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NEWSLETTER OF THE PARTNERSHIP FOR THE DELAWARE ESTUARY – HOST OF THE DELAWARE ESTUARY PROGRAM

ESTUARY NEWS



Building Stronger and More Impactful Relationships with Urban Waters Communities

I hope that this issue of Estuary News finds you doing well and enjoying the summer of 2022. It has been a busy few months for the Partnership for the Delaware Estuary, filled with lots of research and restoration work out in the field. We've been getting back into the swing of in-person engagement events across our region. It has been great to see old friends and meet new people who are involved in helping keep our waters clean, our habitats healthy, and our communities strong in the Delaware Estuary.

Speaking of strong communities, throughout this newsletter there are stories about important work taking place in the four cities that are part of the Urban Waters Federal Partnership location for the Delaware River (See page 9). Our location includes Camden, New Jersey, Philadelphia, Chester, Pennsylvania, and Wilmington, Delaware, and is one of 20 in the United States working to reconnect urban communities with their waterways, particularly those that are overburdened or economically distressed. This program helps to improve coordination among federal agencies and facilitates collaboration with community-led revitalization efforts to improve our nation's water systems and promote their economic, environmental, and social benefits.

As we build stronger and more impactful relationships with these communities, we are partnering with them to support projects they identify. We have been able to provide some financial and technical support for these projects and will soon expand these opportunities with funding from the Bipartisan Infrastructure Legislation (BIL). Through the BIL, each of the 28 National Estuary Programs will receive \$909,800 a year for the next five years. One of the core priorities of this funding is to accelerate environmental and community restoration goals within the Delaware Estuary Program's Comprehensive Conservation and Management Plan (CCMP). This funding falls under the Justice40 Initiative, a national program, which has a target of ensuring that at least 40 percent of the benefits from federal funding flow to disadvantaged communities.

We are very excited to have the opportunity to expand our work to implement the CCMP beginning in 2023 and will be sure to keep you updated on our progress.

Best wishes,

KATHY KLEIN, Executive Director, Partnership for the Delaware Estuary

COMMITTEES CONTACT LIST

Meetings conducted by the Delaware Estuary Program's implementation and advisory committees occur on a regular basis and are open to the public. For meeting dates and times, please contact the individuals listed below:

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ON THE COVER

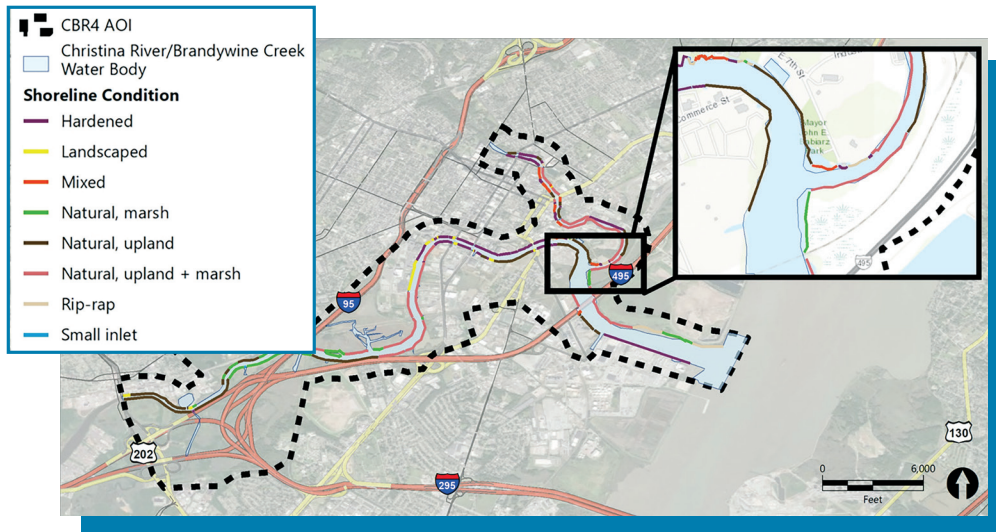
The tidewater mucket is an example of the 13 native mussel species in the Delaware River Basin. It is uniquely adapted for tidal freshwater systems that abound in the watershed. PDE's Mussels for Clean Water Initiative aims to create more mussels, like the tidewater mucket, for the purpose of making the Delaware River Watershed cleaner.

