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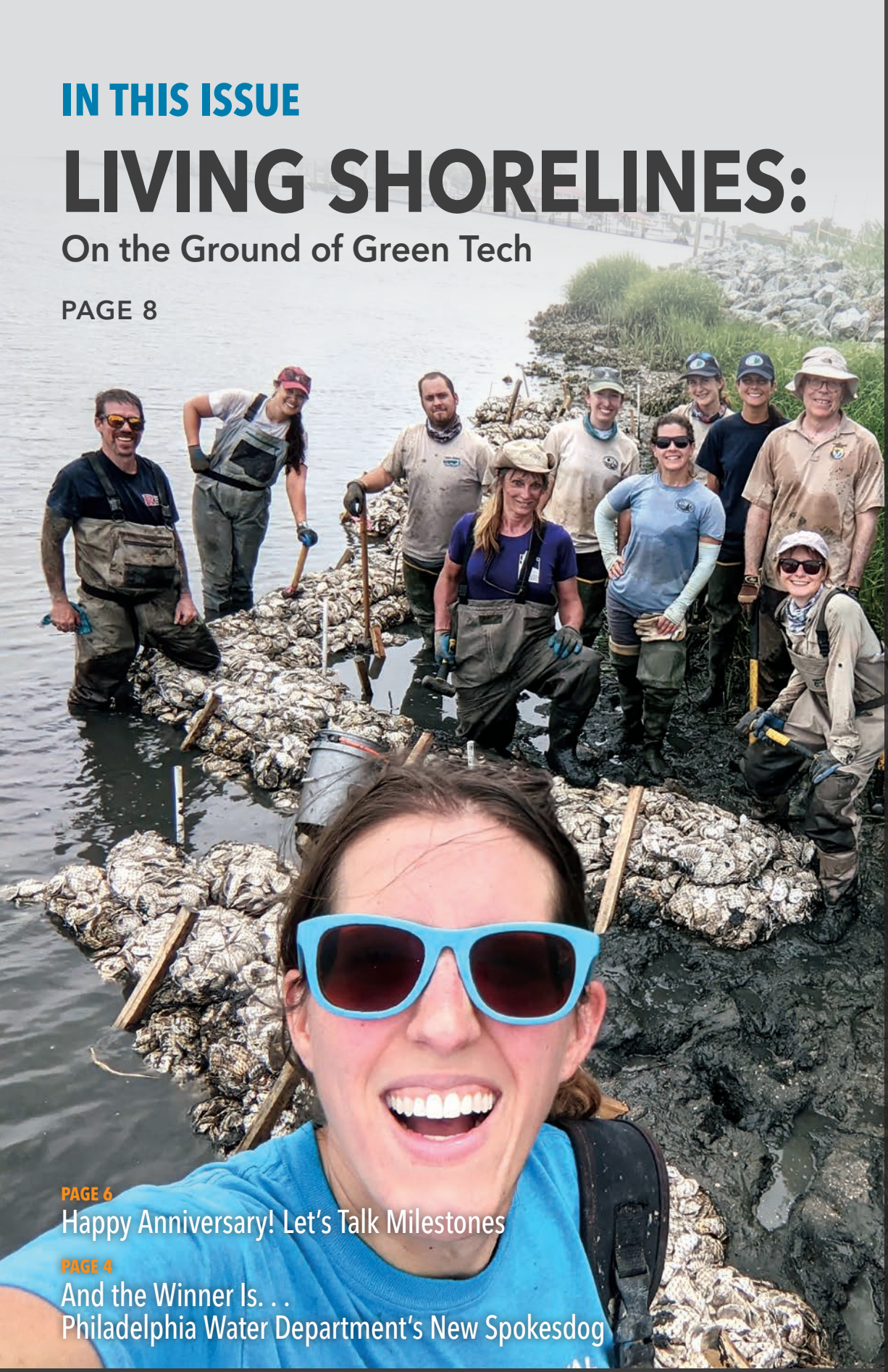

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THE PARTNERSHIP FOR THE DELAWARE ESTUARY
CONNECTING PEOPLE, SCIENCE, AND NATURE FOR A HEALTHY DELAWARE RIVER AND BAY

VOLUME 31
NUMBER 3

Looking Forward to Celebrating PDE's 25th Anniversary

DEAR FRIENDS,

I hope that this issue of *Estuary News* finds you doing well and having a great summer. In 2019, when we began thinking about how we wanted to celebrate the Partnership for the Delaware Estuary's 25th anniversary, we had some very ambitious and exciting plans for 2021. As you can imagine, these plans have evolved over the past year to take into consideration all the twists and turns we have experienced with the pandemic. During this period, PDE has faced its challenges head on and found new ways of working on behalf of clean waters, healthy habitats, and strong communities for the Delaware River and Bay, and all of us who live in this diverse and dynamic region.

