

# STRONG COMMUNITIES

Strong communities value their natural resources and work to protect and enhance them both for economic and environmental health. Climate change and rising sea levels are intensifying storms and floods' effects on waterfront communities. Planning for these changes now will help prepare for the future. To protect and support the Delaware Estuary resources and waterfront communities, and foster a sense of pride in these places, people need to be able to access them. Providing access and information will help the public create a special connection to the Delaware Estuary.

*"When we see land as a community to which we belong, we may begin to use it with love and respect."*

~Aldo Leopold, A Sand County Almanac



Fowler's Beach in Milford, DE.  
Credit: Jodi Brown



## STRONG COMMUNITIES GOAL C1

# INCREASE COMMUNITY RESILIENCE AND ACCESS

Communities around the watershed rely on clean and healthy streams and natural areas for recreation, health, and quality of life overall. Waterfront communities are particularly important to the Delaware Estuary's health, and to its economic uses that are essential to the region. Waterfront communities are also especially vulnerable to certain climate change effects, including rising sea levels, and more intense storms and floods, which must be taken into consideration when planning for the future.

Protected lands include public lands and those under conservation easement, which also are very important to Estuary communities. Protected lands help ensure healthier rivers and streams and host public

access points to the Delaware River and Bay for boating, fishing, and recreational activities. Working waterfronts and protected lands offer opportunities to restore and preserve natural features, build coastal resilience, provide public access, and encourage jobs.

Working waterfronts in the Delaware Estuary range from very urban and industrialized to very rural and dependent upon natural resources. After decades of development and unmitigated pollution, new trails and parks were established in the 1960s and 1970s, and the Delaware

## A Commitment to Diversity and Environmental Justice



ne overarching challenge DELEP partners face when trying to achieve Strong Communities in the Delaware Estuary is involving underserved communities and those subjected to environmental injustice. DELEP recognizes that standard approaches to the way environmental efforts are organized can create barriers to diverse groups' engagement. Its partners are committed to find ways to remove or overcome these barriers. Involving underserved communities in priority areas and issues in the CCMP is critical. Key activities for doing so are included in the following Strong Communities strategies.



Mullica River in Shamong, NJ. | Credit: Jerry Franklin





Estuary's waterfronts began to transform into hotspots for recreation and tourism. Once booming with the bounty of natural resources, working waterfronts around Delaware Bay now are threatened by floods, erosion, and economic hardship. These threats make investments in infrastructure for water access and resilience challenging. Sea levels in the Delaware Estuary have risen by approximately a foot in the last century, which is a faster rate than that in the previous 15 centuries.

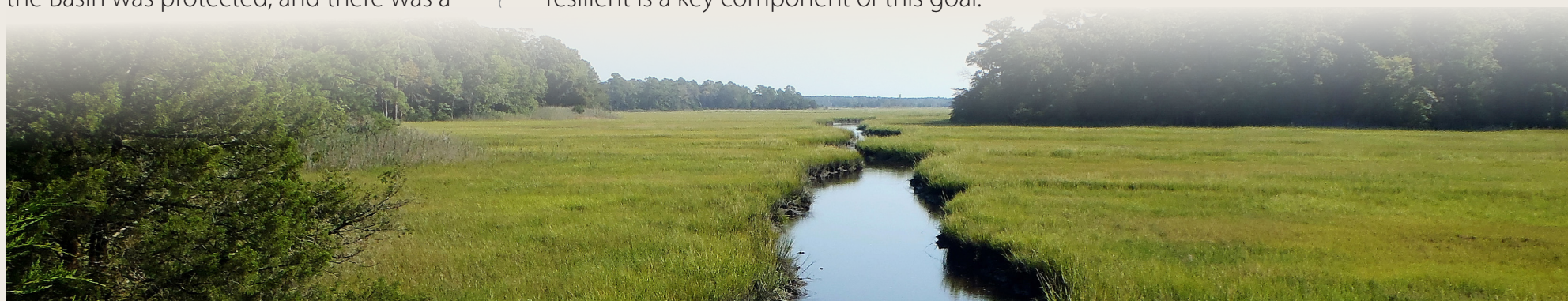
Waterfront restoration of the Delaware Estuary is attracting attention. Waterfront communities are beginning to recognize the value of "green infrastructure," such as living shorelines, which can improve shoreline resilience to storms and rising sea levels. As of 2016, 15% of the land in the Basin was protected, and there was a

density of approximately one access point for every 2 miles along the 330 miles of the Delaware River and Bay. This amounts to approximately 150 access points, including public lands and private marinas.<sup>11</sup> There are many working waterfronts, protected lands, and public access points around the Delaware Estuary, but many need new investments to improve and sustain access, ecological function, and productivity into the future.

The vision for waterfront communities' economic and environmental sustainability extends well beyond what DELEP alone can achieve measurably. Finding ways to encourage and build local communities' ability to address these challenges with their own projects and programs to become more economically and environmentally resilient is a key component of this goal.

## HOW WE WILL MEASURE SUCCESS:

- Improve working waterfronts by reducing brownfield areas, increasing wetland areas, and supporting more visitors
- Increase access to the Delaware River; sustain and enhance access to the Bay
- Increase protected land for community benefits



Herring Landing, Rehobeth Bay | Credit: Kurt Philipp





## STRATEGY C1.1: Restore working waterfronts

### Description

Working waterfronts are areas where uses with high economic value intersect with those of high ecological value. Working waterfronts are economically important for a variety of reasons—in some places because of their draw for tourism-related businesses (e.g., Penn's Landing in Philadelphia, the Wilmington Riverfront) —and others because of their importance to fisheries dependent on the Estuary (e.g., Bivalve, NJ and Leipsic, DE). Restoring these waterfronts' natural resources is needed to increase and improve important ecosystems, such as tidal wetlands, and keystone species, such as shellfish. Restoring these working waterfronts for ecological and economical productivity is critical, and will be pursued in the following ways:

- **Rehabilitating degraded waterfront properties.**

Unfortunately, many of the Estuary's waterfronts are home to



Delaware River and Philadelphia, from Camden, NJ. | Credit: Barry Plimpton





a large number of other industrial sites formerly developed and now abandoned. Most require some level of rehabilitation to be reinstated for productive use (e.g., new businesses or community spaces). Cleaning up these sites and attracting new users will fall largely on local communities, with guidance and support of state Brownfield Programs. Through its Brownfields Community of Practice, the Urban Waters Federal Partnership provides an important venue to share best practices between Brownfield Programs and communities in need.

- **Facilitating natural and nature-based infrastructure.** The use of nature-based tactics for stormwater management and coastal resilience can increase a community's capacity to manage both persistent and event-based flooding, while helping maintain and improve ecological function and resiliency of key ecological habitats. Depending on a community's location within the Estuary, these habitats can include: freshwater and brackish wetlands; salt marshes; dunes, and/or floodplains. A variety of green infrastructure tactics have been developed for stormwater management through Philadelphia's Green Cities, Clean Waters initiative and can be adapted for use in other communities. PDE and others are working actively to expand wetland and shoreline restoration tactics to be suitable for freshwater, tidal, and developed areas. PDE will seek to engage local partners in efforts to expand and share information about these tactics to empower local communities, state agencies, and contractors to adopt them in working waterfront restoration efforts.
- **Ensuring public access.** Public access should be considered and available in all working waterfront restoration efforts where it is safe and feasible. Effective, public-friendly access to waterfronts provides communities both educational and recreational opportunities that historically have been disconnected from the water, as well as potential for tourism and recreation to benefit local businesses and economies.

The first step in reconnecting these communities to the water is ensuring that access is available, safe, and easy to use. Waterfront restoration projects—whether cleanups or ecological enhancements—are opportunities to include or improve public access, including appropriate amenities such as trails, boardwalks, walkways, fishing piers, boat launches, and public restrooms (or connections to these features nearby). State or local communities own many established or potential public access sites, and as such, take the lead incorporating these features. PDE and others can support these efforts by providing information and technical assistance and promoting successes.

- **Engaging local communities affected in waterfront restoration projects, particularly underserved communities.** Some of the most vulnerable and underserved communities in the region are in close proximity to waterfronts.

Efforts will include supporting community-wide sustainable development plans for key infrastructure, and conducting outreach to redevelopment organizations to facilitate resilience, green infrastructure, and access in primary features of their plans. The scope of these efforts will be Estuary-wide, focusing on urban and rural communities along the Delaware River, Bay, and major tributaries, with the goal of connecting and benefiting communities with potential environmental justice concerns. Place-based activities include supporting the installation of natural and nature-based infrastructure projects in areas of high vulnerability and engaging underserved, economically underprivileged communities in waterfront redevelopment projects. All agencies and partners involved in urban waterfront restoration will play roles in ensuring these are considered and included in projects.

Waterfront communities are vulnerable to climate change effects, and need support to become more resilient. Bolstering community resilience to climate change is a major driver for this strategy. Emphasizing and





focusing on waterfronts' restoration of natural habitat and access for recreation and natural resources-dependent activities discourages other uses that expose people and property to greater risks of climate change effects. Rising seasonal temperatures and sea levels, and increasing storm frequency and magnitude throughout the Estuary will affect the types and distributions of natural habitats along waterfronts. Efforts to facilitate natural and nature-based infrastructure projects will also need to account for changes in these environmental factors with targets suitable for a variety of potential future conditions.

### **Performance Measures and Key Deliverables**

- Improve resilience in at least 2-3 key locations
- Improve access in at least 2-3 key locations
- Track number and results of nature-based infrastructure projects/practices in waterfront communities

### **Costs and Funding**

- **Estimated Cost Range:** \$\$\$
- **Possible Funding Sources:** Federal grants (U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration), state grants



Prime Hook National Wildlife Refuge, Milton, DE | Credit: Martha Gery

### **Purpose**

*To restore underused sites and ecosystems in waterfront communities with features that improve environmental and economic conditions.*

### **Core Partners**

*Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA), United States Environmental Protection Agency*

### **Key Partners**

*Alliance of Bayshore Communities (DE), Camden County Municipal Utilities Authority and other waterfront utilities and municipalities, South Jersey Bayshore Council, and other federal collaborations*

### **Contributing Partners**

*Alliance for Watershed Education of the Delaware River, Army Corps of Engineers, Circuit Trails, Conservation Districts, National Oceanic and Atmospheric Administration, Sea Grant*

### **Timeframe**

*Ongoing*





## STRATEGY C1.2: Provide tools and technical assistance to waterfront communities & partners to improve economic and environmental resilience

### Description

For waterfront communities, improving environmental and economic resilience go hand-in-hand. Improving both requires investments that can be challenging for communities who lack sufficient tax revenue, political will, or both. Yet, for most, these investments are critical to the local economy—whether to support tourism and recreation, or water-dependent businesses and industries. Investment in waterfront communities can increase tourism and coastal jobs, benefiting the local economy ultimately, and therefore, must be encouraged and facilitated. This strategy will be achieved through collaboration with and between communities, with a focus on providing tools and technical assistance for the following key activities:

- **Adding or enhancing public access sites.** Local communities can both benefit from, and contribute to, efforts to inventory public access points (described further in Strategy C1.3). PDE will seek to engage local communities and partners to assess these points and collaborate with local groups that use these areas regularly, including watermen and hunters. PDE will share the results as a tool to use in local/regional campaigns to promote and enhance access.
- **Removing the barriers to safe, enjoyable public access in a way that engages people as stewards.** Making visits to public access points a safe and enjoyable experience will help connect and attract people. Projects that prevent and remove debris from waterfront areas—including cleanups, marine debris removal, fishing line recycling, and hydrations stations—also can engage local residents as stewards. PDE will take advantage of opportunities to implement and share information with local partners about projects like these.