FOLLOW US ON:



CBR4 FOCUSES ON Urban Rivers

By Jennifer Adkins, Executive Director, Delaware Nature Society



The CBR4 area is about 4,000 acres from northeast Wilmington, Delaware, to the Russell W. Peterson Wildlife Refuge and a wetland complex under the Interstate-95/495 exchange outside the city.

Decades of industrial pollution in and around Wilmington's rivers and creeks left a legacy of chemicals in soils and water. Many years later, through cleanup and development, the area around the Wilmington Riverfront has come back to life with places to live, work, shop, and dine. But what about the water itself? What would it take to bring the Christina and Brandywine rivers (or creek) back to life with more fish and wildlife, swimming, and recreation?

Breathing life back into these waters is the aim of CBR4, the Christina and Brandywine Rivers Remediation, Restoration and Resilience project. This is no small feat, given the extent of pollution, the limited remaining natural areas and restoration opportunities, and the complexity and costs involved.

For the communities living along the rivers and the millions more who visit and rely on clean water from these waterways, the work is imperative. Fortunately, with cleanup of the land advancing, water quality improving, and new technologies for remediation and restoration developing, what CBR4 envisions is possible.

In 2020, a group of people from different environmental organizations and agencies devised a way to turn the CBR4 concept into a plan with two linked efforts. One effort was a feasibility assessment for remediating contamination from the rivers with support from the Delaware Department of Natural Resources and Environmental Control (DNREC). The second effort involved restoration planning for the Christina and Brandywine area with support from a National Fish and Wildlife Foundation grant. The group secured funding and formed a project team that originally included American Rivers, Brightfields, Inc., a private environmental consulting group based in Wilmington; the Christina Conservancy, DNREC, Delaware Nature Society, Partnership for the Delaware Estuary, and Sarver Ecological. The original group has since added members such as the planning and engineering firm RK&K.



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Partners Introduce Innovative Trash-Capture Devices to Accelerate a Cleaner Delaware River Watershed

By Hannah Sanders, Life Scientist, EPA Mid-Atlantic Region

It looks like a floating trash can, acts like a vacuum cleaner for the water and, since May, has removed thousands of pieces of trash and microplastics from the Delaware and Schuylkill rivers. What is this amazing device? It's called a Seabin™ and in June, staff from PDE, members of EPA Mid-Atlantic, and other officials gathered in Philadelphia to catch a demonstration of the gadget's abilities.

The U.S. Environmental Protection Agency (EPA), Partnership for the Delaware Estuary (PDE), and an Australian tech start-up company, Seabin Project, have partnered to launch a project studying the effectiveness of a network of floating trash-capture devices in the Delaware River watershed.

The project involves a six-month field pilot study in which Seabin Project's self-titled trash-capture devices, Seabins™, are deployed at multiple locations in the watershed. The devices are currently deployed on docks at the Pier 3 Marina on the Delaware River in Center City Philadelphia and at Bartram's Garden on the Schuylkill River in Southwest Philadelphia.

"Partnerships like this lead to innovation and accelerate progress," said Adam Ortiz, EPA Mid-Atlantic Regional Administrator. "We all hate seeing trash floating in our waters, and this device is part of the solution. Not only is it pretty cool to watch, but the monitoring and maintenance of the devices can create jobs in public works and sciences."

Seabins™ work by filtering surface water to capture floating debris, including microplastics, which can measure down to two millimeters in size. Microplastics are a growing concern in terms of water pollution. It comes from a variety of sources, including larger plastic debris that breaks apart into small, and sometimes tiny, pieces. Fish and other aquatic life often mistake microplastics for food and eat them.

From May to July, the three devices at Pier 3 Marina captured more than 2,500 pounds of marine litter. Among that debris were 139,310 pieces of plastic. Of that, 108,333 pieces were microplastics. Devices have been in the water, running 24 hours a day, seven days a week, since May 3.

Data collection involves regular characterization of the debris captured by each Seabin™. Every day, Seabin environmental technicians weigh the debris each device captures. Seabin and EPA staff then sort and categorize the collected trash.

Macro debris (trash that is larger than five millimeters in any dimension) goes into groups that include food packaging, tobacco products, balloons, plastic bags, and foam.

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From the top to bottom, a member of Seabin fishes out a device from the Delaware River in Philadelphia during a demonstration in June. From left, Elizabeth Horsey, PDE Development Director, Megan Mackey, National Estuary Program Team Leader for EPA Region 3, and a member of Seabin, sift through trash that the device collected in the water.