Please check out the center spread of this newsletter that features a timeline of our organization's milestones. You'll see that we're also celebrating the 25th anniversary of the completion of the Delaware Estuary Program's first Comprehensive Conservation Management Plan. Working in concert with our DELEP partners, we have made meaningful progress in addressing our shared priorities to protect and restore water quality and the ecological integrity of the Delaware Estuary.

It should come as no surprise that funding is our biggest challenge. Therefore, we are thrilled that the National Estuary Program has been included in the bipartisan Infrastructure Investment and Jobs Act, which has that includes significant funding to support improvements to our country's water infrastructure. Clean water for all is a must and will only be fully realized through significant investment and commitment.

We are looking forward to celebrating with our friends and partners at our Experience the Estuary Celebration on October 7 at Vie in Philadelphia. We are very grateful for the outpouring of support we have received for the gala. Individual tickets are now on sale and can be purchased at https://pde21.eventbrite.com.

As we close the chapter on our first 25 years, we look toward the future and how we can best address the evolving challenges ahead. We are thinking hard about our priorities and eagerly anticipate working on those in partnership with you!

Best wishes,

Kathy Klein

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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Water Restoration
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Toxics Advisory Committee

Ron MacGillivray, Ph.D.
Senior Environmental Toxicologist
Delaware River Basin Commission
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Science and Technical Advisory Committee

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Partnership for the Delaware Estuary
Senior Science Director
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Water Quality Advisory Committee

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Manager, Water Quality Assessment
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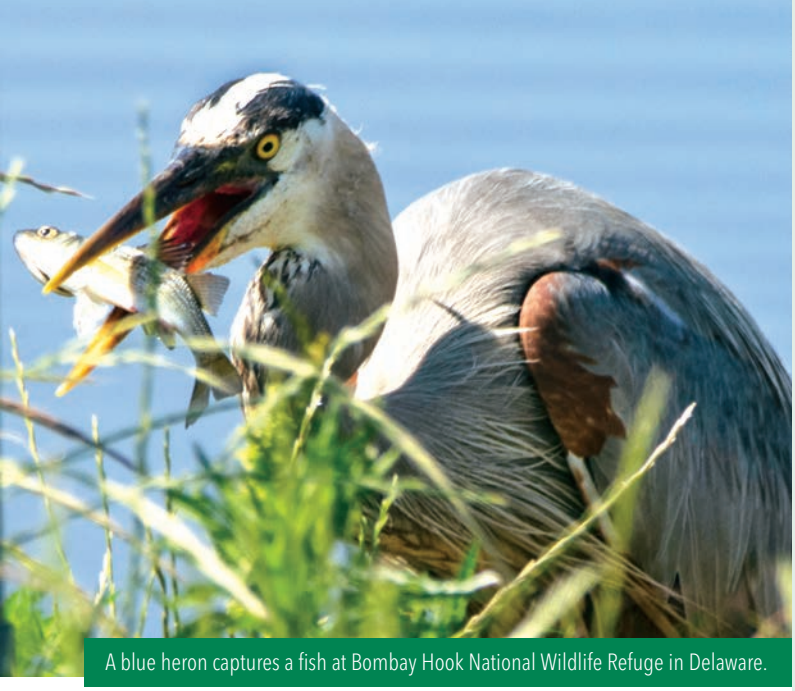
ON THE COVER

Staff from Partnership for the Delaware Estuary, the DNREC Wetland Monitoring and Assessment Program, and the US Fish & Wildlife Service Delaware Bay Estuary Project show off their work on a living shoreline at the Lewes Canal in Lewes, Delaware.

FOLLOW US ON:



A blue heron captures a fish at Bombay Hook National Wildlife Refuge in Delaware.

Delaware Estuary Program Working on a New TREB for 2022

New Report Will Include a DEIJ Audit

Work has begun on an update to the Delaware Estuary Program's Technical Report for the Delaware Estuary and Basin (TREB). The updated report will be published in 2022.

