SHORERIVERS ADVOCATE

CHESTER | MILES, WYE, & EASTERN BAY CHOPTANK | SASSAFRAS & BAYSIDE CREEKS

FALL 2021

PLANTING SEEDS FOR CLEAN WATER

ShoreRivers Research Shows Planting Cover Crops Early Prevents Nitrogen Loss from Fields

First Seed Turbulator on the Eastern Shore Doubles State's Capacity to Restore Underwater Grass Beds

Planting Seeds for a Restorative Home with *Rebuilding Together*

…and more

DEAR SHORERIVERS MEMBERS AND SUPPORTERS,

With your help, we plant, nurture, cultivate, and advocate today in order to enjoy vibrant rivers and strong communities tomorrow. By planting tree saplings and oyster spat, nurturing future environmental stewards, cultivating new approaches for cleaning our rivers, and advocating for strong policies at every level, together we are sowing seeds of change.

Year after year these efforts have grown in scope and strength and have begun to make a difference.

The more trees and oysters we plant, the more innovative agricultural projects we bring to our region, the more students we inspire and teachers we empower, the more pro-environmental policies we help get passed, the more people we engage and uplift through our work—the cleaner our rivers will become.

On page 8, read about volunteers building reef ball habitats for oyster spat. On page 10, learn how planting cover crop seeds early prevents nitrogen loss from fields. On page 5, discover how we nurture our children's curiosity through professional development classes for teachers. On page 11, learn how ShoreRivers board members are participating in nutrient and carbon trading programs. And on page 7, see how our advocacy in the Choptank, through an innovative collaboration, influences state-wide policy.

As Ken and Sue say on the following page, this work requires collective action: "a collective mass with power, knowledge, and leverage." Working together with our communities, building our programs, strengthening our organizational voice and influence—through all of this work we are creating positive change.

Come plant a seed with us!

Isabel C. J. Hardesty
Executive Director

Photo by Dave Harp
All photos are by ShoreRivers staff unless otherwise noted.
Cover photo: ShoreRivers staff plant trees on public property for the Natural Lands Project.
Cover photo by Pamela Cowart-Rickman

My wife and I joined because we wanted to enjoy the water. We wanted clean water and the river needed help. As individuals, we planted trees to stop erosion, but we realized that individual actions—while important—are not enough. Cleaning up air and water requires collective action, a collective mass with power, knowledge, and leverage. We know that contributions of time and money to ShoreRivers are multiplied many times. ShoreRivers has people with the knowledge and skill to make a meaningful difference.

Ken and Sue Shumaker, Sassafras River

YOUR MEMBERSHIP
makes a difference **for YOUR river.**

JOIN or RENEW

your membership with a gift at
shorerivers.org/donate

Our gift was inspired by your action-oriented mission! I grew up on the Miles River and moved back 20-some years ago with my husband and our two daughters. I love all wildlife and it makes me truly sad to see what is becoming of our natural habitat. ShoreRivers has been making a huge difference locally with a powerhouse board, a top-notch staff, inclusive educational programs, creative friend-raising events, and a steadfast focus on the mission statement. We are thrilled to support ShoreRivers!

Georgeanne and Peter Pinkard, Miles River

PLANTING SEEDS FOR A RESTORATIVE HOME WITH *REBUILDING TOGETHER*

Darran White Tilghman

By Darran White Tilghman, Director of Community Engagement

Restoration, in the environmental sphere, refers to projects that help restore a system's natural resilience. ShoreRivers is grateful for a new partnership that is truly restorative for both people and place.

Rebuilding Together Kent County brings neighbors together to improve homes and lives. Part of a movement to end substandard housing in our communities, the volunteers of *Rebuilding Together* bring home repairs and upgrades to vulnerable seniors, those living with disabilities, and families with limited resources. These services are provided at no cost.

