

# PDE CCMP EXPERT WORKSHOPS SUMMARY

February 2017

This document summarizes input received at nine expert workshops hosted by the Partnership for the Delaware Estuary (PDE) between November 2016 and February 2017, which were held in order to gather ideas for revising the Comprehensive Conservation Management Plan (CCMP) for the Delaware Estuary. It includes a synthesis of the comments offered by experts at each workshop.

## CONTENTS

- Introduction ..... 2
- Workshop Presentations and Structure ..... 3
- Key Topics ..... 4
- Workshop Summaries ..... 8
  - Healthy Waters..... 8
    - Repeated topics across all Healthy Waters workshops ..... 8
    - Repeated concepts for reducing toxic discharges and reducing toxic chemicals in fish ..... 8
    - Repeated concepts for measuring improvements in dissolved oxygen and ecological health ..... 9
    - Repeated concepts for achieving and maintaining flow at benchmarks for drinking water and ecology under changing watershed conditions..... 10
  - Healthy Communities ..... 10
    - Repeated topics across all Healthy Communities workshops..... 10
    - Repeated concepts for restoring vacant urban waterfronts and taking action to increase resilience in river and bay front communities ..... 11
    - Repeated concepts for sustaining and enhancing access to the bay and improving access to the river, and increasing protected land with public access ..... 11
    - Repeated concepts for increasing PDE web site visits, downloads, and newsletter subscriptions; engage citizen science volunteers and stewards in major metro areas and watersheds ..... 12
  - Healthy Habitats ..... 12
    - Repeated topics across all Healthy Habitats workshops ..... 12
    - Important concepts across habitat types ..... 13
- Unique and Creative Concepts Emerging from the Workshops ..... 14
  - Healthy Waters..... 14
  - Healthy Communities ..... 15
  - Healthy Habitats ..... 15
- APPENDICES ..... 16

## INTRODUCTION

The Partnership for the Delaware Estuary (PDE), on behalf of the Delaware Estuary Program (DELEP), invited input for revising the Comprehensive Conservation Management Plan for the Delaware Estuary (CCMP). Input was solicited from approximately 300 scientists and experts on topics related to *Healthy Waters, Healthy Habitats, and Healthy Communities*, the thematic areas proposed for the revised CCMP. In Spring 2016, over 150 of these experts provided responses to a series of simple open-ended survey questions on actions underway and needed to address these topics. Input was also received from three public listening sessions held in Summer 2016 for feedback on a basic set of draft goals for each theme. PDE compiled feedback from surveys and listening sessions into an “Ideas Document,” along with additional feedback collected from its Science and Technical Advisory Committee and Estuary Implementation Committee in Fall 2016. Over 1,700 ideas were collected and categorized into this document, without regard for their feasibility or suitability as CCMP actions.

Following this initial collection exercise, all experts surveyed were invited to participate in workshops to further refine actions for the CCMP. The goals of these workshops were to:

- Ensure that participants’ most important ideas were captured by PDE,
- Filter and refine a list of ideas for the revised CCMP, and
- Explore connectivity and strategies for implementation and monitoring.

Three workshops were held for Healthy Waters, three workshops were held for Healthy Habitats, and three workshops were held for Healthy Communities. Organizers ensured that workshops were held in multiple locations within the geography of the watershed in a manner that would allow for participation from as many organizations and experts as possible. The dates and locations of the nine workshops were as follows:

- Healthy Waters (1): 11/17/16 @ DRBC, West Trenton, NJ
- Healthy Waters (2): 12/7/16 @ St. Jones Reserve, Dover, DE
- Healthy Waters (3): 1/10/17 @ CCMUA, Camden, NJ
- Healthy Habitats (1): 2/1/17 @ Montgomery Co. Community College, Blue Bell, PA
- Healthy Habitats (2): 11/29/16 @ Abbotts Mill, Milford, DE
- Healthy Habitats (3): 1/9/17 @ PSEG EERC, Salem, NJ
- Healthy Communities (1): 1/31/17, Heinz Refuge, Philadelphia, PA
- Healthy Communities (2): 12/8/16 @ Cumberland Co. College, Vineland, NJ
- Healthy Communities (3): 1/11/17 @ St. Jones Reserve, Dover, DE

The workshops attracted 120 unique participants, representing over 70 organizations, agencies, companies, and institutions.