The most recent report came out in 2017 following several years of collaboration among environmental scientists in Delaware, New Jersey, and Pennsylvania. The TREB is an assessment of the status and trends of select natural resources in the Delaware River Basin, home to approximately 9 million people.

The TREB covers environmental indicators that help PDE staff and scientists understand the overall health and condition of the Delaware Estuary and Basin. These indicators range from water quantity and quality to habitats and different key species in the watershed. Each indicator has its own chapter that is written by experts in each of those topics. Much of the core content in the 2017 report will be updated, but the 2022 report will include an audit on diversity, equity, inclusion, and justice (DEIJ) on the TREB's indicators to identify gaps in these areas. This will inform how PDE, working in concert with its broad-base of partners, can help make a difference in this critical focus area.

To read the 2017 TREB, go to our website at https://delawareestuary.org/data-and-reports/state-of-the-estuary-report/

STRONG COMMUNITIES • GOAL C2.5

Volunteers do their part for their community during the 2021 Christina River Watershed Cleanup. Photo courtesy of The Delaware Department of Natural Resources and Environmental Control.

Christina River Watershed Cleanup Urges People to Stick Close to Home This Year

Residents from New Castle County, Delaware got into the community spirit this past spring for the annual Christina River Watershed Cleanup. From April 1 to May 15, 96 volunteers collected 124.25 bags, or 1,340 pounds, of litter in their neighborhoods and local parks.

Typically, the Christina Cleanup is held only on the first Saturday in April along the rivers and creeks within the Christina River Watershed. Cleanup organizers cancelled last year's event due to the COVID-19 pandemic but resumed it this year by putting special precautions in place. The 2021 Cleanup called for volunteers to participate in small groups that stayed close to home. Small group participation gave volunteers more freedom to choose when, where, and how often they participated in the Cleanup.

Volunteers reported where, when, and how much litter they collected via the Delaware Department of Natural Resources and Environmental Control's new website hub. They also could send photos to the hub and to social media. Volunteers who posted photos on facebook.com/ChristinaCleanup were entered for chance to win a 2021 pass to all of Delaware's state parks.

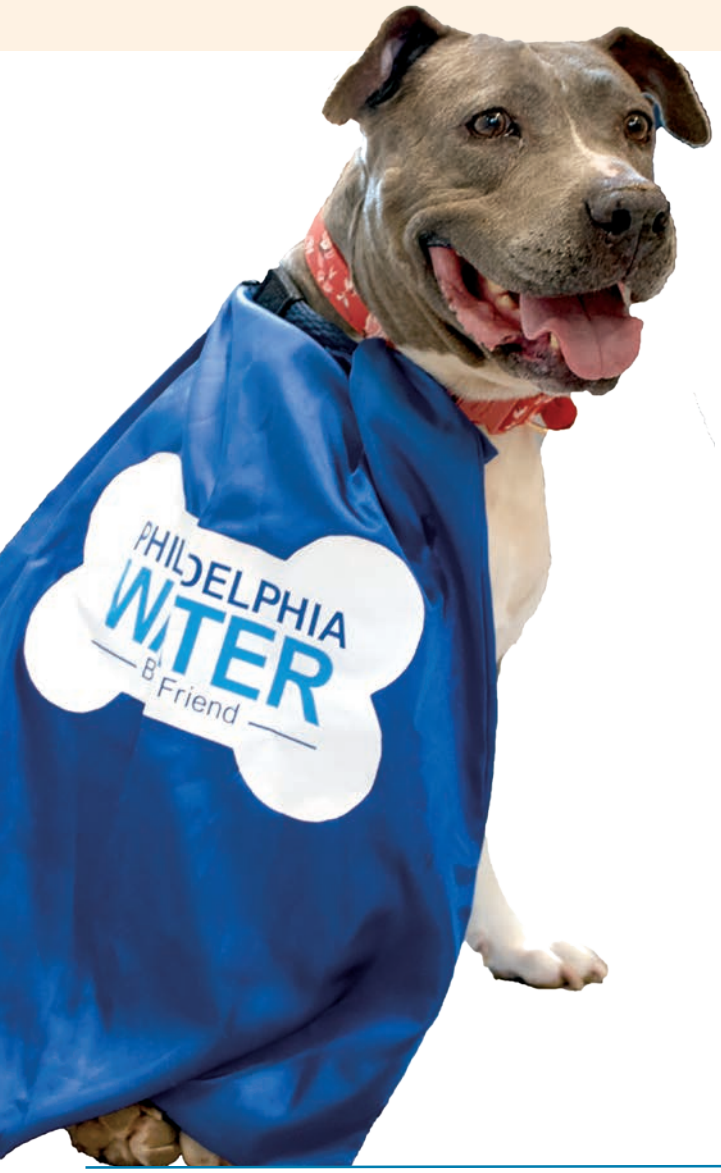
STRONG COMMUNITIES • GOAL C2.4

AND THE WINNER IS….