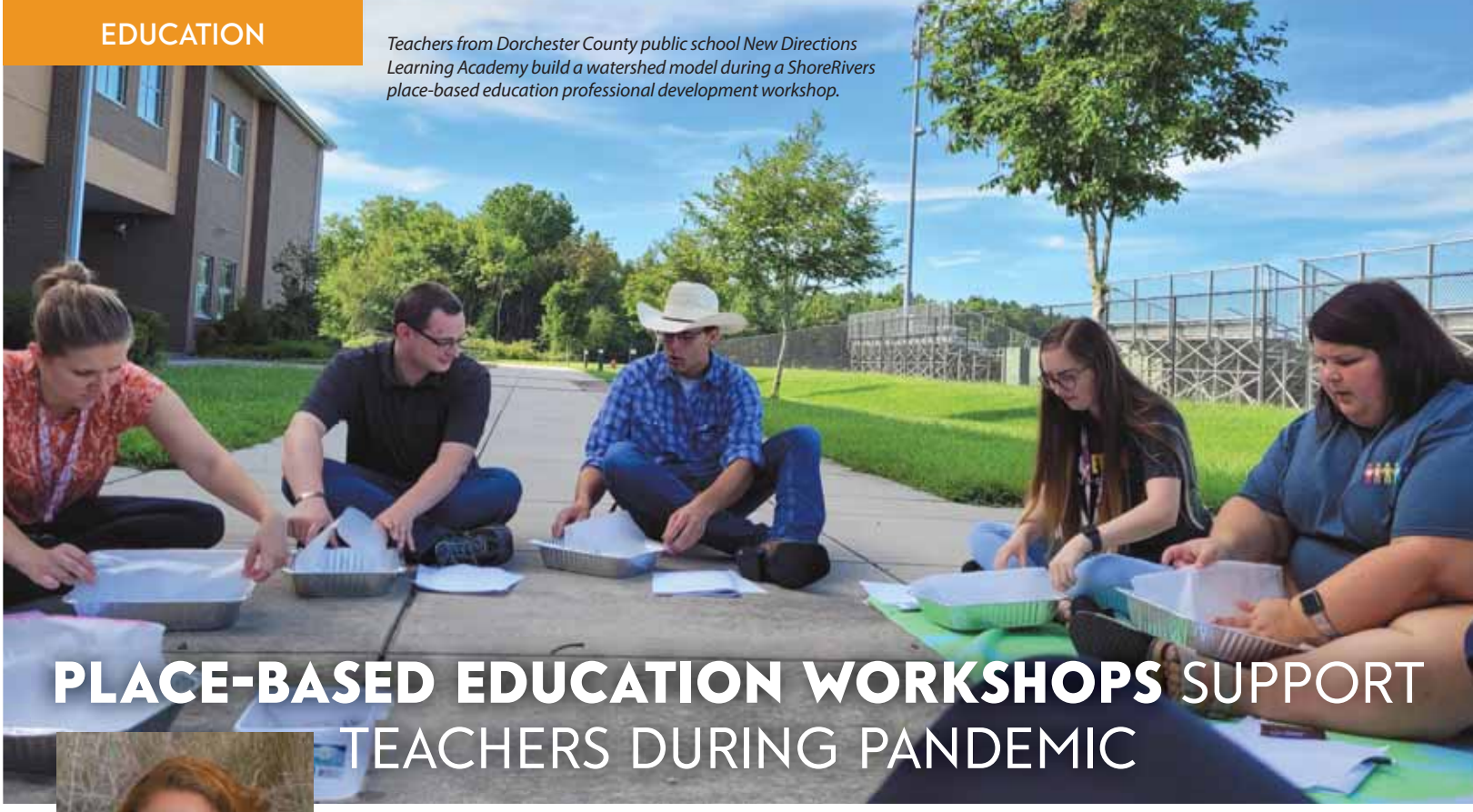
ShoreRivers joined National Rebuilding Day this year to bring a River-Friendly Yard to a home in Butlertown, a Kent County community of about 500 residents. The homeowner, a single parent of two, reported that she couldn't believe it when volunteers knocked on her door to offer help with her home maintenance, including a mold problem.