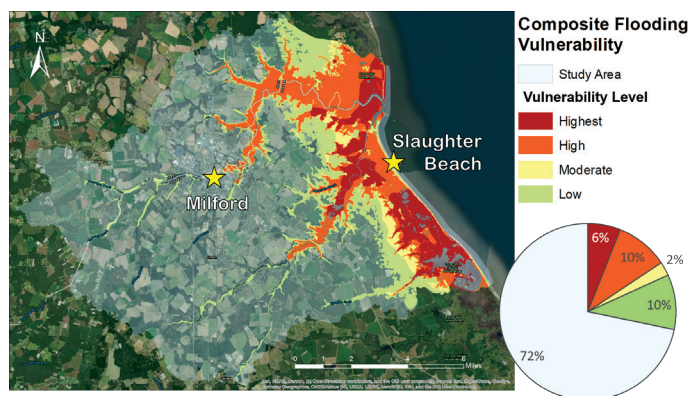
Study is Tool for Showing Flooding-Prone Areas Along the Delaware Bayshore

By Ella Rothermel, PDE's Data Management Coordinator

Anyone who has spent time in southern Delaware, along the Delaware Bayshore, knows that the area is full of options when it comes to enjoying outdoor activities. In addition to the scenic hiking, biking, walking, and relaxation opportunities found at parks and beaches, the Delaware Bayshore includes large tracts of protected land and one of the most productive horseshoe crab spawning areas in the world. Communities in this region therefore benefit not only from the ecosystem services provided by local habitats, but also from their ecotourism benefits that could be worth millions of dollars according to a recent regional economic study from the University of Maryland.

Unfortunately, many resources and communities along the Delaware Bayshore are currently vulnerable to flooding and may experience an even higher risk of inundation and damage in the future due to climate change. In order to help area stakeholders and community members better understand the interactive factors that may threaten their natural assets, PDE recently completed a vulnerability assessment of the Mispillion and Cedar Creek watersheds (which include such municipalities as Milford, Lincoln, and Slaughter Beach). For this study, PDE used flood maps from the Federal Emergency Management Agency (FEMA) to represent current flooding risk, while the Delaware-specific coastal inundation map at 1-foot and 2-foot increments was chosen to approximate future flooding risk. Current and future flooding risk designations were combined to create a composite measure of flooding vulnerability consisting of five categories: Highest, High, Moderate, Low, and Lowest.

Although more than half of the study area was found to have no risk of current or future flooding, areas with higher vulnerability were concentrated



along the coast and near the essential communities of Slaughter Beach and Milford. PDE compiled lists of the most vulnerable assets in these regions, which included the Mispillion Riverwalk and the Prime Hook National Wildlife Refuge in the Milford and Slaughter Beach area.

A full report summary and key takeaways of the assessment have been submitted to funders, however, the true value of the vulnerability assessment lies in its capacity as an adaptable, interactive tool. The mapping tool allows managers and stakeholders to visualize data in different ways to answer their own need-based questions. Users can filter or search for desired combinations of land use, social factors, and flooding risk across the study area. This tool, which can be updated as new data become available, will help with site investment prioritization and aid in the eventual creation of a large-scale management plan and investment strategy for the Delaware Bayshore's natural resources.💧

STRONG COMMUNITIES • GOAL C1.2

MuCWI:

Helping Unsung Aquatic Heroes to Promote Cleaner Water

By Danielle Kreeger, Ph.D., PDE's Senior Science Director

FRESHWATER MUSSELS ARE LIKE RODNEY DANGERFIELD – THEY “DON’T GET NO RESPECT.”

Much like the Delaware Estuary as a whole, which is only starting to be nationally appreciated for its ecological treasures, freshwater mussels have always been unsung heroes of the aquatic world. But a closer look opens a world of fun facts. Not only can mussels live up to 100 years, their life cycle is nothing short of fantastical.

But what’s especially cool about mussels is, they are truly “blue collar bivalves.” They are molluscs that work hard every day, 365 days a year filtering water by constantly feeding from the complex soup of microscopic particles suspended in natural water. Mussels draw particle-laden water into hairlike cilia on their gills. The particles get trapped in mucus on the gills, and the cleaner water then

passes from the other side of the gills and back out of the mussel. Up to 10 gallons of water need to be filtered per day by each mussel for its nourishment. An acre-sized bed of healthy mussels can contain 50,000 animals, resulting in millions of gallons of water filtered per acre every day.