PDE/PWD hold 2021 Spokesdog Competition

By Chesa Ramacciotti, PDE's Community Engagement Specialist

MEET LUCY, A BROWN AND WHITE 7-YEAR-OLD MIXED BREED DOG WHO LIKES SQUEAKY TOYS AND MEETING NEW PEOPLE. SHE IS ALSO THE 2021 SPOKESDOG FOR THE PHILADELPHIA WATER DEPARTMENT (PWD). THIS YEAR, SHE BEAT OUT SIX OTHER DOGS FOR THE TITLE.



The annual Spokesdog Competition is a joint effort between the Partnership for the Delaware Estuary (PDE) and PWD to raise awareness about the connection between dog waste and clean water. When owners don't pick up their dog's waste, it can wash down storm drains and end up in local creeks and rivers, contributing millions of fecal bacteria to waterways. The bacteria impacts drinking water sources and aquatic habitats. About 40 percent of dog owners don't pick up after their pets.

After taking a break in 2020, the Spokesdog Competition returned last spring for a month-long contest to see which special pup among seven adoptable shelter dogs would represent PWD for the upcoming year.

This year, four animal shelters – Pennsylvania SPCA, Philadelphia Animal Welfare Society, Morris Animal Refuge, and ACCT Philly – participated in the competition. Each shelter nominated dogs to compete and distributed free dog waste bags, bag dispensers, and educational materials to new adopters. PDE is happy to report that all seven canine contestants have found homes since the contest started.

The competition ran entirely on social media. Followers voted for the dog of their choice with "likes." With 242 votes, Lucy, who came from ACCT Philly, won the title of Spokesdog 2021. As Spokesdog, Lucy will assist PWD in spreading awareness among Philadelphia dog owners about the importance of picking up after their pets to help keep local waterways clean.

CLEAN WATERS • GOAL W1.4

RESTORING
THE VILLAGE OF FORK BRANCH

The Village of Fork Branch near Dover, Delaware, is a sacred place surrounded by freshwater wooded wetlands and archeologically significant sites for the Lenape Indian Tribe of Delaware Federal Census District.

For more than a year, Tribal members, volunteers, professors at the University of Delaware, scientists from the Stroud Water Research Center, and Partnership for the Delaware Estuary (PDE) staff have been working toward the restoration of the Village's natural and cultural heritage, including reintroducing native plants and trees to the property. Longer-term plans for this half-acre parcel include possibly seeding two streams with freshwater mussels and creating educational space for youth.

Thanks to hundreds of work hours, trash and debris at the site is gone, including at least 200 tires, three junked cars, a trailer, and half of a 1950s-era truck. They've also cleared out invasive plants and trees, including tree of heaven, a common breeding ground for the problematic spotted lanternfly.

With the help of Anna Wik, a professor of landscape architecture at the University of Delaware, the Tribe hopes to replace the invasive plants and trees with native ones to attract pollinators, control erosion, grow food, create arts and crafts, and make traditional medicines. So far, Wik and volunteers have planted some shadblow serviceberry (*Amelanchier canadensis*) and redbud (*Cercis canadensis*), and they plan to plant more trees, shrubs, perennial forbs and grasses, and groundcover plants.

"It has been an amazing project to be involved in and is wonderful to see the transformation/restoration happening on site," Wik said.

Jon Cox, an assistant professor in the University of Delaware's Department of Art and Design, has been heavily involved with the project. Cox also installed a wildlife camera at the property and captured footage of various creatures, including deer, owls, and raccoons. He uploaded some of the images to iNaturalist and invites other citizen scientists to contribute their own pictures and videos of native plants and animals to the site. Cox and his colleague Dylan Francis created a short video that briefly describes the land restoration.

continued on page 10

CLEAN WATERS • GOAL W3.2 // HEALTHY HABITATS • GOAL H2.1, H3.3 // STRONG COMMUNITIES • GOAL C2.4

GET INVOLVED

The Tribe will hold a work party at the site on October 2. To volunteer, please, contact Simon James at simonpurchasejames@gmail.com or call 610-348-8119.