The purpose of this document is to summarize the key concepts and feedback received from those workshops for PDE and its partners to use in crafting strategies and actions for the revised CCMP.

## WORKSHOP PRESENTATIONS AND STRUCTURE

Each CCMP Expert Workshop followed a similar format. Jim Eisenhardt from RK&K welcomed the group and reviewed the materials. A representative from PDE, either Jen Adkins, Danielle Kreeger, or Lisa Wool, gave a short summary of the framework for the revised CCMP and guidance on the types of actions most appropriate for including in the revised CCMP. The summary included a comparison of the structure of the 1996 CCMP with the anticipated structure of the revised CCMP. Participants were then given the chance to review the workshop-specific *Ideas Document* and vocalize their favorite ideas through a discussion facilitated by Jim.

After getting familiar with the *Ideas Document*, participants broke into three groups and were sent to one of three stations representing the three goals of the particular workshop. (Revised CCMP themes and goals are shown below in **Table 1**.) A facilitator was assigned to each station, and the same facilitator was used for same topic when possible. Facilitators included Emily Baumbach (PDE), Sari Rothrock (RK&K), and Laura Whalen (RK&K), with Catherine Cruz-Ortiz (RK&K) rotating in when needed. For Healthy Waters and Healthy Communities workshops, participants stayed at each goal station for 45 minutes and then circulated to the next, ensuring their input on all three goals for the given theme. At Healthy Habitats workshops, participants were invited to select the habitat goal for which they had expertise, and were invited to shift stations at the end of each round, but were not required to do so.

**Table 1: Revised CCMP Themes and Goals**

Healthy Waters	
Toxics	Reduce toxic discharges and reduce toxic chemicals in fish
Nutrients	Measure improvements in dissolved oxygen and ecological health
Flow	Achieve and maintain flow at benchmarks for drinking water and the ecology under changing watershed conditions
Healthy Communities	
Healthy Growth	Restore vacant urban waterfronts and take action to increase resilience in river/bay front communities
Public Access	Sustain and enhance access to the bay and improve access to the river; increase protected land with public access
Public Engagement	Increase PDE web visits, downloads, and newsletters subscriptions; engage citizen science volunteers and stewards in major metro areas and watersheds
Healthy Habitats	
Wetlands	Prevent wetland loss and track changes in condition
Forests	Stem forest loss basin-wide and identify and protect high priority forests
Fish and Shellfish	Maintain or increase oyster beds and productivity; Measure and improve abundance and habitat for freshwater mussels, spawning horseshoe crabs, iconic fish like sturgeon, and nursery habitat for fish and crabs; Restore fish passage

At each goal station, a series of challenge questions was posed to the group. There were three primary questions, each with three sub-questions:

- Were your most important ideas captured? If not, what is missing?
  - o What actions are most important for making meaningful progress toward goals?
  - o Which actions are already being addressed?
  - o Which actions are important for filling gaps or overcoming barriers that aren't being addressed?
- Which of these actions are most feasible to include in the revised plan?
  - o Which actions have sufficient resources (or potential for securing resources) to carry them out?
  - o Which actions can be reasonably accomplished in the next 10-15 years?
  - o Which actions are appropriate for the CCMP (non-regulatory, within the geography, collaborative, science-based)?
- How can progress be measured?
  - o Which actions are important for making measurable progress toward goals?
  - o What metrics could be used for the actions you consider most important?

Facilitators at each station recorded participant responses and discussion. Facilitator notes from each workshop were assembled and analyzed by RK&K for repeated concepts and common topics across the three groups.

The remainder of each workshop consisted of a facilitated discussion including review of the notes and a report-out from each goal station. The final agenda item of the day was a discussion facilitated by Jim on connections between actions and ideas across goals and themes. The purpose of this discussion was to continue refining actions and ideas that were deemed important, and to identify actions that cut across themes.

## KEY TOPICS

After assembling notes from all workshops, RK&K identified certain topics that emerged as crossing themes and action categories. The following list contains summaries of these common topics, along with brief explanations of their importance. *Note: the following topics are not listed in order of importance.*

### CREATING, SUPPORTING, AND PROMOTING GREEN JOBS

Creating, supporting, and promoting green jobs was a theme that emerged routinely in the Healthy Waters and Healthy Communities workshops. Participant definitions of "green jobs" varied (definitions included positions related to ecotourism, as well as having to do with installing and maintaining green or even grey infrastructure). Participants interested in green jobs articulated a combination of the following points: green jobs create economic benefit for a community in a way that supports rather than depletes resources; green jobs simultaneously provide ecological uplift and educate employees about water in the community; creating green jobs (especially in environmental justice communities) paints a story that legislators will find compelling, creating the political will needed to generate more.