This water filtration can have sizable benefits for both people and the ecosystem in places where mussels are abundant. Mussel beds decrease the cloudiness of water, which provides more light for plants on the bottom. Since many of the filtered particles are pollutants, such as nutrients and pathogens, mussels can help remove and transform them into forms that are less problematic. If a single-acre bed of mussels can help clean millions of gallons of water per day, what impact could millions of mussels have for cleaner water? Unfortunately, the potential to answer that question is not yet known because there simply aren’t enough mussels to fully perform large-scale studies.

This is why Partnership for the Delaware Estuary (PDE)



Matt Gentry, PDE's Shellfish Coordinator, with mussel baskets at one of PDE's many monitoring locations where staff tests how well mussels can thrive at different sites.

is working to build the first mussel hatchery in the world that has cleaner water as its foremost goal. By producing up to 500,000 common and rare species of freshwater mussels per year, PDE aims to alleviate the mussel supply bottleneck for restoration, enhancement, research and engagement programs in the upper mid-Atlantic region, with a particular focus on impaired waterways of the lower Delaware River Basin.

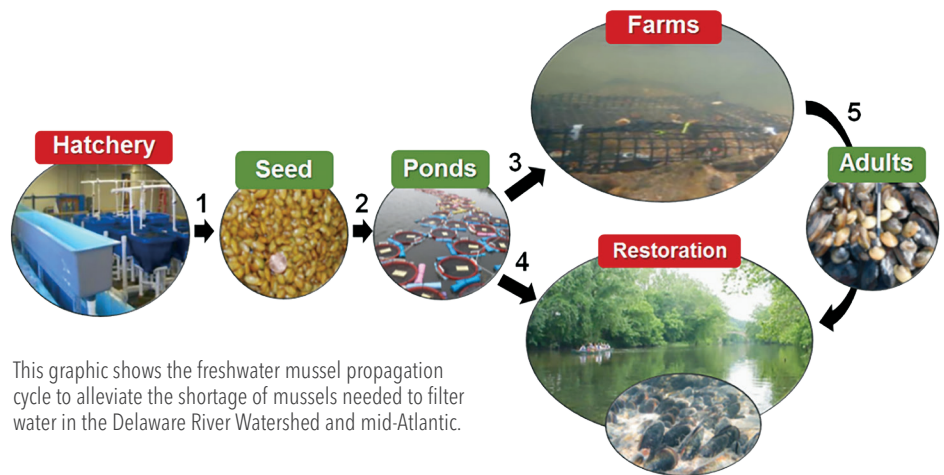
PDE estimates that more than 1 billion mussels would be needed in the Delaware River Basin alone to either restore natural populations in places where they can still survive or to enhance water quality in man-made systems. PDE has already identified many suitable

areas in southeast Pennsylvania and northern Delaware that could easily be stocked with millions of mussels to provide immediate benefits for water quality. Examples include living shoreline projects along the Schuylkill and Delaware rivers and many stormwater ponds in New Castle County, Delaware. Suitable stream locations that have been identified include Chester, Darby, Red Clay, Tacony, and Skippack creeks. As key research and genetic questions are addressed, we can expand to new target areas.

ALLEVIATING THE MUSSEL SUPPLY BOTTLENECK

The hatchery is part of PDE's Mussels for Clean Water Initiative (MuCWI), which launched in 2019. MuCWI also includes a network of regional mussel rearing centers and various pilot projects in natural and man-made streams, rivers, lakes and ponds, including stormwater ponds.

With climate change and continued development, it is vital that we do whatever we can to protect and enhance natural habitats that give back by helping to purify our



This graphic shows the freshwater mussel propagation cycle to alleviate the shortage of mussels needed to filter water in the Delaware River Watershed and mid-Atlantic.

water and air. Although it's a new concept and there are many research questions to still address, MuCWI squarely addresses the main goal of PDE's shellfish strategy by restoring and enhancing shellfish beds, while also "greening up" urban landscapes that have long suffered from inequitable environmental attention and investment. PDE also wants to promote mussel conservation since a majority of the 13 native mussel species found in the Delaware River Watershed are largely gone from most historic streams.