Rebuilding Together Kent County used grant funds to contract professional mold remediation. Our Sassafras Riverkeeper (and passionate native plant enthusiast) Zack Kelleher collaborated with the homeowner to create a beautiful, simple planting plan. The native plants and shrubs they selected will help absorb standing water that had previously contributed to the mold problem, create habitat for birds and pollinators, and add the homeowner's favorite colors, blue and purple, to her backyard view.

Vic Pfeiffer, a ShoreRivers Advisory Board member and president of the board of *Rebuilding Together*, says, "National data show that physical and mental health can be significantly impacted by one's physical surroundings—both for safety reasons and for one's sense of well-being that results from living in a fully functioning and attractive house."

Pfeiffer sees the connection between ShoreRivers and *Rebuilding Together* and the potential of a partnership that cares for the livable future of our shared communities and landscapes.

(Top) ShoreRivers and Rebuilding Together *volunteers joined forces to install (bottom) river-friendly landscaping for a local homeowner.*



Teachers from Dorchester County public school New Directions Learning Academy build a watershed model during a ShoreRivers place-based education professional development workshop.

PLACE-BASED EDUCATION WORKSHOPS SUPPORT TEACHERS DURING PANDEMIC

Suzanne Sullivan

By Suzanne Sullivan, Director of Education

Learning about the anatomy of an oyster on a PowerPoint presentation admittedly sounds, well, boring.

But armed with gloves and a shucking knife, dissecting an oyster to discover its gills, stomach, and maybe a pearl—now that is an authentic Chesapeake experience!

Combine that experience with activities like creating your own oyster aquaculture brand, modeling different historic harvesting methods, and designing a mechanism to filter water just like an oyster, and you have a perfect example of the place-based, immersive, interdisciplinary curriculum that ShoreRivers brings into our public schools.

Whether it is on school grounds or a field trip, place-based education emphasizes "learning by doing" and incorporates local culture, heritage, nature, and authentic experiences so students make personal connections to learning. Place-based education develops students' individual interests in language arts, mathematics, social studies, and science as it makes these subjects relevant to their daily lives.

This summer ShoreRivers hosted four teacher professional development workshops to support teachers as they grappled with challenges posed by the pandemic. During quarantine, teachers had to engage students through a screen and, even when schools were back in person, restrictions on leaving campuses prohibited field trip experiences. Teacher workshops involved a mix of virtual and in-person learning to showcase how place-based pedagogy can be used in both scenarios.

During virtual workshops, teachers explored locations across the globe using Google Earth's tool, Voyager. Voyager utilizes data provided by Google's street view and satellite images to let users explore places all over the world. Teachers virtually visited Tangier Island to learn about sea level rise and visited the Galapagos Islands to learn about evolution. As one elementary school teacher explained, "It's nice to have the ability to provide exposure to new places that are otherwise unfeasible for students to visit."

During in-person workshops, ShoreRivers modeled how to use school grounds for learning. In a sample math lesson, ShoreRivers taught teachers how to look upside down between their legs at tree tops and use distance and angles to measure tree height. **A participating teacher relates, "When I first heard we would be doing trigonometry outside, I shuddered! But now I can say that it was fun and I know students will enjoy it too."**

The Chesapeake Bay, our local rivers, and natural resources present the perfect platform for teachers to incorporate many subjects into their lessons. History, social studies, art, English writing, and science take on a life of their own for students through the lens of the Chesapeake. These workshops were funded by Chesapeake Bay Trust and Maryland Department of Natural Resources and included content from the American Geosciences Institute.

NEW VOLUNTEER GROUP MAINTAINS TREE CANOPY FOR **HEALTHIER URBAN COMMUNITIES**

Annie Richards

(Left) Congregation members plant trees at St. Luke United Methodist Church in Cambridge. (Right) ShoreRivers staff and volunteers plant trees and shrubs in the Prospect Bay community in Grasonville to mitigate stormwater flooding. This year, 30 ShoreRivers Tree Stewards will be certified to care for tree plantings in urban areas like these. Tree Steward volunteers will work to maintain plantings and ensure trees stay healthy.