**Rain Garden created as part of the Green City, Clean Waters program in Philadelphia, PA.** | Credit: PWD

- **Improving resilience to the effects of climate change.** Sharing information, success stories, and existing resources between communities and partners will help them improve community planning for resilience. PDE will continue to host and coordinate its Climate Change Roundtable as a Community of Practice for the Urban Waters Federal Partnership and update its Weathering Change program to include new resources, information, and support for communities planning for adaptation.
- **Enhancing local economies based on natural resources.** Outreach and publicity to promote the virtues of low-impact recreation and stewardship will draw new users and stewards to these areas. PDE will collaborate with





the Alliance for Watershed Education of the Delaware River to coordinate and co-market activities designed to engage recreational users. PDE also will collaborate with the NJ Bayshore Council, the Alliance of Bayshore Communities in Delaware, the South Jersey Bayshore Coalition, and DNREC's Bayshore Initiative to co-brand and market the Bayshore region as a destination. Scenic Byway designations are now in place on both the Delaware and New Jersey sides of Delaware Bay, which connects with the Cape May-Lewes Ferry and presents new opportunities. Further, PDE will seek to raise awareness and prioritize resilience projects critical to protecting infrastructure needed to sustain fisheries and related businesses' economic viability.

- **Prioritizing efforts on underserved waterfront communities.** Some of the most vulnerable and underserved communities in the region are in close proximity to waterfronts. Ensuring that these communities can access and benefit from their waterfronts should be a priority.

Many partners are involved in this strategy in the ways identified here, and by working with and within various committees, tasks forces, and workgroups—sometimes as a leader, other times as a participant. Executing this strategy successfully will require new resources and collaboration with key partners from all three states (DE, NJ, PA). Many groups that focus on byways, trails, and trail networks could be involved, while PDE's focus will be on encouraging recreational users to appreciate the Estuary's natural attractions and forging/focusing collaborations with partners to meet common goals. Among these natural attractions, fishing, spawning, and stopover sites will be a high priority, given the

way potential stewards can experience signature species en masse reliably at these locations.

Funding is a constraint for nearly every CCMP strategy. However, the false perception that PDE has funding to provide local communities support for these activities can create tension with local partners. To address this, PDE often seeks opportunities to write grants and raise funds on behalf of, or in collaboration with, local partners. Erosion, flooding, rising sea levels, storms, and long-term neglect may threaten to destroy prospective project sites before partners can take action, but they can minimize such loss through rigorous prioritization.

### Performance Measures and Key Deliverables

- Improve resilience and/or access in at least 5 communities
- Convene practitioners conducting outreach on climate adaptation annually
- Update or redesign climate adaptation outreach materials (Weathering Change)
- Track number and results of technical assistance projects on community access and resilience

### Costs and Funding

- **Estimated Cost Range:** \$\$
- **Possible Funding Sources:** Federal grants (U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, Federal Emergency Management Agency), foundation grants

## Purpose

*To empower waterfront communities with tools and resources to improve economic and environmental resilience.*

## Core Partners

*Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA), United States Environmental Protection Agency*

## Key Partners

*Urban Waters Federal Partnership, Waterfront Municipalities, Delaware Valley Regional Planning Commission Municipal Technical Assistance Advisory Panel, Non-Governmental Organization partners*

## Contributing Partners

*Circuit Trails, Riverfront development organizations and collaborations of municipalities, watermen*

## Timeframe

*Ongoing*





## STRATEGY C1.3: Protect and enhance natural areas and public access

### Description

Protected natural areas provide critical access points for people to learn about and enjoy the Delaware Estuary. There are over 1,950 square miles of publicly-protected lands in the Delaware River Basin—lands that the public owns, or that are protected by conservation easements held by public agencies.<sup>11</sup> Additional lands are owned or protected by conservation easements held by land trusts. Many, but not all of these conserved lands, offer some form of public access or recreation. Conserved lands include nature preserves, parks, and trails, and also offer scenic views from public roadways. Those that do not offer public access currently, may have the potential to in the future.

Public access to these natural areas promotes human health, education, and ecotourism, but is not always assured. For example, in many urban waterfront areas, industry, including both active facilities and historical operations that have fenced off contaminated sites, often impede access. In bay-front communities, shoreline erosion prevents or has degraded several former towns and access points to the water.

The protection of natural areas and public access points is the first step in ensuring that these places are preserved. Ongoing management is needed to keep these areas safe and healthy, to allow the public to appreciate and enjoy them. Improving these areas with infrastructure appropriate for their natural features and uses is the final step.



2015 Christina River Watershed Cleanup in Wilmington, DE. | Credit: PDE

Key activities include:

- **Continue, support, and promote land protection programs.** Focus efforts on protecting waterfronts, riparian corridors, and other areas critical to sustaining resilience to flooding and climate change, and providing access to waterways. Structures and processes are in place in each of the Delaware Estuary states (DE, NJ, PA) to support public agencies and/or land trusts' permanent protection of land. Such programs as Green Acres in New Jersey, the Open Space Preservation Program in Delaware, and Growing Greener in Pennsylvania have been successful and should continue. Creative new efforts, such as the land conservation sponsorship option available to borrowers from the Clean Water State Revolving Fund also show promise, and should be used and encouraged. Providing incentives (or removing disincentives) to communities with





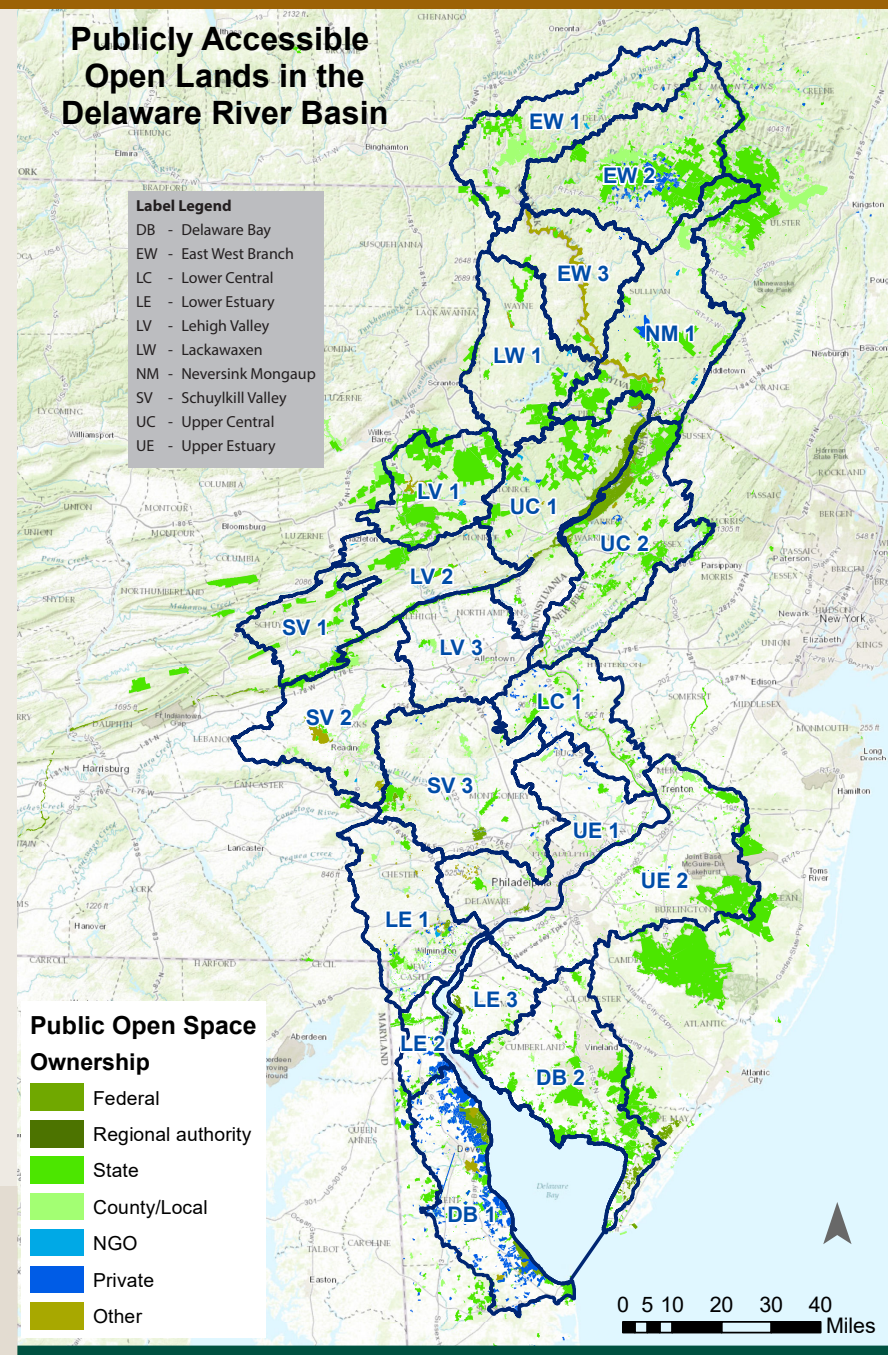
large amounts of conservation lands also is a critical part of this strategy.

- **Manage protected lands to encourage and provide appropriate public access.** This includes managing natural areas' health, as well as creating and managing trails, boardwalks, viewing platforms, boat ramps, piers, parking, restrooms, and other improvements appropriate for waterways and other natural resources' protection and appreciation. The focus of these efforts should be on sustaining and improving access to waterways with particular attention to the inclusion of underserved communities. Remediating urban working waterfronts and stabilizing eroding bay-front shorelines provide opportunities to incorporate improved public access. Continued development of the Circuit Trail system in Philadelphia and the surrounding region, the East Coast Greenway, Northern Delaware Greenway, and scenic byways along the Bayshore in Delaware and New Jersey are important actions to advance. The Bayshore Initiative in Delaware is an example of a new and innovative combination of land protection and access improvements that promises to benefit the economic

and environmental resilience of local communities as well as the state.

- **Involve local partners to inventory and assess public access points to the Delaware River and Bay to identify opportunities and gaps.** As part of the 2012 State of the Estuary report, 150 access points were identified along the Delaware River and Bay, including public lands and private marinas (one access point per 2 miles). However, these access points were identified on paper only, and the data do not reflect their condition and utility for different uses, or the way they are (or should be) maintained or improved. By collecting and compiling data on these points, a basis for more strategic actions can be developed to improve access, and work with local partners to find efficient ways to track and maintain access. This inventory also will be used to advance other strategies to increase

**Spatial distribution of publicly accessible open space in the Delaware River Basin in 2016 by ownership type**  
(See 2017 TREB Chapter 1, Section 1.5 Public Open Space for more information).





community resilience and access, as noted in other sections.