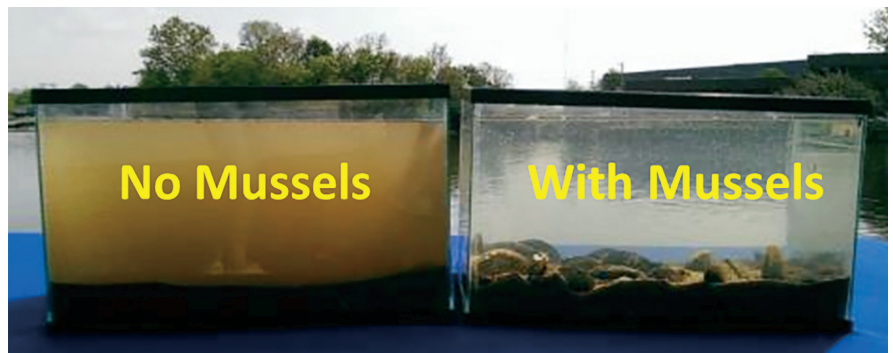
The new mussel hatchery will be built along the lower Schuylkill River in partnership with Bartram's Garden. The network of mussel rearing centers will

initially include a variety of sites in Delaware and Pennsylvania which have already shown to be excellent places where baby mussels can be raised to larger sizes and hardened to field conditions. Key partners on this phase have included the Philadelphia Water Department, Academy of Natural Sciences of Drexel University, Longwood Gardens, and Winterthur Museum, Garden, and Library.

At more than 8,000 square feet, the new hatchery will be more than large enough to meet PDE's production goal. The MuCWI facilities will also complement and potentially help service the needs for mussels along the Atlantic seaboard. Several excellent mussel hatcheries exist elsewhere, but their main



PDE hopes to produce up to 500,000 freshwater mussels per year in a large lab once it's built.



This two-tank demonstration shows the water filtering power of freshwater mussels.



SCHUYLKILL RIVER SOJOURN

Riding the River of Refuge

Above, a kayaker makes a splash on the Schuylkill River during the Schuylkill River Sojourn. Photo by Kara Foran.

By Kara Foran, 2022 Schuylkill Action Network Schuylkill Sojourn Steward

On a sunny Saturday in June, I arrived at the starting point at Schuylkill Haven Island park along with about 120 other people for the Schuylkill River Sojourn. For the next seven days I kayaked down the ever-changing river. I averaged 16 miles a day, rain or shine. I camped along the river each night and celebrated my 30th year around the sun.

The Sojourn was an incredibly unique way to experience the Schuylkill River. I had a welcoming community of fellow Sojourners and a feeling of excitement being on the water. The trip did come with some challenges. I don't think I paddled a total of 25 miles in my entire life until that week. At the end of the trip, I completed 112 miles.

Throughout the week we heard from organizations that advocate for a healthier Schuylkill River Watershed and who work to make it a cleaner place for both people and wildlife. It was humbling to know that just by participating in the Sojourn, I too was playing a small part in that effort. Some Sojourners were first-timers like me. Others had been participating for years. I loved hearing what brought them to this adventure and how they are connected to the Schuylkill River. Some have childhood memories of tubing or exploring the riverfront, and some even got married on the river.

Throughout the journey, I kept this year's Sojourn theme, "River of Refuge" in my mind, as I connected with many new faces, watched the river flow around me, and learned the importance of this waterway. This is a river of refuge for friends to explore, families to enjoy, communities to connect with, and wildlife to depend upon.💧



MORE

Kara Foran is a professional photographer and this year's Schuylkill Action Network Sojourn Steward, as chosen by the Schuylkill Action Network. Foran captured this year's trip through pictures and video.

Above: Kara Foran, left, the 2022 Schuylkill River Sojourner Stewards, celebrates her birthday with another Sojourner during the weeklong kayak trip along the Schuylkill River. Photo by Kara Foran.