*Categories: outreach/education, BMPs/restoration, funding*

### CONDUCTING OYSTER RESTORATION/SHELL PLANTING

Conducting, supporting, promoting, and finding funding for oyster restoration was discussed in virtually every workshop. Participants articulated that the Delaware Bay community knows how to do oyster restoration, and that the limiting factors are political will and/or funding to purchase shell. Return on investment for shell planting is high, making for a compelling story to communicate to legislators and the general public. Restoring oysters creates ecological uplift, cleans water, can help to support the economic and cultural legacy of the oyster industry on both sides of the Delaware Bay, and creates a plethora of outreach opportunities with the general public. PDE's Oyster Shell Recycling Program, which collects shell from restaurants, helps to support shell planting, public outreach, and raise the profile of the Delaware Bay.

*Categories: outreach/education, BMPs/restoration, funding*

### INCLUDING CLIMATE CHANGE

The importance of including climate change in the CCMP and all actions moving forward was underscored in all workshops. Participants raised research questions regarding flow and habitat, discussed the need to prioritize habitat restoration work, elevated the need to work with coastal and riverine communities, and discussed the importance of predictive models, all in light of anticipated climate change impacts. Specifically, the idea of ecological and community resilience to climate change impacts was also frequently discussed. The Climate Vulnerability Workshops being held in late March will assess the vulnerability of CCMP goals to climate change; however, participants loudly advocated for climate change to be taken account of in the CCMP and the CCMP actions themselves.

*Categories: research/monitoring, outreach/education, BMPs/restoration, funding*

### INSTALLING GREEN INFRASTRUCTURE

Installing, promoting, and doing outreach around green infrastructure was discussed in all workshops. Participants in several workshops voiced their interest in green infrastructure demonstration projects that would provide both ecological uplift and become an opportunity for public outreach. Participants voiced multiple definitions of 'green infrastructure,' though most defined it as either manmade installations using natural materials to mimic natural systems, or as natural systems themselves (forests, wetlands). Some participants thought that green infrastructure should be installed opportunistically, while others thought there should be a plan prioritizing locations for installations.

*Categories: outreach/education, BMPs/restoration*

### RESEARCHING/MONITORING THE EFFECTIVENESS OF BMPS AND RESTORATION EFFORTS

Perhaps an addendum to the "green infrastructure" topic above, many participants in both the Healthy Waters and the Healthy Habitats workshops recommended actions aimed at monitoring and assessing the benefit provided by BMPs after installation. Armed with this information, practitioners can make better decisions about the best places to site the most effective BMPs for maximum benefit.

*Categories: research/monitoring, BMPs/restoration*

### PROMOTING EXPERIENTIAL LEARNING

Participants in the Healthy Communities and Healthy Habitats workshops spoke about the importance of ‘experiential learning,’ which they defined as learning through doing—particularly in regards to interacting with and building affinity for a resource. Ecotourism activities, including guided walks and kayak tours, were recommended, as were programming from local watershed groups and schools that help get kids outside to experience nature. Some participants included green internships and jobs in this category. Citizen science opportunities and volunteer experiences like cleanups were also frequently included with this topic.

*Categories: research/monitoring, outreach/education*

## COLLABORATING WITH HIGH SCHOOLS AND INSTITUTIONS OF HIGHER LEARNING

Participants at a number of different workshops recommended that more collaboration with educational institutions and students would provide additional resources and benefit to the Delaware Estuary Program. There are approximately 90 colleges and universities in the Greater Philadelphia area. Working with them would strengthen the brand of the Delaware Estuary, and provide new opportunities for research and outreach. Participants recommended leveraging volunteer hours from students for programs and installations, as well as providing research topics to students looking for meaningful subjects for papers and theses.

*Categories: outreach/education, research/monitoring, BMPs/restoration, funding*

## SUPPORTING OR CONNECTING WITH ADVOCACY EDUCATION

For all workshop topics, participants routinely recommended linking people with advocacy education opportunities, or partnering with organizations that provide it. The timing of the workshops coincided with a presidential election in the United States, which may have helped to bring this theme to the forefront. Participants showed interest in empowering the general public to advocate for protection, restoration, and funding for natural resources (including drinking water). Participants articulated the importance of connecting audiences with organizations that provide this type of education, or providing outreach information that may be compelling to decision-makers.