By Annie Richards, Chester Riverkeeper

Planting a tree is an investment for the future—an investment in our communities, in healthy lands, and in cleaner water on the Eastern Shore. ***This fall, ShoreRivers will establish a brand new volunteer group to plant and maintain tree canopies in every watershed we serve: ShoreRivers Tree Stewards.***

Well-established tree canopies are essential in urban and suburban areas, where they slow stormwater, filter nutrient and sediment pollution, provide habitat for birds and insects, beautify towns, elevate property values, and mitigate the extreme heat produced by large expanses of impervious surface (the "island effect"). Additionally, for many of our communities on the Eastern Shore that are low-lying and vulnerable to extreme weather events and climate change impacts, planting trees can be an effective, low-cost solution. **Trees are a critical component of our strategy to achieve healthier rivers and communities.**

However, maintaining green infrastructure like urban tree canopy is one of the most significant long-term challenges to stormwater management, because many small municipalities do not have sufficient funds or expertise for the job. To remedy this roadblock, ShoreRivers and environmental policy partners supported legislation in the 2021 Maryland legislative session to increase funding for tree canopy maintenance. As a result, partners including the Alliance for the Chesapeake Bay and the Maryland Forest Service developed the *Chesapeake Tree Stewards* program to enhance tree canopy coverage in our urban and suburban environments by training and supporting community volunteers in proper tree planting and tree care practices.

ShoreRivers is the first partner to establish a local chapter of Tree Stewards on the Eastern Shore. The program offers a four-session online training and an in-person tree planting and care demonstration. Once certified, ShoreRivers Tree Stewards will have developed skills to work with neighbors, organizations, and local public agencies within their own communities to organize tree planting projects, assess new planting sites, care for existing tree canopy, and access a variety of technical and financial resources to support their endeavors. **Approximately 30 ShoreRivers Tree Stewards will be certified by October of this year, establishing a new volunteer group operating throughout our watersheds for healthier tree canopies.**

ShoreRivers prides itself on activating our community in the important work of clean water. We believe the most successful tree plantings are community based and community led. To become a ShoreRivers Tree Steward, contact Community Engagement Coordinator Amy Narimatsu at anarimatsu@shorerivers.org.

Participating farmer Fred Pomeroy tried for three years to install a combination wetland and field buffer project on his farm. He shares, "*Envision the Choptank's* supplemental financing made the difference. The project is now complete and represents an environmental and aesthetic improvement to my family farm."

INSTALLING **BEST PRACTICES**, PLANTING SEEDS, AND INFLUENCING POLICY

Matt Pluta

A tree buffer planted between an agricultural field and a roadside ditch slows and filters rain water before it washes into the river.

By Matt Pluta, Choptank Riverkeeper and Director of Riverkeeper Programs

ShoreRivers is an active partner in the *Envision the Choptank* collaborative, working with farmers to install grass and forest buffers, wetlands, and bioreactors. These best management practices improve water quality while addressing on-field resource concerns. To date, the collaborative has planted hundreds of thousands of seeds on farms across the Choptank watershed—and has also planted the seeds of agricultural policy change in the State of Maryland.

Over 60% of the Choptank's nearly 1,000-square mile watershed is in row crop agriculture. It is imperative that we work with local farmers to improve the health of the Choptank River. And in the face of the global climate crisis, the need to address agricultural nutrient and sediment pollution is even more urgent. Climate and water quality scientists predict a 22% increase in nitrogen loading to the Choptank River by 2100 as a result of more frequent and intense storms and a longer growing season (and therefore the need to apply fertilizer more often).

Since 2019, the* Envision the Choptank *collaborative, with funding from the National Fish and Wildlife Foundation, has worked with farmers and landowners to install 51 acres of grass buffers, 20 acres of forest buffers, and seven acres of wetlands.