STRONG COMMUNITIES • GOAL C2.1

Supporting Communities through Urban Waters Funds

By Erica Rossetti, PDE's Urban Waters Program Coordinator



Cities and developed areas across the United States face similar environmental injustices affecting the health of humans, habitats, and communities: pollution, disconnection from waterways and nature, housing and economic disparities, and the brunt of climate change impacts such as extreme heat and flooding. The Urban Waters Federal Partnership (UWFP) was formed in 2011 to restore and reconnect urban waterways with their communities, specifically historically and economically distressed ones. UWFP has a designated location in the Delaware River Watershed, led by PDE as the ambassador, where partners focus on four cities in the urban corridor of the lower Delaware River:

- Camden, NJ
- Chester, PA
- Philadelphia, PA
- Wilmington, DE

The UWFP Delaware River Location is working to support local community organizations to increase outdoor recreation, green spaces, access, education, and provide economic incentives. Leaders in our urban communities doing this work are eligible for letters of support, resources, and up to \$1,500 in community funds. We must invest in the local voices of the most environmentally disadvantaged urban communities in order to achieve equitable revitalization. Visit www.DelawareEstuary.org/save-the-estuary/urban-waters/ to learn more about these opportunities. 💧

STRONG COMMUNITIES • GOAL C1.3

Partners Introduce Innovative Trash-Capture Devices to Accelerate a Cleaner Delaware River Watershed continued from page 4

Next, the technicians sort a subsample of the captured trash to pick out any “micro” sized trash. Micro sized trash are items smaller than five millimeters and can include pre-production plastic pellets (called nurdles), hard plastic fragments, small pieces of foam, and microfibers found sticking to organic material, such as plant material or tree fragments.

This project supports the partners’ efforts to establish clean water and healthier communities, with a focus on how this issue affects the watershed’s most vulnerable populations.

As the project continues, the partners hope to engage our local communities to educate them about issues of litter and aquatic trash.

There is opportunity for community members and students to get involved in the data collection process. EPA, PDE, and Seabin Project are grateful for any volunteer support from our watershed community.

If you are interested in learning more about this project or would like to get involved, reach out to contact@seabinproject.com. To be a volunteer, contact hayden@seabinproject.com. You can learn more about EPA’s Trash Free Waters program at <https://www.epa.gov/trash-free-waters>. 💧

CLEAN WATERS • GOAL W2.1

Through 2022, CBR4 members will outline their vision and goals with the strategies and projects but needed to achieve them. Work started last year, and the first step was to establish baseline data and mapping for the project area – 4,000 acres along and including the rivers in northeast Wilmington. The acreage extends into eastern Wilmington, around the 7th Street Peninsula, Southbridge, and the Wilmington Riverfront, outside city limits into Banning Park, the Russell W. Peterson Wildlife Refuge, and a wetland complex under the Interstate-95/495 exchange.

Thanks to this baseline, the group knows there are well over 1,000 acres of rare freshwater tidal wetlands in the project area, that 60 percent of shorelines are in a somewhat natural state, and 70 percent of areas within 100 feet of streams are undeveloped. It also identified 700 acres of low-lying nearshore areas that are undeveloped and 1,400 linear feet of streamside areas accessible to the public. Information like this is crucial for assessing river and habitat health and community resilience, and the strategies and projects to improve them.

In the past few months, the group collected input about the area from local communities and cleanup volunteers using a simple survey. Based on responses from 100 people, the top river-oriented activity in which people like to engage is walking and the biggest needs people see for action are chemical and trash abatement and wetlands revitalization. In addition, the group identified and mapped a variety of access types and locations based on what people indicated they wanted to see, such as boating access and walking areas with water views.

The next and final phase, currently underway, is to develop projects that best address the needs and opportunities identified by all data collected so far. These projects, along with updated strategies and goals, will be presented in a stakeholder workshop this December and other meetings for fine-tuning. The result will be a comprehensive vision and plan for Wilmington's rivers, with fundable shovel-ready projects.💧

For more information about CBR4, including links to fact sheets and webinars, visit

www.ChristinaConservancy.org/CBR4 or
<https://dnrec.alpha.delaware.gov/cbr4/>.

HEALTHY HABITATS • GOALS H1.3 // H1.4
STRONG COMMUNITIES GOALS • C1.1 // C1.3 // C1.4

purpose is to save species that are imperiled, and they have limited capacity to support our region's needs.

Hatchery mussels will ultimately end up where they are needed most, provided their ability to survive and grow is favorable, and their genetic makeup is appropriate. PDE's team of scientists, with its expanding list of partners, will be actively engaged with the broader scientific and regulatory community to make thoughtful decisions about what's best for the environment and to conserve and restore freshwater mussels in the places where they can do the most good, both for conservation and water quality goals.