*Categories: outreach/education, funding*

## PROVIDING ASSISTANCE TO MUNICIPALITIES AND THE AGRICULTURAL COMMUNITY

Workshop participants for all topics recommended outreach and collaboration efforts involving two audiences in particular: municipalities and the agricultural community. For municipalities and local governments, participants were interested in outreach efforts that would provide technical assistance to municipalities, including model ordinances. Participants also recommended municipal outreach on green and natural infrastructure. For farmers and the agricultural community, participants recommended focusing outreach on green BMPs, water conservation, and nutrient management.

*Categories: outreach/education, BMPs/restoration*

## ASSESSING AND COMMUNICATING THE COST, VALUE, OR ECONOMIC BENEFIT OF RESOURCES, ECOSYSTEM SERVICES, AND ENVIRONMENTAL ACTIONS

Throughout the series of workshops, participants articulated the importance of ascribing some type of value to resources and habitats. The recommendation for assessing value came from one of three places: a desire to weigh the potential benefits of certain types of protection or restoration, an interest in developing a tool with which to better communicate the value of environmental actions, and a tool with which to better measure and track changes and trends. At the workshops, there was some discussion regarding whether or not environmental valuation was appropriate, but most agreed that assessing ecosystem service values would be worthwhile.

*Categories: research/monitoring, outreach/education, BMPs/restoration*

## CREATING, MAINTAINING, AND SHARING DATABASES AND INVENTORIES

Participants in the workshops invariably discussed a particular strength of the Delaware Estuary Program—sharing science-based information—and often followed this observation with a recommendation for the Program to create some type of database from which partners could pull information and track trends. Some inventories recommended included access points, environmental-related field trips for school groups, stormwater BMPs, agricultural BMPs, model ordinances, and habitat and community resilience BMPs.

*Categories: outreach/education, BMPs/restoration, research/monitoring*

## PRIORITIZING AND TARGETING PLACES, PROGRAMS, AND ELEMENTS FOR RESTORATION, SUPPORT, OR FOCUS

Building from the concept of creating inventories and databases, participants frequently recommended prioritizing a number of different things for investment, work, or focus. Workshop attendees often talked about the need to prioritize projects based on a set of to-be-determined criteria. Some recommended specific conditions to target—for example, prioritizing the most vulnerable wetlands for restoration, or the forests hovering at tipping points—while others recommended creating nuanced ranking systems in order to determine specific needs. Prioritizing wasn't limited to restoration projects—participants also recommended prioritizing landowner assistance programs and dams for removal.

*Categories: research/monitoring, BMPs/restoration*

## TELLING THE STORY

The importance of good storytelling and communication was raised time and again at the workshops. Many people expressly recommended “telling the story” about the estuary and its resources. Several times participants mentioned the importance of “telling the story” for regulatory agencies about the good work that the agencies have accomplished and milestones that have been achieved. Audiences intended to listen to the story include the general public, decision-makers, and legislators. Specific stories that participants were interested in telling include oysters in the bay, horseshoe crabs and shorebirds, freshwater mussels, and the history of the river and bay.

*Categories: outreach/education*

## WORKSHOP SUMMARIES

Based on a review of workshop notes, RK&K identified certain topics that were emphasized in all workshops of the same theme. These lists are similar to the “key topics” list; however, the topics listed here were ones captured only within the identified theme. (For example- microplastics were discussed in some context in each of the Healthy Waters workshops, but not in the Healthy Habitats or Healthy Communities workshops.) While these concepts may not have been repeated within the same workshop, they were repeated across workshops of the same theme.

RK&K also identified statements that were repeated across multiple participant groups for a specific goal within the same workshop (i.e. both the yellow group and the blue group stressed the same point). These “repeated concepts” are identified in the sections below in the following categories: general comments/topics; outreach, education, and collaboration actions; best management practices and restoration actions; funding; and how can progress be measured.