- **Prioritize natural areas accessible to underserved communities' protection and enhancement.**

Ensuring that these communities have access to, and can benefit from, natural areas is a priority.

The states (DE, NJ, PA) will play a leading role in this strategy as major waterfront land owners and managers along both sides of the Delaware River and Bay in New Jersey and Delaware. Major cities, including Philadelphia, Camden, and Wilmington, realize their waterfronts' value for public enjoyment and access increasingly, and can play major roles in these efforts as well, working with riverfront development corporations and organizations devoted to their waterfronts. The PDE can play a supporting role by promoting appropriate uses and green infrastructure, supporting continued funding for land protection, fostering collaborative projects and sharing between communities, and inventorying/assessing access points.

Climate change and continued development are major factors to consider—both as a driver for actions in this strategy, and a threat to some of the infrastructure needed for access. Boat ramps, piers, and boardwalks are major investments that are highly vulnerable to damage from coastal storms and flooding, which are anticipated to increase with climate change and rising sea levels. Careful deliberation and design of these types of infrastructure are needed to inform investments, ideally using natural infrastructure (e.g., wetlands, shellfish beds) to increase

resilience and ecosystem function. However, using coastal areas for improvements that support natural and recreational uses can preclude them from less environmentally sensitive and climate resilient uses, keeping people and major infrastructure out of harm's way. Smart designs will combine recreational and resilience benefits (e.g., parking areas for recreational users that also can serve as flood retention areas during storms) when people are less likely to be enjoying the outdoors.

### **Performance Measures and Key Deliverables**

- Improved protection and access in at least 2-3 locations
- Increased protection and access in at least 2-3 locations
- Access points inventory development
- Track number and results of land protection and improvement projects on natural areas and access

### **Costs and Funding**

- **Estimated Cost Range:** \$ - \$\$\$\$\$
- **Possible Funding Sources:** State budgets and open space programs (funded through bonds or dedicated fees), federal grants, foundation grants (William Penn, Open Space Institute-OSI)

## **Purpose**

*To increase community resilience and access by providing opportunities for the public to enjoy protected natural areas.*

## **Core Partners**

*Philadelphia Water Department, States (DE, PA, NJ)*

## **Key Partners**

*Urban Waters Federal Partnership, Waterfront municipalities, Land Trusts, New Jersey Bayshore Council Tourism and Economic Development Task Force & Byway*

## **Contributing Partners**

*Circuit Trails, East Coast Greenway, Northern Delaware Greenway, Pennsylvania Water Trails*

## **Timeframe**

*Ongoing, with the likelihood that an access inventory can be completed within several years.*





## STRATEGY C1.4: Connect people to natural areas and waterfronts in the Delaware Estuary

### Description

The Delaware Estuary region is rich with accessible parks, preserves, trails, and waterfronts, and showcase the Estuary's natural beauty and ecology. Most of these places are in close proximity to the millions of people who live in the region, many of whom enjoy hiking, biking, running, strolling, dining, and other outdoor activities. These natural areas and waterfronts are ideal places to reach people as we seek to build their connections to the Estuary. Key activities for this strategy include the following:

- **Promoting, supporting, and creating education programs, displays, and signage.** These education and outreach tactics can offer users information and experiences that provide a connection between the places and activities they enjoy and a healthy Delaware Estuary. PDE has a long history of working with local partners on programs, displays, and signage to increase awareness,

appreciation, and a unique sense of ecological place. PDE will continue to work with these partners to explore new opportunities to use these tools and strategies. Some examples of anticipated efforts include:

- ▷ Working with PWD and others to continue, enhance, and promote displays and programs at the mussel hatchery exhibit at Fairmount Water Works, including expanding them potentially to new locations, such as the mussel production hatchery anticipated at Bartram's Gardens
- ▷ Working with DNREC and staff at the Delaware Nature Center at the Mispillion Harbor to expand the Delaware Estuary educational displays to include information on living shorelines that visitors can view from the Center's deck
- ▷ Working with waterfront communities to explore opportunities to add/improve

*In 2015, The Nature Conservancy surveyed 250 tourists from 9 states visiting New Jersey's Delaware Bayshore. Their top reason for visiting was to view wildlife. 99% said they would return, and half said they visit at least five times a year. They also expressed a desire for more information and advertising.*



**New Jersey Bayshore Heritage Byway wayfinding sign and TNC survey sidebar.** | Credit: PDE



signage tailored to tourists and recreational users as a way to enhance access. Developing an inventory of existing Delaware Estuary signage is a need that will be pursued as part of this strategy

- ▷ Seeking and responding to new opportunities to hold programs and implement demonstration projects in places where the natural features and functions provide hands-on experience and context to program content, potentially in partnership with the Alliance for Watershed Education of the Delaware River (a network of over 20 nature centers in the watershed collaborating on programs and messaging)

- **Promoting ecotourism and recreation opportunities in and around the Delaware Estuary.**

Raising awareness of these opportunities and encouraging people to take advantage of local natural, as well as cultural and historic resources, available will facilitate experiences that connect people to the Estuary. PDE also has a history of working with local partners to promote outdoor activities. Here are several opportunities on the horizon:

- ▷ Improving/expanding EcoDelaware.com. For over 10 years, PDE has maintained this site to promote outdoor recreation and experiences, primarily in Delaware. Using information local partners provide, EcoDelaware includes places to visit and things to do that continue to attract a great deal of traffic. There are new opportunities to add content, use the site more strategically, and potentially promote and offer activities and opportunities on both sides of Delaware Bay, including virtual eco-tours to key spots in the Estuary
- ▷ Fostering collaboration and co-marketing and promotion of nature-based tourism between communities and across Delaware Bay. New Scenic Byway designations on both sides of Delaware Bay, and bayside communities' increasing efforts to collaborate (e.g., Alliance

of Bayshore Communities, the South Jersey Bayshore Council, the Bayshore Tourism and Economic Development Task Force) present new opportunities that PDE will explore

- ▷ Exploring opportunities to work with partners in the Alliance for Watershed Education of the Delaware River. This new collaboration on the part of nature centers offers opportunities for PDE to work with local partners to promote recreational activities and opportunities on the Delaware River and major tributaries. For greater effect, both PDE and local partners can share public messaging to engage more people. Continued expansion of the East Coast Greenway and The Circuit Trails in Philadelphia offer new opportunities to promote trail experiences

- **Expanding “Green Job” opportunities.** Fostering youths' interests in pursuing careers in conservation and the environment can create a deep and meaningful connection between them and the Estuary, while also adding new capacity for stewardship of trails and natural areas. In recent years, PDE has worked with other local partners to develop summer “Green Jobs” programs in Wilmington, Camden, and Newark. Philadelphia and Camden have developed job corps to recruit, train, and employ young adults to maintain green infrastructure. Delaware State Parks has developed a Youth Conservation Corps that works in the parks system. These programs engage residents from local areas, including neighborhoods that are challenged economically and environmentally, and offer them educational, training, and/or career opportunities. PDE and partners will seek to continue and expand these types of programs to new areas and uses.

- **Focusing educational, recreation, and employment opportunities on underserved communities.** Some of the most vulnerable and underserved communities in the region are in close proximity to waterfronts, and are most in need of these opportunities





PDE will play a leading role in promoting places and experiences to connect people and partners. States and local partners will promote and provide the access to those places, while PDE will use its mass communications capacity and tools (described in the next strategy) to achieve these goals.

External constraints pertaining to this strategy are related largely to funding and the ability to implement these strategies holistically and strategically. Climate change effects are not anticipated to influence this strategy dramatically in the next 10 years. However, as many of the activities described here will take place in waterfront areas, it will be important to plan and design them for resilience (particularly signage, e.g., any signage/displays in waterfront locations need to be waterproof, or raised or moved easily in case of flooding).

## Performance Measures and Key Deliverables

- Complete new/updated ecotourism website and increase visitor counts
- Inventory/assess existing exhibits and signage and add new exhibits, displays, or materials on living shorelines and freshwater mussels
- Track number and results of outreach programs and projects on ecotourism and recreation, including engagement of youth in green jobs programs

## Costs and Funding

- **Estimated Cost Range:** \$
- **Possible Funding Sources:** State and federal grants/support; new funding needed



Brandywine Creek, Wilmington, DE | Credit: Pat Fallon

## Purpose

*To use natural areas and waterfronts as opportunities to engage recreational users.*

## Core Partners

*Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA)*

## Key Partners

*Alliance for Watershed Education of the Delaware River, Urban Waters Federal Partnership, Waterfront municipalities*

## Contributing Partners

*Circuit Trails, Non-Governmental Organization partners, United States Fish and Wildlife Service*

## Timeframe

*Ongoing, with some activities occurring annually.*



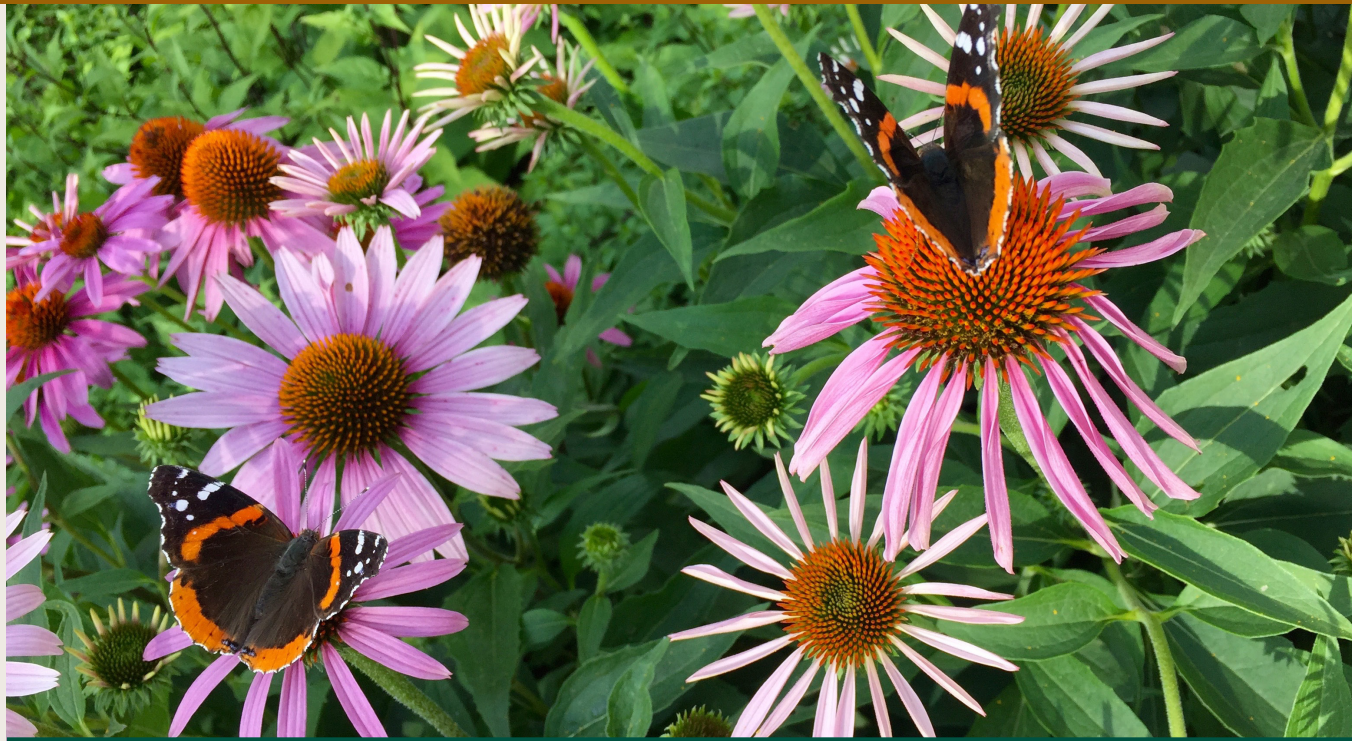
## STRONG COMMUNITIES GOAL C2:

# IMPROVE PUBLIC AWARENESS AND STAKEHOLDER ENGAGEMENT

Engaging people is a key part of conservation efforts, from rural and agricultural areas to suburban communities and urban waterfronts. If people do not care about their natural resources, conservation efforts will have little value to them or future generations. People of all ages and backgrounds should be given the proper tools to understand the problems facing the Delaware Estuary to generate positive changes for the future. Decision-makers and managers must work together across state lines and other jurisdictions to share information, pool resources, and manage the Delaware Estuary effectively.