To upload images or video to the Tribe's iNaturalist site, go to: https://www.inaturalist.org/projects/lenape-indian-tribe-of-delaware

To view the video about the Delaware Camera Trap Initiative, go to: ACEER Delaware Camera Trap Initiative

BUT WAIT, THERE'S MORE:

There's much more information about the Lenape and the Village of Fork Branch. Go to this online story map at https://litde.net/ and short video at https://bit.ly/3y77MvX.

Above: volunteers at the Village of Fork Branch plant a red bud tree on the property.

CELEBRATING 25 YEARS

Timelines *Tell So Much*

1988

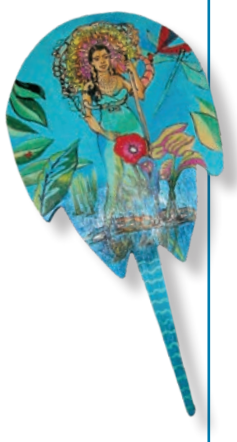
The Delaware Estuary becomes part of the EPA's National Estuary Program

Partnership for the DELAWARE ESTUARY

1996

Partnership for the Delaware Estuary (PDE) is officially incorporated as a non-profit organization

The Delaware Estuary Program publishes its first Comprehensive Conservation Management Plan (CCMP)



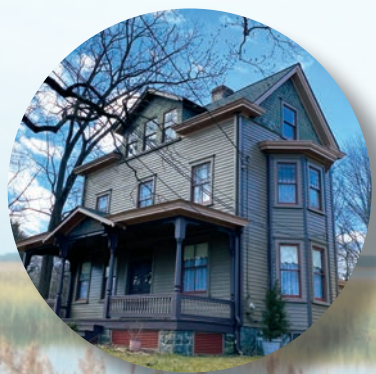
1999

PDE holds its first Experience the Estuary Celebration event

1987 1990 1995 2000

1987

U.S. Environmental Protection Agency recognizes the Delaware Estuary as a National Estuary of Significance



1997

PDE opens its first office at Bellevue State Park in Wilmington

2002

PDE has its first Pennsylvania Coast Day celebration at Fairmount Park in Philadelphia

Partnership for the Delaware Estuary has done a lot in 25 years. In keeping with the celebration of PDE's 25th anniversary, we're sharing this timeline with you to share how much we've accomplished. Since there are more milestones on our list than we can possibly fit here, please visit https://delawareestuary.org/25th-anniversary-timeline/ for a more comprehensive timeline.

2005

PDE and the Delaware Estuary Program holds its first Science & Environmental Summit

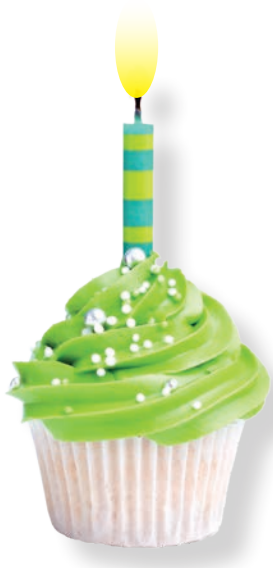
PDE launches the Delaware Bay Oyster Restoration Project and Marketing Campaign

2010

PDE builds its first living shorelines project with Haskin Shellfish Research Laboratory at Rutgers University

2017

PDE partners with Philadelphia Water Department to open a demonstration freshwater mussel hatchery at the Fairmount Waterworks in Philadelphia



2005 2010 2015 2021

2004

PDE becomes the host of the Delaware Estuary Program

2008

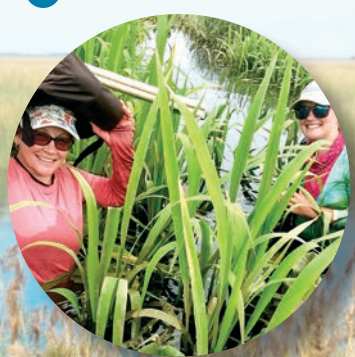
PDE and DNREC design the Mid Atlantic Coastal Wetland Assessment (MACWA)

2012

The first Technical Report for the Delaware Estuary River Basin (TREB) is published

2021

2021 PDE celebrates its 25th anniversary



SPOTLIGHT

DELSI Taking Root and Growing in the Field of Shoreline Preservation

Left: visitors to the DuPont Nature Center in Milford, Delaware, have a view of PDE's living shoreline at Mispillion Harbor. Right: PDE's Wetlands Coordinator LeeAnn Haaf and PDE's Restoration Programs Manager Joshua Moody, Ph.D. work on a living shoreline in New Jersey.