**Please note: key topics captured in the section above will *not* be highlighted below.**

### HEALTHY WATERS

#### REPEATED TOPICS ACROSS ALL HEALTHY WATERS WORKSHOPS

- Chlorinated pesticides
- Microplastics
- Trash-free water strategies
- Expand Master Watershed stewards
- CSOs
- Develop nutrient standards
- “Keystone issues” relatable issues that tie multiple things together: flooding, oysters
- Livable Lawns
- Brownfields
- Monitoring for TMDLs
- Pharmaceuticals
- Supporting communities with MS4s
- Ammonia
- Biological endpoints for flow
- Watershed plan/prioritization for dam removal
- Working with water utilities/purveyors

#### REPEATED CONCEPTS FOR REDUCING TOXIC DISCHARGES AND REDUCING TOXIC CHEMICALS IN FISH

- General comments/topics
  - o Focus on sediment and sediment management, including measuring toxics in sediment
  - o Legacy and emerging contaminants
  - o Plastics are placed under toxics category; should be under emerging contaminants.
  - o Emphasize topics related to microplastics
- Outreach, Education, and Collaboration Actions
  - o Increase outreach on fish advisories
  - o Increase engagement with the business sector



- Focus on experiential learning to connect people with water resources
- Continue pharmaceutical take-back education/prevention of improperly disposed medication
- **Best Management Practices and Restoration Actions**
  - Support regulatory actions that are complementary to current goals
  - Be more responsive to spills/Address spills more thoroughly
  - Use/support/promote WATAR (Watershed Approach to Toxics Assessment and Restoration) actions
  - Use activated carbon.
  - Implement BMPs to reduce toxics.
- **How can progress be measured?**
  - Measure reductions in point discharges
  - Monitor fish/fish tissue to track contaminants and/or PCBs.
  - Track number of sites remediated.
  - Track reductions in fish advisories.

#### REPEATED CONCEPTS FOR MEASURING IMPROVEMENTS IN DISSOLVED OXYGEN AND ECOLOGICAL HEALTH

- **General comments/topics**
  - Change the words “measure improvements” in the goal phrase above.
  - The goal phrase needs to reflect other actions besides DO and ecological health.
- **Research and Monitoring Actions**
  - Research the impact of nutrients on wetlands
  - Research DO and Nutrients.
  - Need to identify nutrient/biological endpoints with greater specificity (research needed)
- **Outreach, Education, and Collaboration Actions**
  - Educate municipalities/local governments
  - Develop and disseminate model ordinances
  - Increase awareness and understanding of CSOs
  - Continue non-point source education
  - Focus nutrient reduction outreach on homeowners with lawns
  - Educate about stormwater fees
  - Expand the Livable Lawn program.
  - Collaborate and/or work with the agricultural community.
  - Promote/Celebrate BMP or program successes
  - Camden County Municipal Utilities Authority (CCMUA) as a model utility
- **Best Management Practices and Restoration Actions**
  - Install BMPs for and educate on point sources/point source reductions
  - Increase BMPs that focus on stormwater/MS4/nonpoint source reductions
  - Site projects where they will be successful
  - Find innovative funding sources.
- **How can progress be measured?**
  - Track BMPs; establish and use similar metrics across BMPs
  - Use collaborative funding/pooled funds for monitoring

- Track acreage of BMP installations.
- Collaborate with various groups to track projects after implementation/BMPs

#### REPEATED CONCEPTS FOR ACHIEVING AND MAINTAINING FLOW AT BENCHMARKS FOR DRINKING WATER AND ECOLOGY UNDER CHANGING WATERSHED CONDITIONS

- General comments/topics
  - Change the term 'benchmarks' in the goal phrase; consider 'target'
- Research and Monitoring Actions
  - Establish a target for ecological flow
  - Study consumptive use (especially of largest users)
  - Research the connection between groundwater (and aquifers) and surface water supply
  - Maintain and expand groundwater monitoring networks
- Outreach, Education, and Collaboration Actions
  - Audience
    - Conduct outreach to homeowners.
    - Conduct outreach to municipalities.
  - Topic/Message
    - Green Infrastructure/BMP/Natural Infrastructure outreach and education
    - Outreach on water conservation
    - Outreach on impacts of climate change, especially regarding increased variability of flow
    - Conduct outreach on how lifestyle impacts water supply.
    - Conduct public outreach in support of regulation and regulatory agencies.
    - Outreach about drinking water
  - Create/promote/support green jobs (green and gray infrastructure, ecotourism)
  - Work with public and private utilities, water suppliers
- Best Management Practices and Restoration Actions
  - Install low-flush toilets
  - Protect source water
  - Install/use green infrastructure
- How can progress be measured?
  - Measure in-stream flows, base flow