Engagement is a continuum that begins with interest and culminates with stewardship. PDE acts as the public face of DELEP,

engaging people on a daily basis using a variety of tools and tactics that are designed to involve people all along that continuum to improve their awareness, knowledge, and ultimately, stewardship of the Estuary's resources. PDE reaches audiences online, on the airwaves, in writing, and in person. PDE works with partners to provide citizens science opportunities, such as freshwater mussel surveys, teacher workshops, volunteer activities, and many other outreach projects to relate the NEP's work to the people it affects. PDE's unique management structure involves stakeholders in the private and non-profit sector together with public agencies' decision-makers and scientists from across the region to work in concert to develop and implement actions to improve the Delaware Estuary.



West Philadelphia, PA. | Credit: Stephanie Rindosh





PDE brings a science and a regional approach to foster collaboration on local and sub-regional challenges, provides solutions grounded in science, and fosters regional collaboration to achieve effective and lasting solutions.

Annual visits to Delawareestuary.org and EcoDelaware.com have increased by 400% since 2003, with over half a million views in the past 10 years. Over 50,000 people have volunteered for various events, including river cleanups over

the last 10 years. More people can be reached by focusing on target audiences (e.g., teachers, local leaders, other decision makers) using tailored tools and messages. By working with local partners and other collaborators in and around sub-watersheds, messages can be even more tailored geographically and reach new audiences. Through past efforts, PDE has informed many people and communities about the NEP's work and the Delaware Estuary's resources.

## HOW WE WILL MEASURE SUCCESS:

- Improve access to information about the Estuary
- Improve the engagement of citizen scientists, stewards, and key stakeholders



Delaware River, Philadelphia, PA | Credit: Kerri Yandrich





## STRATEGY C2.1: Through marketing and communications, build awareness and brand for the Delaware River and Bay

### Description

With a population of over six million across the region and including several major metropolitan areas, mass communications and marketing are essential to spread the word about the great work and events throughout the Delaware Estuary. Because of its industrial heritage, the river suffers from unfavorable public perceptions that call for different marketing and communications strategies than in other watersheds and across sub-watersheds. Fostering affinity for this under-appreciated resource is the first step in building a sense of stewardship and creating a brand of value and meaning for the Estuary. This is a significant focus for the PDE's marketing and communications efforts, which will work with partners to employ marketing and mass communications, including the following key activities:

- **Publishing *Estuary News*.** Redesigned recently, this publication is produced and distributed by email quarterly and by mail twice annually. *Estuary News* typically reaches over 20,000 people in print and nearly 10,000 via email. PDE uses Salesforce, a cloud-based content management system, to manage and increase newsletter distribution, and benefits from a grant program that provides Salesforce to PDE at a greatly reduced cost. PDE will seek to continue and expand its distribution.
- **Maintaining and improving DelawareEstuary.org.** This web page was redesigned recently and provides information on PDE and its



Participants visit a viewing platform created by DNREC at the Ashton Tract of the Augustine Wildlife Area in Middletown, DE during a 2018 Delaware Bayshore Initiative tour. | Credit: PDE

partners' activities, and makes information and publications accessible online for partners and the public to use and share. PDE will continue to host, populate, and increase web traffic to the site to provide information and introduce new people to the Delaware Estuary. PDE uses Google ads to promote website content thanks to a grant through Google Ad Words that provides these services at greatly reduced cost. Google Ad Words is Google's advertising system in which advertisers can use keywords for clickable ads to appear in Google search results.

- **Promoting through traditional media.** PDE seeks to take advantage of traditional media (e.g., newspapers and other publications), typically with over 100 media placements related to the Delaware Estuary





annually. PDE will continue to increase its media presence by distributing press releases, media advisories, and fact sheets, and building relationships with the press.

- **Promoting on social media.** In recent years, PDE also has increased its presence on social media, with an increasing number of followers on Facebook, Twitter, Instagram, and other platforms. PDE will continue posting social media updates, sharing partners' related posts, and cultivating relationships with followers to keep increasing and improving the Delaware Estuary's presence on social media.
- **Branding the Delaware River and Bay.** In addition to the components above, PDE will explore opportunities with partners to implement a campaign (or campaigns) to brand the Delaware River and Bay using advertising to reach and change the perspectives of the over 8.3 million residents in the Delaware River Basin. Throughout the watershed, there is a growing awareness of the need for more coordinated and sophisticated messaging about water resources' importance and creating an identity for the Delaware River, Bay and Watershed to which people relate. The DRWI's development in recent years has heightened this awareness and brought new perspectives, resources, and expertise to this issue. PDE also will seek to use these factors, as well as the upcoming 25-year and 30-year anniversaries in 2021 and 2026, respectively, to develop and advance a branding campaign. This is one of the most ambitious activities envisioned in the revised CCMP, and, to be successful, would involve collaboration to coordinate messaging with a vast network of partner organizations, media outlets, and local communities. With the appropriate resources, PDE is positioned well to lead/coordinate an effort like this, which local partners throughout the watershed have indicated is a need repeatedly.
- **Capitalizing on opportunities with partners.** In addition to taking the lead on the initiatives above, PDE also will take advantage of opportunities its partners lead to reach new audiences through mass communications.



**Map of the Delaware Bay Byways highlighting primary routes (map does not display side roads to the Bay).** | Credit: Frank McShane (Map from *Estuary News* Volume 27, Issue 2, Winter 2017).



Examples include working with national partners on initiatives (e.g., National Estuaries Week, the “I heart estuaries” social media campaign), with the Philadelphia International Airport to develop and promote an in-terminal educational display on living shorelines and Delaware Bay oysters, and with the Delaware Nature Society and others on the statewide Clean Water, Clear Choices campaign.

- **Prioritize reaching underserved residents.**

DELEP partners will explore, use, and share tools and techniques to ensure that marketing and communications efforts include underserved people and communities.

PDE will work with its partners to develop and use content on science, issues, and activities in the Delaware Estuary for all of the above, including recruiting authors to write diverse, high-quality Estuary News articles. In addition to this content and information, a core message PDE seeks to relay through all marketing and communications is that the Delaware Estuary is an amazing resource in need of stewardship and protection that offers ways for everyone to be involved. Core partners will continue to help support this role through communications and associated activities across the Estuary.

Information overload and the need to compete for people’s attention is an external constraint over which the NEP has no control and very limited advertising dollars with which to compete. Changes in internet, social media, and even traditional media’s standards

and practices can influence the costs and effects of advertising and tracking results in unanticipated ways. Fortunately, PDE has grants from Google AdWords and content management systems, such as Salesforce, that reduce the cost of advertising and tracking data and information on contacts (e.g., addresses) greatly, which helps manage marketing and communications costs.

### **Performance Measures and Key Deliverables**

- Continuous increase in distribution/exposure and examples of success in each state, with at least one major regional marketing campaign
- Track number and results of outreach programs and projects (marketing and communications), including increased distribution of Estuary News (2-4 issues annually) and use of DelawareEstuary.org (refreshed weekly) and social media

### **Costs and Funding**

- **Estimated Cost Range:** \$\$ - \$\$\$
- **Possible Funding Sources:** National Estuary Program funding, supplemented by state, federal, and foundation grants for campaigns; new source needed for major regional marketing/branding campaign

## **Purpose**

*To change people’s perceptions of the Delaware Estuary and reflect on the Delaware Estuary Program’s collective efforts over the past 20 years that have resulted in a cleaner Bay. To provide basic information so more people appreciate the value of the Estuary’s long-term recovery and help us achieve a focused collaborative effort over the next 10 years.*

### **Core Partners**

*Delaware River Basin Commission, Partnership for the Delaware Estuary, States (DE, NJ, PA), United States Environmental Protection Agency*

### **Key Partners**

*Estuary News authors and distributors, Association of National Estuary Programs/Restore America’s Estuaries partners, Delaware River Watershed Initiative and Alliance for Watershed Education of the Delaware River partners*

### **Contributing Partners**

*Local/regional media*

## **Timeframe**

*Ongoing*





## STRATEGY C2.2: Utilize events to increase stewardship and engage new people

### Description

Engaging people as Delaware Estuary stewards begins with heightening awareness of the Estuary's resources, functions, and issues. Events are one of the primary tools available to make that initial introduction, and invite them to become more involved. The Delaware Estuary is fortunate to have a large number and variety of community and/or environmental events held regularly in locations throughout the region. These events range from annual festivals that engage a large number of the general public, to events targeted to audiences' specific local communities, interests, or needs.

PDE implements this strategy primarily, but relies heavily on a host of partners to do so fully and successfully. These partners range from event hosts to co-hosts, sponsors, and exhibitors, all of whom are integral to the events' success.