At high tide on the Lewes Canal in Delaware, it's hard to see 1,300 bags of oyster shells. You can't see how fish and crabs feed on the shells, or how they provide a foundation for oyster habitat. What you do see is tall, green, native grasses and water. You may not realize it, but what you're looking at is a living shoreline, an engineered, nature-based, method of protecting acres of precious shoreline from erosion. In August, Partnership for the Delaware Estuary (PDE) gathered at the banks of the Canal with the Delaware Department of Natural Resources (DNREC), U.S. Fish and Wildlife Service, the DNREC Wetland Monitoring and Assessment Program, the City of Lewes, and the Lewes Historical Society on the banks of the Canal to celebrate this living shoreline and a recent 180-foot addition. PDE and DNREC installed the addition in June. The original part of the site was built in 2014.

The Lewes living shorelines site is one of 10 projects PDE has throughout Delaware, New Jersey, and Pennsylvania, all built with various partners. It has three more projects in different stages of planning. Since its first project in 2006, PDE's Delaware Estuary Living Shoreline Initiative (DELSI) has taken root and become an example of shoreline preservation, erosion control, and a method of bolstering cleaner water and healthier plant and animal communities.

LEARN MORE NOW: https://bit.ly/3kmgn9n

"They're a perfect example of the green tech movement," said PDE's Science Director Danielle Kreeger, Ph.D., in reference to living shoreline tactics.

Living shorelines are made of natural materials, such as plants, bivalve shellfish, stone, sand, wood and other organic materials to mitigate erosion and preserve shoreline. The concept was invented by Orrin H. Pilke, Professor Emeritus of Earth and Ocean Sciences at Duke University.

Due to sea level rise, brought on by climate change, the Delaware Estuary and Delaware River Watershed is drowning because it's losing about an acre of tidal marsh every day to erosion. Living shorelines are alternatives to traditional "hard armor" shoreline reinforcements like bulkheads and seawalls. The hard structures, made of wood and concrete, cut the shoreline off from the surrounding natural habitat. Living systems can build themselves up to keep pace with rising seas, whereas the hard structures cannot.

"While conventional methods might hold the shoreline in place, they don't provide the benefits that a natural habitat does," said David Bushek, Ph.D., and director of the Haskin Shellfish Laboratory. "By bringing life to that hardened structure, or replacing that hardened structure with a natural structure, we can retain all those habitat functions, and that's the idea of having a living shoreline as opposed to one that's sterile or dead."

INNOVATION AND ECOLOGICAL UPLIFT

Every shoreline site is unique. Therefore, living shorelines need to be tailor-designed, differing from site to site in building materials and technique. PDE mostly uses native plants, like *Spartina* (marsh grass), and shellfish as its main building blocks. Shellfish, such as oysters and mussels, either cement or bind themselves together and to surfaces, thus reinforcing the shoreline, guarding against wave force, and creating 3-D complexity that provides habitat for other animals like fish and crabs. Since these bivalves are voracious filter-feeders, they can also promote cleaner water in the surrounding area. "Living shorelines are not a singular technique, it's a suite of technologies that is about ecological goals – it's about ecological uplift," said Joshua Moody, Ph.D., Restoration Programs Manager at PDE.

Bushek and Kreeger, longtime friends and colleagues, were able to get the first DELSI site built after they co-wrote a grant application that was funded.

"We had mutual interest in this living shoreline approach and wondered if we could do something like that," Kreeger said. "We were seeing these projects spring up in the southeast, like in the Carolinas with oysters. But the same approach wouldn't work here because oysters live too low in the tidal zone, and so our idea was to add in ribbed mussels that bind with marsh grass up higher."

With each successful project, the DELSI program grows, and so does PDE's desire to test the limits of this green technology.