Together, these projects prevent 7,850 pounds of nitrogen, 155 pounds of phosphorus, and 117 tons of sediment from reaching the Choptank every year. This represents only 34% of the collaborative's goal; we have so much more to do!

***Envision the Choptank* has also helped spur the development of new State agricultural policies and programs.** Earlier this year, the Maryland Department of Agriculture piloted a grass buffer incentive program that was in part modeled on the program *Envision* developed. The collaborative is also working with Caroline County Soil Conservation District to pilot a tax ditch program in which farmers and landowners are provided funds to maintain drainage ditches in exchange for installing clean water practices on adjacent farmland.

Volunteers watch a tree planting demonstration as part of Envision the Choptank *restoration work.*

Programs like these—developed in partnership with clean water advocates and the agricultural community—demonstrate the power of working toward our shared goals of healthy rivers and sustainable, productive farms. Together, the millions of seeds we plant will grow into tall forests, lush wetlands, and native grasslands that will filter water, prevent erosion, protect shorelines, provide habitat, and ultimately result in healthier rivers and lands protected from climate change.

PLANTING OYSTER SEEDS TO IMPROVE WATER QUALITY

Elle Bassett

By Elle Bassett,
Miles-Wye Riverkeeper

Oysters are essential to the health of our waterways—they filter water of excess nutrients and sediments and provide habitat for fish and crabs. **ShoreRivers works through policy, restoration, and outreach to improve local oyster populations.**

Through the **Marylanders Grow Oysters** program, local volunteers grow oysters off their docks to be planted on protected reefs. This program is run by a collaboration of the Maryland Department of Natural Resources, University of Maryland Center for Environmental Science's Horn Point Lab, and the Oyster Recovery Partnership. It engages hundreds of volunteers and partner organizations like ShoreRivers throughout the state.

This summer, ShoreRivers volunteers built 68 oyster cages IN ONE DAY to replace broken ones. This winter, 230 ShoreRivers volunteers will care for 225,000 baby oysters in 900 cages. Next spring, we will plant these oysters on sanctuary reefs in the Choptank, Miles, Wye, and Chester Rivers.

This is a free, easy program—just imagine how many oysters we could grow if every dock in the Mid and Upper Shore had oyster cages. Don't own a dock? We'll work with you to start an oyster growing program at a local community dock, public bulkhead, restaurant, or marina!

Volunteers built 48 concrete oyster reef balls that will be placed in oyster sanctuaries to improve habitat.

In partnership with the Coastal Conservation Association of Maryland, ShoreRivers hosted multiple events to build oyster reef balls as part of the **Living Reef Action Campaign**. Reef balls are hollow concrete structures pocketed with holes that provide essential habitat for oysters and other creatures. Together, staff and volunteers built a total of 48 reef balls, which will be placed in oyster sanctuaries.

This was an exciting year for oyster restoration in Eastern Bay, which was chosen for a project by the **Supporting Oyster Aquaculture and Restoration Initiative**, organized by The Nature Conservancy, Pew Charitable Trusts, and an anonymous donor.

After the pandemic left many oyster aquaculture farmers in distress, this initiative bought large oysters from farms and planted them on restoration reefs. In winter 2020, five local aquaculturists raised more than 200 bushels to plant in Prospect Bay, giving a much needed boost to our local water quality and economy.

There is no doubt oysters provide immense benefits to our waterways and our economy. We are dedicated to protecting and restoring oyster populations through restoration, advocacy, and education. Join us in these efforts and volunteer!

Contact me at ebassett@shorerivers.org to learn more about these programs.

Harvesting (photo by Erin Stubbs),

transporting,

ripening,

turbulating,

displaying the final product.