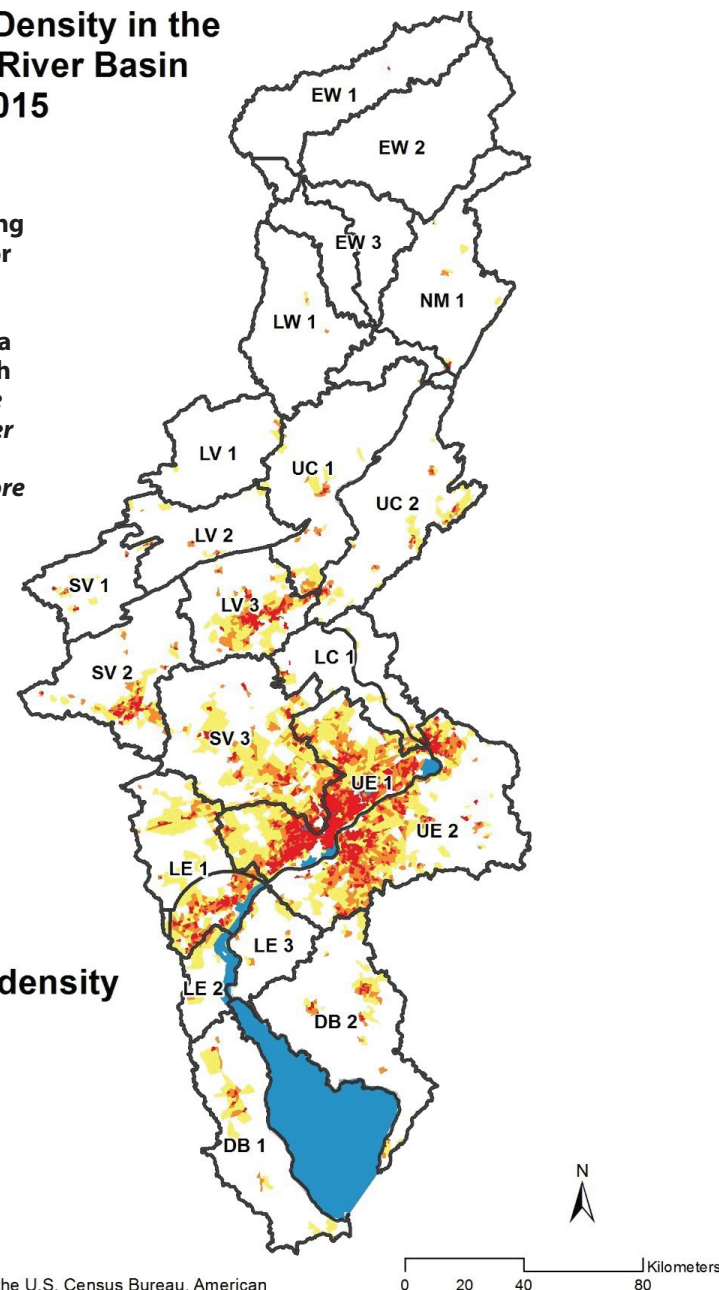
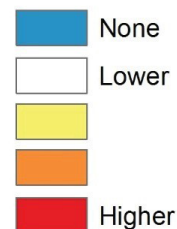
Major components of this strategy include:

- **Host, co-host, and/or support annual Coast Day/Bay Day events with experiential learning opportunities.** For over 10 years, a Coast Day or Bay Day has been held in each of the Delaware Estuary states (DE, NJ, PA)—a tradition that is building affinity for the coast and bay and a sense of place for the Delaware Estuary over time. Traditionally, the Bayshore Center at Bivalve has hosted Bay Day in Port Norris, NJ in June. PDE has hosted Pennsylvania Coast Day in Philadelphia, PA in September, and the University of Delaware's Sea Grant program has hosted Delaware Coast Day in Lewes, DE in October. Each of these events features a large array of coastal-themed activities and information tables, including interactive experiences with direct relevance to the Delaware Estuary, and engages thousands of interested members of the public. PDE and Core Partners

### Population Density in the Delaware River Basin 2015

With population concentrated along the urban corridor of the Delaware River, events like PA Coast Day are a good way to reach many people (See TREB 2017 Chapter 1, Section 1.1 Population for more information)

#### Population density



Population data based on the U.S. Census Bureau, American Community Survey, 5-year estimates by block group, 2011-2015.



will continue to build these events' momentum by continuing to implement and support them.

- **Participate in festival-style events held by others in each state and major watersheds.** Annually, PDE is invited to participate in a variety of festival-style events in different locations throughout the watershed, including co-hosting an Earth and Arbor Day event with the City of Wilmington in Delaware. Many are "tabling" events, at which PDE and partners have tables that provide information and activities to raise public awareness and interest in the Delaware Estuary. Establishing a key message with supporting materials and activities tailored to each events' audience is an important part of this strategy. Annually, PDE and Core Partners will select and attend a series of events that offer the best combination of geographic diversity, attendance, and likelihood of reaching key stakeholders/users.
- **Participate in events and give presentations to groups of key stakeholders/users.** In addition to the festival-style events to which PDE is invited (and which usually have a broad environmentally-related theme), PDE seeks out events and presentation opportunities to reach key audiences. The target audiences for these events are groups with a special interest in the Estuary, including nature lovers, recreational users, businesses, watermen, and others whose work depends on natural resources, particularly in rural areas. Annually, PDE and Core Partners will identify and participate in those events that provide the best opportunities to reach key audiences.
- **Prioritize and/or tailor events to be accessible and engaging to underserved communities.** This includes holding or selecting events that are low or no cost, and that are accessible to local communities within walking distance or by public transportation. Key messages and activities would be tailored to these audiences.



**Conducting public outreach on the water-filtering value of shellfish with a two-tank demonstration at Pennsylvania Coast Day in Philadelphia.** | Credit: PDE

To ensure robust attendance at events, PDE and Core Partners will use traditional and online advertising; share information through social media, websites, email, and newsletters; and conduct outreach to local partners/businesses. They also will continue to explore opportunities to build new partnerships to promote and cross-promote events for greater participation and impact. PDE collects and tracks attendance and newsletter sign-ups from each event that are stored in a contact database for future engagement. The core message PDE seeks to relay through events is that the Delaware Estuary is an amazing resource that needs





stewardship and protection and offers ways for everyone to be involved (with different sub-messages tailored to specific audiences).

The vast majority of events to implement this strategy are held outdoors, and depend on weather; some are held in coastal areas where storms and flooding can have an even greater effect. Poor weather conditions can prevent robust attendance, and lead to cancellations. For example, in 2015, the University of Delaware canceled Coast Day in Delaware because of Hurricane Joaquin. With a changing climate, increased precipitation and more severe weather events are expected, so this strategy may become more challenging and less effective over time. However, events also are opportunities to provide information and raise awareness about climate change. Other conditions outside DELEP's control that will affect this strategy include partnerships and funding—most events will rely on partners to organize, participate in, or fund them, so significant benefits to partners and funding in the watershed could affect the ability to meet event goals.



New Hope, PA | Credit: Jerry Franklin

## Performance Measures and Key Deliverables

- Continuous improvement in event attendance (# of people/events annually)
- Examples of reaching key audiences in each state successfully, including hosting/supporting at least one major event annually
- Track number and results of outreach programs and projects related to events

## Costs and Funding

- **Estimated Cost Range:** \$\$
- **Possible Funding Sources:** National Estuary Program funding, major municipalities, corporate and partner support; federal grants (National Oceanic and Atmospheric Administration Coastal Zone Management Program)

## Purpose

*To introduce people to the Delaware Estuary, provide them with information, and build their awareness through engagement at events.*

## Core Partners

*Delaware River Basin Commission, Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA), United States Environmental Protection Agency*

## Key Partners

*Organizers/partners/exhibitors of major events, including Coast Day/Bay Day, City of Wilmington, Delaware Nature Society, Shad Fest and other event hosts*

## Contributing Partners

*Conservation Districts, Watershed organizations and other Non-Governmental Organizations involved in events*

## Timeframe

*Coast/Bay Days and other festival events often are held annually*





## STRATEGY C2.3: Develop and promote programs that engage teachers and schools in stewardship of the Delaware Estuary

### Description

Teachers, schools, and nature centers are venues to reach youth groups as key audiences to educate them to increase their appreciation of the Estuary and its natural resources' value. Every teacher affects the lives of many students during his or her career. Because educators and their administrators are valuable leaders and messengers within their communities, their engagement often is key in providing programs or projects at schools with an Estuary focus. As some of the largest landowners in many sub-watersheds of the Delaware Estuary, schools and nature centers are valuable and visible demonstration sites for their surrounding communities. For these reasons, developing and promoting programs that engage these key audiences in Estuary stewardship is critical. Activities include:



2015 PDE Teachers workshop at DuPont Environmental and Education Center in Wilmington, DE. | Credit: PDE





- **Developing and providing teachers with training, tools, and materials** that allow them to undertake and promote stewardship in their schools and classrooms, and such programs as teachers' workshops give teachers skills, tools, and ideas for teaching about the Delaware Estuary. Resource guides and classroom materials facilitate teachers' efforts to incorporate Delaware Estuary concepts in required curriculum that can be made available online for easy access.
- **Providing opportunities for schools and classrooms to be hubs** for community engagement and/or involved in experiential learning. Critical activities include contests that challenge youth to use creativity to learn about, and illustrate issues in, the Estuary, and outdoor and floating classrooms that give children and teachers hands-on experience with the Estuary's resources. These also can provide opportunities for volunteers and citizen scientists in the community to be involved, and serve as demonstration opportunities for practices that other members of the community can replicate (e.g., rain gardens, other stormwater management practices).
- **Partnering with institutions of higher learning** can extend the stewardship experienced to older students, and engage those students, from citizen to professional scientists. Making internships and fellowships available to current students gives them in-depth, hands-on experiences, advances their careers, and accomplishes projects that benefit the Delaware Estuary and local communities.
- **Prioritize and/or tailor educational opportunities to be accessible and engaging to underserved communities.** This would include focusing on schools and teachers with predominantly underserved students, and holding low- or no-cost programs accessible to local communities (within walking distance or by public transportation) with key messages and activities tailored to the audiences.



**2015 PDE Teachers workshop at DuPont Environmental and Education Center in Wilmington, DE.** | Credit: PDE

In addition to schools and nature centers, many organizations and agencies provide valuable environmental educational programs and resources to teachers and schools in the watershed on many topics important to the Delaware Estuary. PDE takes the lead in programs and projects designed to connect schools and educators with local partners, filling gaps and providing services to those local partners, and creating and providing unique Delaware Estuary-centric experiences. For example, PDE works closely with PWD and its Fairmount Water Works interpretive center to provide programs for teachers and classrooms in Philadelphia, and with partners in SAN to implement programs for classrooms and schools in the Schuylkill River Watershed. The Alliance for Watershed Education in the Delaware River Watershed includes over twenty nature centers, many of which PDE has worked with. The Alliance offers new and more partnering



opportunities to implement this strategy over the next 10 years.

The core message that PDE wishes to relay to educators and their institutions through these activities is that there are a variety of ways to use the Delaware Estuary and its resources as valuable teaching tools to engage students and improve their success. A significant focus of these efforts is on providing these audiences with opportunities for experiential learning through creative and hands-on activities, volunteer stewardship opportunities, and citizen science.

Changing school environments and teachers' educational standards and requirements can be a challenge in implementing this strategy and is beyond PDE's control. Providing teachers continuing education and professional development credits and other incentives, and tailoring programs to changing curricula, standards, and teachers' schedules are strategies PDE will continue to employ to address this challenge. Eventually, climate change may affect the ability to conduct outdoor activities with teachers and students. In the meantime, climate change is becoming an

important educational topic for teachers quickly, and is a valuable Science, Technology, Engineering, and Math (STEM) learning opportunity that will shape the educational content of the materials covered and produced as part of this strategy.