PDE has a new project in development in Philadelphia – a living shoreline in a tidal freshwater area of the Schuylkill River. For the first time, PDE will incorporate freshwater mussels, submerged plants, and freshwater wetland plants. The project has similar shoreline protection, habitat creation, and water filtration goals as saltwater projects, but this project will additionally "green up" a dilapidated shoreline in a community that has long suffered from environmental injustice.

"There's a much broader cast of characters in freshwater tidal systems – much greater plant and animal diversity," Kreeger said. "No one has ever done a freshwater tidal living shoreline to our knowledge. That's what makes this exciting for us. If the project is successful, it should open up new opportunities to expand our limited restoration toolkit in urban landscapes."

LIVING LABORATORIES

Like living laboratories, each of PDE's living shoreline projects offers ecological research and learning opportunities.

"Everything that we've done from day one until today is set up to learn what works and what doesn't work," Kreeger said. "If you're not seeing some failure, then you're not learning. You have to figure out what the tolerance limits are for certain things that you're testing. And the only way to do that is to do that is to put things in some crazy places and have a really good scientifically-based monitoring program and see it through."

Moody said this emphasis on research and monitoring is what sets PDE's living shorelines program apart from many others in the country.

"Although some entities focus on large-scale protection efforts, we have found our niche in the science of innovation and research," Moody said.

COST AND VALUE

The value of monitoring is not just to help learn from research studies – it can also be necessary to ensure a project's succeeds. Living shorelines, unlike traditional methods, are not projects that you build once and forget about. They need regular monitoring.

"They're like gardens that you need to tend," Kreeger said. "I think this presents a new and different type of business opportunity whereby companies might develop service contracts to maintain a living shoreline, much like a landscaping and gardening contract, rather than a traditional construction contract."

Justifying the cost of something that will need years of monitoring and maintenance may seem like an

"If you're not seeing some failure, then you're not learning. You have to figure out what the tolerance limits are for certain things that you're testing. And the only way to do that is to do that is to put things in some crazy places and have a really good scientifically-based monitoring program and see it through."

Danielle Kreeger, Ph.D., *Science Director, Partnership for the Delaware Estuary*

continued on page 10

DELSI continued from page 8

uphill battle, but the up front installation costs can be lower and the path is getting easier. It used to be difficult in some places to get the necessary permits to build a living shoreline, whereas seawall and bulkhead permits were easy to acquire. Now, Delaware and New Jersey, Moody said, are taking more progressive approaches to shoreline protection and value projects that provide ecological enhancement.

"Where we are now is at the cusp of a paradigm shift," Kreeger said. "In addition to the direct cost comparison between living shorelines and traditional projects, we're entering an age where the indirect ecological benefits will increasingly be valued."

"What is the value of clean water? What is the value of carbon capture? What is the value of fish and wildlife that are produced in these fringing marsh habitats? Economies are going to be evolving around these green technologies, so once you start to capture the ecosystem benefits that these kinds of projects have over a traditional bulkhead or seawall, then I think that return on investment is going to start tilting heavily toward the more green approaches, and this is true for everything with ecological restoration."

The Army Corps of Engineers now lists dunes and living shorelines as tactics for shoreline stabilization because they provide comparable or better outcomes than hard-armor approaches. Bushek said that the military recognizes this technology for protecting coastal operations.

"When the Army Corps of Engineers recognizes the value of this tactic, it's a big game changer," Kreeger said.

GROWING INTO PDE'S FUTURE

This year, as PDE celebrates its 25th anniversary, the organization is not only reflecting on its accomplishments, but casting an eye to the future. PDE's living shorelines program has secured its place there.

"We have established a firm reputation of being interested in doing meaningful, well-respected work, and I think that regional partners absolutely see an important place for us in moving forward with living shorelines and nature based infrastructure," Moody said.

From a small project in the Delaware River Watershed, the DELSI program has become an example of what national estuary programs can do.

"We've evolved light years in 15 years by going from an idea to an actualized program that extends well beyond PDE," Kreeger said. "This is thanks to similar-minded, hard-working partners, visionary funders, and tireless, passionate staff."