FIRST SEED TURBULATOR ON THE EASTERN SHORE **DOUBLES** STATE'S CAPACITY TO RESTORE UNDERWATER GRASS BEDS

Zack Kelleher

By Zack Kelleher, Sassafras Riverkeeper

This summer, ShoreRivers piloted a program to collect submerged aquatic vegetation (SAV) seeds for use in the Bay-wide effort to increase underwater grass beds. Restoring SAV is a four-step process: 1) monitor existing beds to understand species diversity and geographic location, 2) harvest seeds using hand rakes, 3) turbulate harvested material to refine the seeds, and 4) plant seeds in new bed locations.

The turbulation stage of this process requires specialized equipment: **a turbulator is a large agitator device which mimics the wind and wave action that naturally separates seeds in our waterways.** Instead of taking several weeks or months, this technology allows us to replicate the natural process in a matter of days. Through a grant from Chesapeake Bay Trust and partnerships with Anne Arundel Community College, Maryland Department of Natural Resources, and Washington College's Center for Environment and Society, **we constructed the first ever turbulator on the Eastern Shore—only the second in the state—effectively doubling Maryland's capacity to restore these critical Bay species.**

THE RESTORATION PROCESS

Throughout the spring and summer, ShoreRivers staff and SAV Watcher volunteers harvest SAV seeds from our waterways. We transport harvested material to Washington College's Semans-Griswold Environmental Hall on the banks of the Chester River, where it sits submerged in open tubs to ripen and decompose.

The turbulator is a large tub of water into which we insert a series of tubes and nozzles to generate air currents that shake the seeds loose from the rest of the plant material. Volunteers work several bushels of raw plant material through the turbulator over the course of several minutes, collect the separated seeds using mesh bags, and then push the seeds through layers of mesh screens to remove as much detritus as possible. The result is pure seed material, which we then refrigerate and aerate in a saline solution until planting time in the fall and spring.

By the end of the year, we will have processed five species of underwater grasses: horned pondweed (*Zannichellia palustris*), redhead grass (*Potamogeton perfoliatus*), widgeon grass (*Ruppia cirrhosa*), sago pondweed (*Stuckenia pectinata*), and wild celery (*Vallisneria americana*). For each species we have produced anywhere from a few hundred thousand to several million seeds.

Next spring we will plant these seeds in the Sassafras, Chester, Miles, Wye, and Choptank Rivers, creating a total of 60 acres of new underwater grass beds.

Underwater grasses are vital to the health of our rivers and the Chesapeake Bay. They provide habitat for fish and crabs, oxygenate the water, filter sediment, absorb nutrients, sequester carbon, and aid in shoreline resilience. This program will significantly increase the quantity of underwater grasses that we are able to harvest, process, and replant in our Eastern Shore rivers every year.

Sign up to be an SAV Watcher at shorerivers.org/volunteer and get in on the action!

Adjacent stands of mixed species cover crops show why planting earlier makes a difference: the crops on the right were planted earlier and had more time to grow and absorb excess nutrients from the soil, resulting in the darker green color. Photo credit: University of Maryland

SHORERIVERS RESEARCH SHOWS PLANTING COVER CROPS EARLY PREVENTS NITROGEN LOSS

Timothy Rosen

By: Timothy Rosen, Director of Agriculture & Restoration

Cover crops are one of the most ubiquitous and cost-effective conservation practices employed around the Chesapeake Bay to reduce agricultural pollution. Cover crops are crops planted in the fall to cover the soil through the winter and prevent nutrient and sediment loss to surrounding waterways.

Much of the foundational research on the impacts of cover crops on nutrient loss occurred in the early 1990s at the Wye Research & Education Center right here on the Eastern Shore. This initial research led Maryland to invest heavily in cover crop incentives. The program now has an annual budget of more than $20 million and is one of the most highly regarded conservation programs in North America.

Four years ago, ShoreRivers embarked on a research project to discover what aspects of cover cropping could be adjusted to maximize water quality benefits. With funding from a generous donor, we partnered with the University of Maryland, Washington College, and local farmers to implement a variety of cover-cropping methods and monitor their effects on nutrient levels in the soil and groundwater.