### **Performance Measures and Key Deliverables**

- At least one effective program for teachers/schools in each state and a growing community of teachers, schools, and students they reach
- Track number and results of outreach programs and projects related to teachers and schools, including production and distribution of classroom materials and guides, and creation/use of internships and outdoor/floating classrooms

### **Costs and Funding**

- **Estimated Cost Range:** \$\$ - \$\$\$
- **Possible Funding Sources:** National Estuary Program funding, major municipalities, state, federal, foundation grants

## **Purpose**

*To engage educators, schools, and nature centers as Estuary stewards both directly and through their effects on students and communities.*

## **Core Partners**

*Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA)*

## **Key Partners**

*Alliance for Watershed Education of the Delaware River, Schuylkill Action Network*

## **Contributing Partners**

*Delaware Association for Environmental Education and other environmental education organizations*

## **Timeframe**

*Many PDE programs for educators and their classrooms take place annually. Most projects with schools can be completed in a 1- to 2-year timeframe. Building relationships with educators and their institutions to facilitate these kinds of programs/projects is ongoing.*



Pennsylvania Coast Day 2017 | Credit: PDE





## STRATEGY C2.4: Develop and promote programs with local communities and partners that foster volunteer stewardship and experiential learning)

### Description

Providing opportunities for experiential learning through topical programs and citizen science projects helps involve local residents in regional restoration projects in a very meaningful way. Whether they develop a greater appreciation of biodiversity through volunteer monitoring, or simply answer a question about marine debris, these teachable moments provide the opportunity to discern current environmental challenges and solutions.

While PDE promotes programs and volunteer stewardship via this strategy, many other partners in the watershed offer programs that provide experiential learning and/or involve volunteers and citizen scientists. PDE will rely heavily on collaborations with partner organizations and their programs, as well as volunteer networks, to implement them.

Major components of this strategy include:



**Volunteers participate in bagging recycled shell to be used in restoration projects.** | Credit: PDE



- **Using storm drain marking and associated activities to engage local communities in preventing stormwater runoff pollution.**

In urbanized areas, the most prevalent path for this pollution is through storm drains and lack of awareness of this is a large part of the problem. Involving local residents in marking storm drains with “no dumping—drains to river” medallions raises their awareness and engages them in doing the same with others on a local level. Since 2000, PDE has collaborated with hundreds of organizations and more than 50 municipalities and their volunteers to mark approximately 100,000 storm drains. In Philadelphia, PDE will continue working closely with PWD to involve residents in storm drain marking that also will attract attention to local watersheds otherwise hidden from view. In other areas of the watershed, PDE will continue to encourage and facilitate storm drain marking on the part of community groups by promoting its value and making marking kits (including instruction manuals, safety vests, adhesive, medallions, and education cards) available to municipal officials, property managers, retail businesses, homeowners’ associations, farmers, and school groups. PDE will work with PWD and other interested partners to expand and improve storm drain marking with new tracking technology and resources, and creative new approaches (e.g., street art stickers).

- **Engaging volunteers in monitoring and citizen science to gather information on our waterways’ quality and current status of our living resources.**

Citizen science involves enlisting enthusiasts rather than scientists to collect data, and offers interested members of the public the opportunity to participate in research. One of the benefits of using volunteer monitoring includes deriving data from a much larger pool of collectors to provide a higher volume of results across a large geographic area. The collection of this information might be impossible otherwise because of the limited amount of research that organizational staff can conduct. One of the primary ways PDE uses

citizen scientists is by recruiting and training volunteers to search for and report on freshwater mussels in local waterways. Since 2012, over 70 volunteer surveys have been completed, with more than 60 volunteers trained by PDE staff annually. PDE will continue to expand this network by holding and promoting volunteer training workshops with partners, continuing to collect data through its online portal, and using results to identify sites for scientific surveys. PDE also will work to expand its citizen science opportunities by developing and implementing new volunteer monitoring programs, like one for wetlands/shoreline monitoring under development currently in partnership with NJDEP and the Barnegat Bay Partnership.

- **Engaging volunteers through oyster shell recycling.** In 2015, PDE started an oyster shell recycling program that collects shells from restaurants so that they can be returned to the Bay. Bagged shells were installed in living shorelines and other conservation projects to increase the number of shells available on which young oysters grow. Through this shell recycling initiative, PDE engages restaurants and their patrons in education about oyster restoration. PDE also encourages volunteers to help collect and bag shells and works with partners, including the PWD, to identify and host new shell management areas. Since the program’s inception, more than 150 volunteer hours have been logged for shell pickup and bagging, in which 13 restaurants have participated. PDE will continue shell recycling efforts in Wilmington, DE and seek to expand them to Camden, NJ and Philadelphia, PA.

- **Hosting, promoting, and participating in river and watershed cleanups.** Cleanups are excellent ways to immerse residents in the outdoor environment while also enlisting them to clean our waterways. For example, the Schuylkill Scrub is a watershed-wide cleanup that takes place every spring and engages tens of thousands of volunteers across the Schuylkill Watershed. PDE also hosts the Christina River Watershed





Cleanup in partnership with DNREC, and Delaware River cleanups in partnership with PWD, each of which attracts hundreds of volunteers annually. Other partners host and/or participate in additional clean-up activities, such as the Coastal Cleanup DNREC hosts in sites along Delaware's coast. PDE will work with these and other partners to expand and improve volunteer involvement, and apply citizen science to assess sources and materials of concern.

- Promoting horseshoe crab volunteer opportunities.** A number of programs partners around Delaware Bay coordinate seek to engage volunteers and citizen scientists in horseshoe crab conservation. These include Development Group's (ERDG) "Just Flip Em" program and New Jersey's "ReTURN the Favor" program, both of which encourage volunteers to flip horseshoe crabs stranded on bay beaches. They also include horseshoe crab and shorebird counting and tagging programs that USFWS and others coordinate, and ERDG's Horseshoe Crab Sanctuary Communities program. PDE will continue to promote volunteer activities associated with these programs, and provide financial support periodically for items, including signage, when feasible.



**Volunteers learn to survey streams for the presence or absence of freshwater mussels.** | Credit: PDE

- Involving communities and corporations in hands-on projects to improve habitat and water quality.** Over the years, PDE's involvement of corporations and communities in hands-on habitat and water quality improvement projects has evolved considerably. The Corporate and Community Environmental Stewardship Program has continued to enlist local partners and volunteers in planning and conducting projects on corporate and community lands. However, corporations increasingly are establishing their own stewardship and grant programs to which PDE applies for specific projects and activities,



and are branching out to become involved in projects at local schools and/or parks. PDE will continue to evolve its efforts in response to these changes, and find ways to involve corporate and community volunteers in meaningful projects where they live and work.

- **Prioritizing and/or tailoring experiential learning opportunities to be accessible and engaging to underserved communities.**

This could include providing low or no cost opportunities that are accessible to local communities within walking distance or through public transportation. Key messages and activities would be tailored to these audiences.

In addition to these major ongoing programs, PDE will continue to encourage and facilitate volunteerism in specific projects, like the water quality and habitat improvement detailed in other strategies. To coordinate and promote volunteer opportunities across these activities and geographies better, PDE will consider adding staff or volunteer capacity to manage volunteers and use apps or other new technologies.

A majority of these stewardship opportunities take place in an outdoor setting and depend on weather, including along waterways or areas prone to stormwater flooding. Climate change effects may lead to cancellations of events, workshops, organized volunteer activities, and decreased participation rates with respect to some of the more expansive projects.

Other obstacles beyond NEP's control that can affect this strategy are contingent upon the availability of funding and long-term partnerships. Volunteer availability and reliability are essential for programs that take place regularly throughout the year and require flexible, yet dependable assistance to operate the program efficiently. The extent of the Delaware Estuary and nature of many of PDE's projects makes developing a reliable corps of volunteers challenging without a robust program to recruit, train, and manage them (which PDE currently lacks, but is interested in developing).

### **Performance Measures and Key Deliverables**

- Assess and increase corps of volunteers and citizen scientists with new data/outcomes shared/used annually, including shell bags produced, storm drains marked, debris removed
- Track number and results of outreach programs and projects related to volunteers and citizen scientists

### **Costs and Funding**

- **Estimated Cost Range:** \$\$
- **Possible Funding Sources:** National Estuary Program funding, major municipalities, state, federal, foundation grants

## **Purpose**

*To engage residents in activities that benefit the Estuary, while also improving their understanding, knowledge, and support.*

### **Core Partners**

*Delaware River Basin Commission, Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA), United States Environmental Protection Agency*

### **Key Partners**

*Academia, cleanup partners, mussel survey training partners, shell recycling partners, Penn State Extension Master Watersheds Stewards, United States Fish and Wildlife Service, Upstream Suburban Philadelphia Cluster, other horseshoe crab and shorebird monitoring partners*

### **Contributing Partners**

*Volunteers, interns/fellows*

## **Timeframe**

*Large-scale volunteer cleanups are held annually. Citizen science, storm drain marking projects, and actions related to shell recycling are ongoing, with annual monitoring of programs (attendance and evaluations)*





## STRATEGY C2.5: Publish and share outreach materials and scientific results

### Description

Sharing scientific research and creative outreach materials with local residents can inspire them to learn more about the role they play in enhancing the Delaware River and Bay. Information relayed through scientific reports also provides readers with insights into the current status and trends of their region's natural resources. Sharing scientific results periodically across regions and sectors helps support organic, bottom-up transfer of valuable scientific data and outreach/education techniques.

Publishing and publicizing findings of current environmental research also provide opportunities for new or emerging research projects through inter-institutional and interdisciplinary grant proposals, and support for future funding. Working with key agency partners, the PDE will continue to provide and share the most accurate, current scientific information on topics critical to the Delaware Estuary to use to make decisions and raise awareness and understanding on the part of the interested public and next generation of scientists.

Major components of this strategy include:

- **Producing and sharing public-friendly publications to improve public awareness and knowledge.** Producing science-based



Poster presentations during the Delaware Estuary Science and Environmental Summit in Cape May, NJ. | Credit: PDE

publications is essential to build public awareness and promote involvement through education. Every 3 to 5 years, PDE publishes the State of the Estuary Report (often as a public-friendly version of Estuary News) which serves as an overview of the tidal Delaware River and Bay's current status. Other products for the public include guides on topics including stormwater, household hazardous waste, and adapting to climate change. These guides translate science into layman's terms for non-science audiences who may be interested in taking action. PDE publications also include products like the Annual Report, which is meant to provide the public with information about programs and priorities, and a window into opportunities for involvement.



- Producing and sharing technical reports and publications related to the Estuary's environmental conditions.** It is critical to share scientific information to encourage learning, collaboration, and decision-making among scientists in different parts or sectors in the region. The purpose of the Technical Report for the Delaware Estuary and Basin (TREB) is to relay information on the status and trends of environmental indicators of the Delaware Estuary and River Basin's health by analyzing the best current quality data. To compile this report, PDE relies on the time and expertise of a variety of partners and scientists on the STAC from agencies, academic institutions, companies, and non-profit entities. The production of a technical report, including the TREB, also can be used for multiple purposes: to provide information for public-friendly documentation, as well as other agency technical reports (e.g., State of the Delaware River Basin Report). Examples of other technical reports PDE produces with the help and input of partners include the Regional Restoration Blueprint and Climate Change in the Delaware Estuary reports. PDE will continue to develop and share such reports to communicate findings with other experts and the engaged public about ongoing projects and associated research.
- Holding and attending the Delaware Estuary Science & Environmental Summit and other meetings and conferences.** Conferences provide the opportunity to share information and develop new collaborations. More than learning about inspiring stories, attendees can learn the way others have solved similar problems that they also may be facing, which helps individuals, as well as entire organizations, surmount roadblocks in their work. Since the Delaware Estuary Science and Environmental Summit's inception in 2005 (and biennially thereafter), this event has allowed scientists, managers, educators, and the public to learn about, and collaborate on, practical solutions to challenges faced in and around the Delaware River and

Bay. In addition (and often between Summit years), PDE hosts other workshops on key issues that need sharing and collaboration. PDE will continue to do both, based on needs partners identify, and post presentations/results on the PDE website for additional learning/sharing. Workshop topics for the near future include monitoring, working with the DRBC and DNREC, and tech transfer between Bayshore communities. PDE also will work with partners in the region who host similar events (e.g., the Coalition for the Delaware River Basin's Delaware Watershed Forum), to explore ways to coordinate and co-promote events to encourage transfer between audiences, and make participation in both events easier for partners who attend both. In addition to these PDE-hosted conferences and meetings, PDE staff participate in a wide array of conferences annually to share expertise and learn from one another. These include annual National Estuary Program meetings, as well as scientific conferences, other regional conferences, and workshops on topics of interest/concern.