A CAPITAL CAMPAIGN Raising \$3 Million

PDE is optimistic that the MuCWI hatchery and rearing network can be built in time to begin producing mussels in 2025. The initiative has been made possible thanks to a generous \$7.9 million investment from PENNVEST that includes more than \$2 million for hatchery construction. Despite broad support for the innovative concept, rising construction costs hamper the project. A capital campaign is underway to address a more than \$3 million funding shortfall. PDE, however, is confident that it can overcome these headwinds.

Once a sufficient number of mussels is available to perform larger experiments in natural systems – documenting their actual pollutant removal benefits – PDE and partners expect that other watersheds across the United States will begin to follow suit. Scientists in the Chesapeake Bay watershed are already studying the MuCWI concept. Within the next 10 years or so, freshwater mussels might finally get the widespread respect they deserve.💧

FOR MORE INFORMATION ABOUT MUSSELS, HERE ARE A FEW HELPFUL LINKS:

PDE's Freshwater Mussels of the Delaware

Estuary guidebook: <https://s3.amazonaws.com/delawareestuary/pdf/Restoration/Volunteer%20Guidebook.pdf>

Visit: Mightymussel.com

Visit: PDE's website: <https://delawareestuary.org/science-and-research/freshwater-mussels/>

HEALTHY HABITATS • GOAL H3.3 // H3.2
CLEAN WATERS • GOAL W3.2

**SAVE THE DATE!****DELAWARE RIVER FESTIVAL**

Saturday, September 24 • 10 a.m. to 4 p.m.

Penn's Landing, Philadelphia, and Wiggins Park, Camden, New Jersey

Come to Penn's Landing and Wiggins Park this year for a fabulous and FREE in-person festival to celebrate the Delaware River, its history, and all the amazing plants and animals that call it home. We'll have exhibitors, a scavenger hunt, face painting, free ferry access, and so much more. You and your family will love it. Check the Delaware River Festival website for updates at www.delawareriverfest.org.

But wait, there's more! The fun will continue at the Chester River Festival which will run from 11 a.m. to 2 p.m. on Saturday, October 1 at Subaru Park Plaza, Chester, Pennsylvania. There will be food trucks, fun activities, environmental education, and giveaways. It's more FREE family fun as we celebrate the Delaware River.

STRONG COMMUNITIES • C.2.2**SAVE THE DATE!****EXPERIENCE THE ESTUARY**

Thursday, October 13

Vie by Cescaphe, Philadelphia

Join PDE at the 2022 Experience the Estuary Celebration - our annual gala fundraiser! The evening will feature a cocktail hour, open bar, dinner, auction, and the famous 90-minute raw oyster bar featuring local Delaware Bay oysters. Registration begins in mid-August. For more information, visit our website at www.delawareestuary.org/news-and-events/fundraiser/.

**SAVE THE DATE!****10TH BIENNIAL DELAWARE ESTUARY SCIENCE & ENVIRONMENTAL SUMMIT**

January 30 to February 1, 2023

Harrah's Resort, Atlantic City, New Jersey

Save the Date and pack your suitcase, because the Delaware Estuary Science & Environmental Summit heads to Atlantic City next year!

The 2023 biennial Summit resumes its in-person format at a new venue at Harrah's Resort. The location might be new, but we'll still have great speakers, poster sessions, networking opportunities, and social time with fascinating people in the environmental science community. Plus, we're excited to again partner with the Delaware River Basin Commission's Advisory Committee on Climate Change (ACCC) for a one-day Climate Forum as part of the Summit. For all information on the Summit, including session and abstract submissions, visit PDE's website. You can also sign up to be the first to know about registration, abstracts, updates, and more by visiting <https://delawareestuary.org/delaware-estuary-science-and-environmental-summit/>.

STRONG COMMUNITIES • C.2.5



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THE PARTNERSHIP FOR THE DELAWARE ESTUARY

CONNECTING PEOPLE, SCIENCE, AND NATURE FOR A HEALTHY DELAWARE RIVER AND BAY

The Partnership for the Delaware Estuary, Inc. (PDE), is a nonprofit organization established in 1996. PDE is the host of the Delaware Estuary Program and leads science-based and collaborative efforts to improve the tidal Delaware River and Bay, which spans Delaware, New Jersey, and Pennsylvania. To find out how you can become one of our partners, call PDE at (800) 445-4935 or visit our website at www.DelawareEstuary.org.

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