Traditional cover-cropping methods call for planting a single species of cover crop after the fall harvest and killing the crop in early spring before planting. Over the past four years, we have studied the effects of changing these traditional methods in three ways:

COVER CROP VARIABLE #1: Planting cover crop seeds earlier, in August through mid-September, into standing summer grain using aerial seeding (by plane) or drilling technology.

> **Hypothesis:** More warm-weather growing days mean cover crops will have more time to absorb leftover nutrients from the soil, thereby reducing nitrogen loss from the field.

COVER CROP VARIABLE #2: Planting a three-species mix that includes a legume to fix nitrogen, a brassica to scavenge nitrogen deeper in the soil, and a small grain to provide cover.

> **Hypothesis:** Planting a variety of cover crop species will reduce nitrogen loss from the field.

COVER CROP VARIABLE #3: Killing the cover crop later, right before summer planting, or planting the summer grain into the standing cover crop (called "planting green").

> **Hypothesis:** Killing cover crops later will provide more growing days for crops to absorb nutrients and therefore reduce nitrogen loss from the field.

Initial analysis of our data suggests that planting cover crops earlier (variable #1), in August through mid-September, provides the greatest in-field nitrogen retention and therefore the greatest benefit to water quality of the three variables studied. **Specifically, increased cover crop biomass accumulated during the late summer and early fall correlates to lower nitrogen loss from the field.**

We observed this result regardless of the cover crop species (variable #2) or planting method used. Killing the cover crop later in the spring (variable #3) did not result in lower nitrogen loss, because by early spring the cover crop has completed its job of nitrogen uptake. **These findings highlight that for the best water quality benefits, cover crops need to be planted before mid-September.**

University of Maryland Ph.D. candidate Nathan Sedghi is analyzing the past four years of data from this research. His Ph.D. thesis presenting our findings will be published in spring 2022 and shared with farmers across the region.

Armed with data on specific cover crop practices that maximize water quality benefits, ShoreRivers will work with farmers, agribusinesses, and ag agencies to discover barriers to implementation and adjust our policies to incentivize these practices and achieve cleaner water.

University of Maryland students install a lysimeter to monitor nitrogen levels in groundwater. Photo credit: University of Maryland

ShoreRivers Board Members Conduct Pollution Trades for Cleaner Water and Reduced Emissions

Photo credit: Tim Trumbauer

ShoreRivers governing board members Trey Hill and Scott Budden are participating in the fledgling markets of carbon and nutrient trading—a strategy using the power of the marketplace to reduce pollution. Hill, owner and operator of Harborview Farms and a leader in innovative agricultural practices, is partnering with a middleman company that connects businesses and farmers to pay for carbon reduction offsets. Budden, owner and founder of Orchard Point Oyster Company (pictured above), recently completed one of the first oyster nutrient trades in Maryland.

Carbon and nutrient trading occurs when an entity purchases credits to offset their pollution. These credits represent pollution reduced on the ground, often from the agricultural realm where projects are more cost-efficient. Trading is a strategy that could help meet EPA-mandated pollution reduction goals for the Chesapeake Bay.

Hill uses the carbon absorbed by his farm to offset an industrial source of carbon emissions and thus reduce overall greenhouse gases. Budden uses the nutrients filtered out of the water by his oysters to offset nutrient pollution from another source. In Maryland, nutrient trading must occur in the same designated geographic region and must achieve measurable improvements in water quality.

"Once nutrients are in the water, oysters are one of the most cost-effective means of reduction," says Budden. "Nutrient trading through oysters is a way to compensate growers for the water quality improvements they provide to the public."

ShoreRivers has been working for a cleaner Bay for decades, and much of the simple, cost-effective projects have been completed. Each additional pound is increasingly more difficult to reduce. Innovative practices like these will help us continue to measurably reduce pollution.

HARBORVIEW FARMS

ORCHARD POINT OYSTER CO.

SHORE RIVERS

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SAVE THE DATE

FRIDAY, NOVEMBER 19, 2021