- Making materials, publications, and technical information available and engaging to underserved communities.** This could include tailoring and presenting information in a way that is relevant to diverse communities, providing materials and publications at low or no cost and in multiple languages, and using special invitations and/or scholarships to invite underserved community presenters and attendees to the Summit.

Potential barriers beyond NEP's control that affect this strategy include funding and partner constraints. Drafting, compiling edits, and collaborating with writers for reports, including the TREB, can be a lengthy and demanding process for PDE and contributing partners/authors. Sponsorships fund the Summit primarily, and are becoming more difficult to obtain from public agencies, as well as registration fees, where funding relies on participant organizations with healthy budgets.





## Performance Measures and Key Deliverables

- Continue hosting the Delaware Estuary Science & Environmental Summit biennially, and involve more stakeholders at each event (300 people or more, 100 presentations or more)
- Distribute and share reports, publications, and other literature online at DelawareEstuary.org (4,500 annually)
- Produce and distribute reports on accomplishments annually and reports assessing the state of the

Estuary's conditions and trends every 3-5 years

- Track outreach programs and projects through products scientists, managers, and practitioners publish

## Costs and Funding

- **Estimated Cost Range:** \$\$
- **Possible Funding Sources:** State and federal grants and sponsorships, partner and business sponsorships, registration fees



New Hope, PA | Credit: Jerry Franklin

## Purpose

*To educate scientists, practitioners, and the public involved by sharing information on the status, trends, and latest research on the Delaware Estuary.*

## Core Partners

*Delaware River Basin Commission, Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA), United States Environmental Protection Agency*

## Key Partners

*Academia, other Science and Technical Advisory Committee and Monitoring Advisory Coordination Committee member organizations, Science & Environmental Summit partners/sponsors*

## Contributing Partners

*Meeting/event exhibitors, attendees, presenters/authors*

## Timeframe

*Annually to every 3-5 years*



## Strategy C2.6: Engage key stakeholders to coordinate science and management of the Delaware Estuary

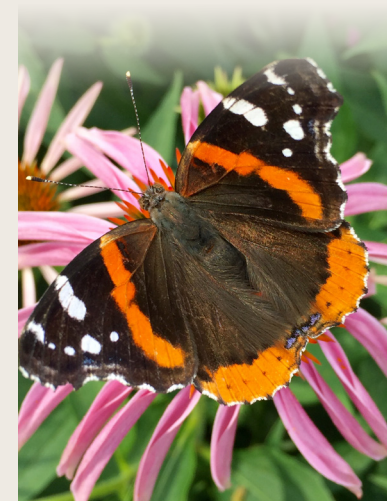
### Description

A critical role of any NEP is the coordination of science and management based on stakeholders' input. This role is particularly important in the Delaware Estuary, where multiple states (DE, NJ, PA), hundreds of local communities, and a variety of federal and regional agencies share its resources' management. The DELEP's Management Conference was designed to incorporate input from these and other stakeholders at multiple levels. Stakeholders are involved through a network of working groups and committees, each of which requires strategic leadership and coordination. Effective communication is needed among these groups to inform and guide collective efforts to protect and enhance the tidal Delaware River and Bay. Key activities include:

- **Coordination of the Steering Committee to provide policy-level guidance for DELEP's Core Partners collective efforts.** This committee consists of leadership-level appointees from the Core Partners identified on the right. The Steering Committee meets twice annually, with leadership rotating between the states (DE, NJ, PA) every two years, in accordance with the agreement among DELEP partners (most recently, in December 2014). This structure ensures Core Partners' consistency and high-level support, which PDE will continue to facilitate with their participation and leadership.
- **Coordination of the Estuary Implementation Committee (EIC) in conjunction with the PDE Board of Directors.** Coordination of the EIC and PDE Board will continue to provide ongoing input from key stakeholders to develop and implement an annual work plan using NEP funding. The EIC includes Core Partners' management-level appointees, as well as other selected government agencies (currently the USFWS and

National Park Service). The EIC, which convenes at least quarterly under the PDE Executive Director's leadership, includes joint meetings with the PDE Board of Directors. The PDE Board of Directors consists of up to twenty representatives from the private, non-profit, or local government sectors elected and operating in accordance with the organization's by-laws. Additional topical committees, meetings and/or phone calls are used as needed to meet NEP requirements and involve individuals with expertise on important topics and issues. This coordination allows both groups an opportunity to provide regular guidance and collaboration in implementing the annual work plan, which PDE has continued to coordinate and submit with Core Partners' participation.

- **Coordination of the STAC to provide a sound scientific basis for PDE and Core Partners' activities on a wide range of scientific topics.** The STAC includes up to 21 elected scientists with diverse expertise and associations with other technical groups, who provide DELEP with robust peer review and technical guidance. As described in its charter, the STAC develops reports on environmental indicators to assess status and trends in the Estuary over time as part of the State of the Estuary reporting all NEPs require every three to five years. The STAC also plays an instrumental role in developing and implementing the scientific content at PDE conferences and workshops, including the Delaware Estuary Science & Environmental Summit held semiannually. The STAC meets with the MACC (described below) annually to assess and update monitoring activities and Delaware Estuary needs. The STAC also meets with the EIC (described above) annually to provide a direct link between science and management groups. The STAC convenes



West Philadelphia | Credit: Stephanie Rindosh

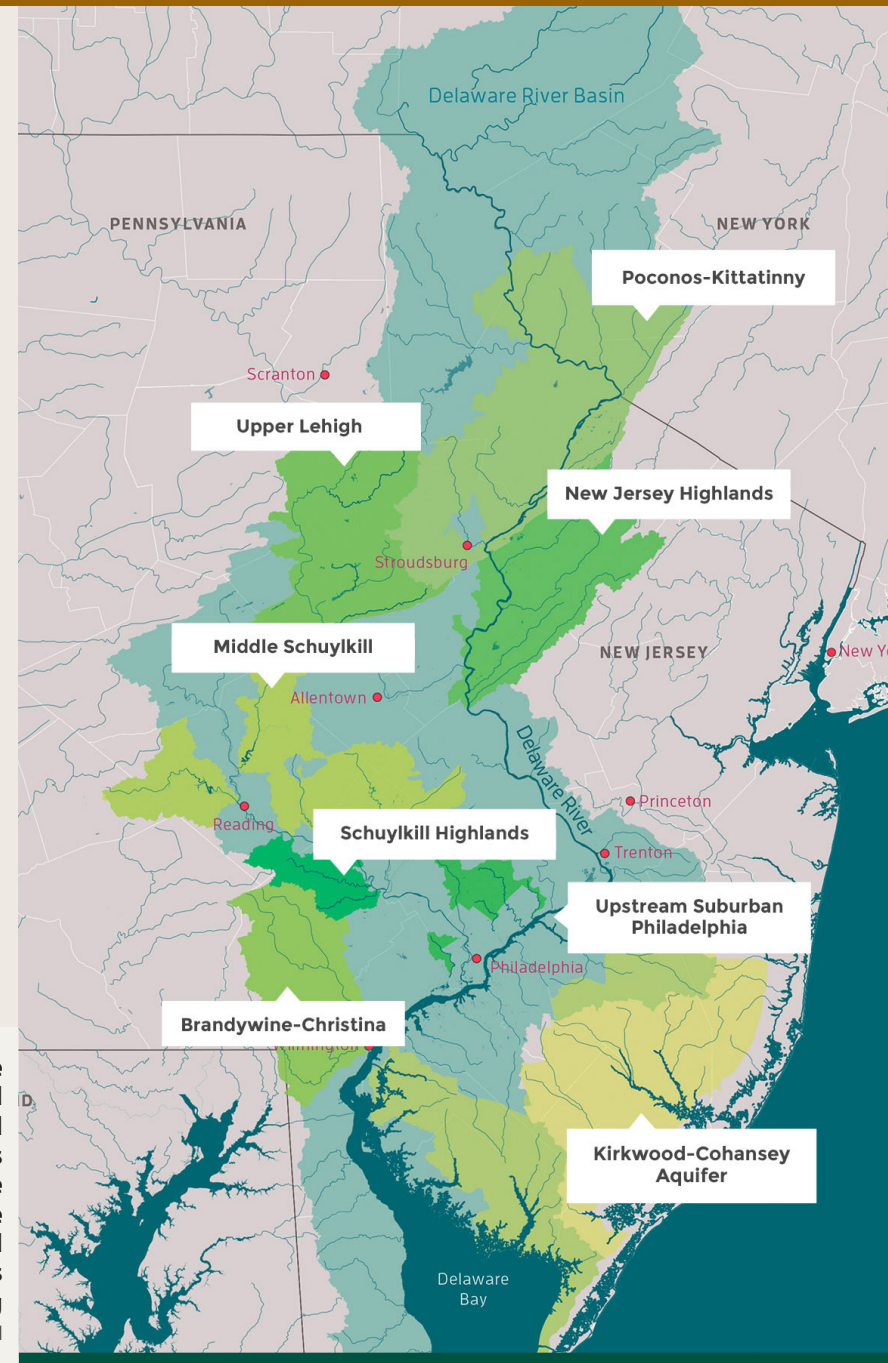




at least quarterly under an elected Chair and the PDE Science Director's leadership. It reports to the EIC, and is available on request to provide peer review and/or develop briefs on topics of concern the EIC requests. As a fundamental part of this strategy, PDE will continue to coordinate STAC with participation and support for Core and other partners.