HEALTHY HABITATS • GOAL H1.3

Restoring the Village of Fork Branch continued from page 5

> "I am honored to participate in this regeneration project and watch firsthand as the ancestral land of the Lenape Indian Tribe of Delaware returns to a more natural state."
>
> Jon Cox
> *Assistant professor in the University of Delaware Department of Art and Design*

Tara Muenz, Assistant Director of Education and Leaf Pack Network Administrator at Stroud, said she worked on the Village project as a part of the Delaware Teachers Institute Training with the University of Delaware and the Amazon Center for Environmental Education and Research (ACEER) Foundation. This included a one-day collection of baseline water quality information on Fork Branch to show teachers the techniques, methods, and equipment, to inspire them to take the information about the watershed back to their classrooms. She said Stroud would like to support the monitoring of waterways important to the Lenape of Delaware. Two streams on the property are part of the headwaters of the St. Jones and Leipsic rivers. Stroud and PDE staff will be working with the Tribe see if the streams can support freshwater mussels. Mussels are not only natural water filters, but they are primary indicators of water quality.

"If we can get a freshwater mussel to thrive out here, then it's a sign that our waters are improving in health," said Principal Elected Chief Denis J. Coker of the Lenape Indian Tribe of Delaware. "Most Tribes align their environmental laws to reflect the state's natural resource regulatory structure where they now live. Since we do not see other living things as resources to be commodified, we would like to have higher standards than that for the right to life of all our relations. We recognize we are all connected. What we do to the freshwater mussel, we do to ourselves."

DELAWARE RIVER FESTIVAL

September 23 to October 3

Online and In Person

FREE family fun awaits at the 2021 Delaware River Festival! Once again, we're offering a hybrid of online and in-person events on the Pennsylvania and New Jersey sides of the Delaware River. Either way, they're sure to be educational and show the forever value of the Delaware River. In-person activities will require sign-up. Go online to www.delawareriverfest.org for the schedule of activities.

EXPERIENCE THE ESTUARY CELEBRATION

October 7

5:00–8:30 PM • VIE BY CESCAPHE, PHILADELPHIA

You're invited to join PDE at the 2021 Experience the Estuary Celebration – Celebrating 25 Years! Join us for an incredible evening including a cocktail hour, open bar, dinner, auction, and the famous 90-minute raw oyster bar featuring local Delaware Bay oysters. Most of all, you will have a chance to chat with PDE staff and supporters and show your support for PDE. Our event venue adheres to the highest COVID safety standards. You can learn more about their enhanced safety protocols https://weddings.cescaphe.com/your-dream-wedding/.

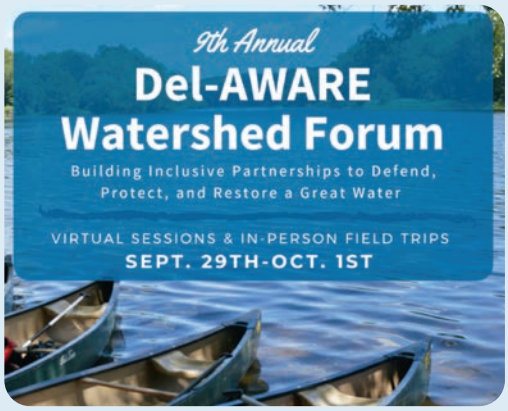
For tickets, go to https://pde21.eventbrite.com. For more information, contact Elizabeth at ehorsey@delawareestuary.org.

LIVING SHORELINE UNVEILING

November 19

1:00–3:00 PM • TULPEHAKING NATURE CENTER
157 Westcott Avenue, Hamilton Township, New Jersey

Professionals from Mercer County Park Commission, Princeton Hydro, Hunter Research, and PDE will present the design phase of a new living shoreline planned for installation at Robeling Park in New Jersey. The presentation will include an introduction to the project, a history of the site, important ecological aspects of the project, and a first draft design of the project. The presentation will be followed by a short walk to the project's proposed site. Final details are coming soon. Pre-registration is required. Visit the Mercer County Parks website for more information in the coming weeks.



9TH ANNUAL Del-AWARE Watershed Forum

September 29 to October 1

ONLINE AND IN-PERSON, REGISTRATION REQUIRED

Register now for the Coalition for the Delaware River Watershed's (CDRW) 9th Annual Delaware River Watershed Forum. The Forum, held virtually, will feature a mix of engaging speakers, facilitated discussions to work toward shared watershed priorities, and in-person field trips. Additionally, the CDRW will host an outdoor, in-person networking reception on September 30 in Philadelphia. Register by going online to: https://bit.ly/3g7tTfT.

Partnership for the DELAWARE ESTUARY
CELEBRATING 25 YEARS 1996-2021

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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 private, 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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