- **Coordination of the Monitoring Advisory and Coordinating Committee (MACC), Toxic Advisory Committee, and Water Quality Advisory Committee.** DRBC's coordination of these committees provides additional input on technical topics relevant to CCMP implementation. The DRBC staff created and coordinated these committees to provide input and guidance required for DRBC activities and programs, but also to provide valuable input and guidance on these topics to PDE and other DELEP partners. As a regional river basin commission, DRBC plays a critical role in conducting monitoring activities on the main stem of the Delaware River, and linking its monitoring programs with those of PDE and others. Coordination of monitoring related to water quantity and quality, fish and shellfish, key habitats, and other features provides the most comprehensive and efficient way to track changing conditions in the watershed. Monitoring coordination on DRBC's part helps fulfill its own responsibilities/requirements, as well as some of the NEP's key requirements, such as State of the Estuary tracking and reporting.
- **Coordination of, and participation in, sub-watershed collaborations to build and enhance local capacity, partnerships, and stakeholder input to implement the CCMP.** In a watershed as large and diverse as the Delaware Estuary's sub-watershed, collaborations have proven an effective way to engage local stakeholders, including watershed organizations, conservation districts, local governments, and interested citizens, to work collectively to identify and implement local projects and programs of shared value. A prime example of this is the SAN, where PDE and Core Partners, including the PWD, PADEP, and DRBC, have played a leadership role since 2003 in coordinating over 100 local partners' activities to address water quality issues in the Schuylkill River Watershed. Over the next 10 years, PDE will work with these and other Core Partners to strengthen and advance the SAN's work and that of the many other sub-watershed collaborations.
- **Use of a variety of other mechanisms to involve different key audiences.** PDE has engaged with audiences outside of its management structure, including sub-watershed collaborations

**The Delaware River Watershed Initiative identified eight priority areas across the Delaware River Basin where restoration and protection projects can have a lasting impact.** | Credit: DRWI



(local conservation partners), attendees at the Delaware Estuary Science & Environmental Summit (scientists, outreach specialists) and the Annual Experience the Estuary Celebration, Corporate & Community Environmental Stewardship Program members (corporate campuses, local communities), as well as participants in local projects and workgroups. These activities provide some limited opportunities for stakeholder input on NEP priorities outside of the Management Conference structure. The PDE Board of Directors also brings additional local and private-sector resources, input and guidance to the table within the Management Conference. To develop a more meaningful way for an even broader audience to provide input is a challenge that requires a new, innovative approach. PDE will work with the EIC to develop, fund, and implement this concept and design it in a way that includes underserved communities.

PDE will be this strategy's primary lead implementer, except for DRBC committees' coordination described above. However, all the Core Partners mentioned above, as well as the various other participants in these committees and groups, will play critical roles in its implementation and success. This role includes participation, and in some cases, leadership and/or funding for implementation. Activities in this strategy provide the foundation on which to coordinate water quality and resource management and collaboration on projects and programs for greater effect to benefit the Delaware Estuary.

Changes in political administrations and staffing and Core Partners' funding have a significant effect on

this strategy's success. Because of the Steering Committee's composition, there is nearly constant change in leadership attributable to state, federal, and local elections. These changes affect agency priorities, staffing, and funding that is beyond NEP's control. This makes PDE (Board and staff) and the EIC's consistent leadership particularly important. Accordingly, PDE and all partners' flexibility and agility in responding to changes and stepping in to fill leadership gaps as needed also are important.

### **Performance Measures and Key Deliverables**

- Sustain and improve leveraging (through involvement/coordination)
- Continue to convene EIC, STAC and PDE Board of Directors' meetings (at least quarterly) and SC (biannually) to coordinate the management conference
- Track and expand additional meetings and other activities to engage new stakeholders and promote collaboration to address key issues in sub-watersheds

### **Costs and Funding**

- **Estimated Cost Range:** \$\$\$\$
- **Possible Funding Sources:** NEP funding, federal, state, and local grants/contracts, foundation grants

## **Purpose**

*To coordinate diverse scientific, management, and stakeholder groups to protect and restore for the Delaware Estuary's resources most efficiently.*

## **Core Partners**

*Delaware River Basin Commission, Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA), United States Environmental Protection Agency*

## **Key Partners**

*Delaware River Watershed Initiative, National Park Service, Schuylkill Action Network, United States Fish and Wildlife Service, other Science and Technical Advisory Committee and Monitoring Advisory Coordination Committee member organizations, other sub watershed collaborations*

## **Contributing Partners**

*Delaware Bay and River Co-op, National Marine Fisheries Service, United States Army Corps of Engineers*

## **Timeframe**

*Ongoing*



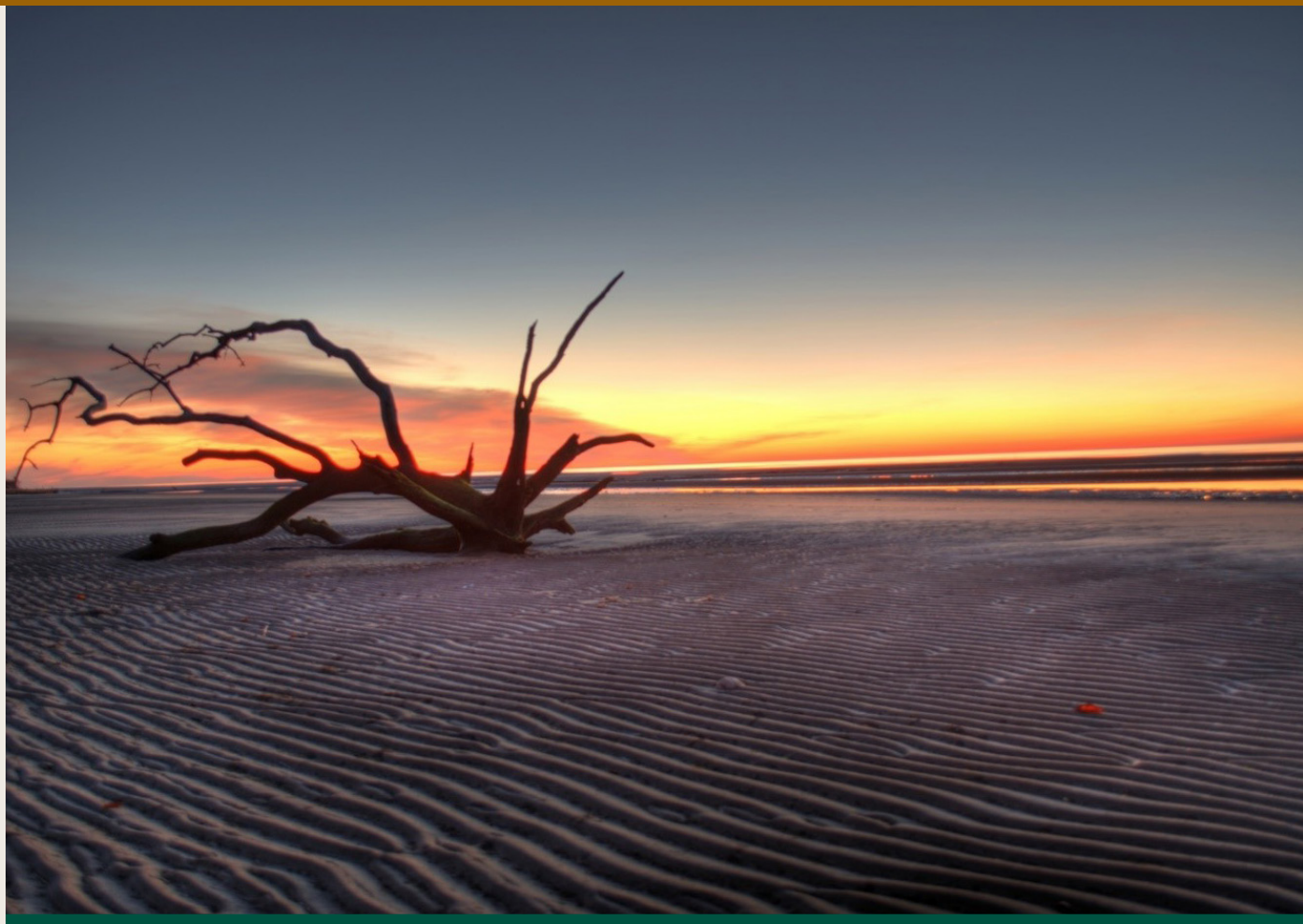


## Strategy C2.7: Monitor, develop, and promote opportunities to assess impacts of outreach

### Description

Assessing outreach effects over time is challenging. Ideally, outreach efforts build awareness, change behavior, and instill an ethic of stewardship in a critical mass of people who can make a measurable difference in the Delaware Estuary over time. Behavioral changes can range from direct effects (e.g., ceasing to use pesticides) to indirect effects (e.g., teaching young children about horseshoe crabs). Effective outreach activities include:

- **In the short-term, use program attendance and evaluations to measure outreach effects.** This could include tracking program participation and the degree to which participants represent target audiences (although this may require some estimating, as most activities do not involve the collection of demographic or economic information on the people involved). The PDE will track and report program attendance and survey results in its annual work plan, and seek ways to collect and incorporate similar data from Core Partners involved in outreach programs.
- **In the short-term as well, identify and pursue efforts to track the extent to which DELEP programs and activities are engaging**



Green Creek, New Jersey. | Photo Credit: Aaron Maffei

**underserved communities.** Again, this may be challenging, as most DELEP activities do not involve the collection of demographic or economic information.

- **In the mid-term, use focus groups and surveys as cost-effective ways to obtain feedback on outreach programs' effects.** These can target very specific audiences (e.g., program participants) or samples



from certain geographies and demographics. In 2013, PDE engaged a marketing and communications contractor to conduct three focus groups and an email survey to provide feedback on communications/ branding for PDE and the Estuary. To gauge effects, focus groups and other methods (e.g., surveys) could be repeated and compared to track changes over time.

- **In the long-term (decades and generations), determine the way outreach efforts contribute to environmental improvements, as indicated by changes in environmental indicators, such as those the State of the Estuary reporting tracks.** PDE will explore new and improved ways to track behavioral changes over time, outreach efforts' effectiveness, and environmental improvement. There are some exciting new opportunities underway in the watershed, including communication efforts under the DRWI and the new Alliance for Watershed Education for the Delaware River that could contribute to environmental improvements over time.

Just as many organizations are conducting outreach within this watershed important to the Delaware Estuary, many are involved in assessing results. PDE will continue to take the lead on outreach and communications specific to the Delaware Estuary, and their tracking and reporting for the NEP's purposes. If there are opportunities to advance research and practices in this arena that could

benefit from everyone working in the watershed, we will seek them out and pursue them where feasible with partners' input and support.

The greatest barrier to measuring outreach effectiveness is scarcity of funding. For many of the outreach programs and projects PDE undertakes, a rigorous assessment of their effects on behavioral change would cost more than implementing the project itself. A second and related barrier is the lack of data and cost-effective best practices to assess the effects, which may lead funders to under invest in outreach programs. This strategy is designed to help address this constraint, and new technologies that can help control costs associated with measuring results (e.g., Survey Monkey for post-surveys will be explored).

### **Performance Measures and Key Deliverables**

- Conduct focus groups and surveys
- Identify and implement new performance measures for outreach
- Track numbers and results of research projects on outreach

### **Costs and Funding**

- **Estimated Cost Range:** \$
- **Possible Funding Sources:** Outreach program partners, state/federal grants, foundation grants

## **Purpose**

*To measure and demonstrate outreach efforts' effectiveness to report results and fine-tune programs.*

## **Core Partners**

*Partnership for the Delaware Estuary, Philadelphia Water Department, States (DE, NJ, PA)*

## **Key Partners**

*Program partners and participants, contracted experts*

## **Contributing Partners**

*Alliance for Watershed Education of the Delaware River*

## **Timeframe**

*Focus groups and surveys repeated every 5-10 years would allow results to be compared over time*