#### HEALTHY COMMUNITIES

##### REPEATED TOPICS ACROSS ALL HEALTHY COMMUNITIES WORKSHOPS

- Signage
- Environmental Justice and underserved communities
- Economic values/ecosystem service values of resources
- Identity- create cohesion/branding
- Inclusive messaging
- EPA trash-free waters
- Information sharing around brownfields
- Create/sustain youth job programs and volunteer corps

- Work with schools
- Build capacity in communities that rely on natural resources
- Create opportunities for multiple activities at access points

#### REPEATED CONCEPTS FOR RESTORING VACANT URBAN WATERFRONTS AND TAKING ACTION TO INCREASE RESILIENCE IN RIVER AND BAY FRONT COMMUNITIES

- General comments/topics
  - o Target efforts in environmental justice and underserved communities
  - o Dislike the action that states “discourage growth,” alter the wording.
- Research and Monitoring Actions
  - o Define what metrics constitute success for resilience
- Outreach, Education, and Collaboration Actions
  - o Outreach to communities/municipalities
    - Provide communities with brownfields support- help them get engaged in the agency process, provide information and technical assistance (like grant writing)
    - Provide communities with information on retrofitting for hazard mitigation and climate adaptation
    - Outreach to municipalities specifically about green/natural infrastructure
    - Ensure local communities are involved with all on-the-ground BMP installations.
    - Education on/distribution of model ordinances and zoning opportunities for resilience and sustainability
  - o Provide outreach to waterfront and natural resource economy communities
  - o Use weather events to create interest in pre-storm/hazard mitigation/climate adaptation planning
  - o Messaging for outreach and communication: focus on economic and financial impacts
  - o Empower the public to speak to legislators
- Best Management Practices and Restoration Actions
  - o Create demonstration and pilot projects.
  - o Repurpose existing elements to support resilience.

#### REPEATED CONCEPTS FOR SUSTAINING AND ENHANCING ACCESS TO THE BAY AND IMPROVING ACCESS TO THE RIVER, AND INCREASING PROTECTED LAND WITH PUBLIC ACCESS

- General comments/topics
- Research and Monitoring Actions
  - o Prioritize areas for focus.
  - o Compile existing project inventories
  - o Need to inventory and map access points
- Outreach, Education, and Collaboration Actions
  - o Signage
    - Use signage for education, outreach, wayfinding, and branding
    - Create signage for roads and bridges about watersheds (like the Chesapeake Watershed)
  - o Create programming for and support multiple experiences at access points
  - o Target a variety of audiences with inclusive messaging and words

- Engage with youth programs
- Utilize new technology/apps to engage new audiences and to more efficiently convey information.
- Determine which groups should be a part of compiling projects/creating an inventory.
- Expand “EcoDelaware” estuary-wide/Create an estuary-wide repository for ecotourism and recreation areas.
- Focus outreach on environmental justice communities, underserved communities, and urban populations.
- Best Management Practices and Restoration Actions
  - Protect and restore natural areas to sustain and enhance access
  - Create long-term sustainable public access sites
  - Develop access point infrastructure and site amenities
- How can progress be measured?
  - Count boat ramps as a metric for progress

REPEATED CONCEPTS FOR INCREASING PDE WEB SITE VISITS, DOWNLOADS, AND NEWSLETTER SUBSCRIPTIONS; ENGAGE CITIZEN SCIENCE VOLUNTEERS AND STEWARDS IN MAJOR METRO AREAS AND WATERSHEDS

- General comments/topics
  - Don't use "PDE" (or just PDE) in the goal; remove or use "DELEP Partners"
- Research and Monitoring Actions
  - Pull together a network/inventory of engaged organizations/players
  - Determine how to best track behavior changes to indicate progress on issues
- Outreach, Education, and Collaboration Actions
  - Create a more cohesive identity/target estuary-wide branding strategies
  - Create a slogan
  - Work with youth
  - Increase environmental literacy through schools and local organization programming
  - Work with high schools (students, teachers, administrators)
  - Ensure visual representation of resources and projects online (incl. social media)
  - Create an online hub, portal, or clearinghouse for all partners as a place to share information
  - Create and share progress reports on goals, actions, and projects

## HEALTHY HABITATS

REPEATED TOPICS ACROSS ALL HEALTHY HABITATS WORKSHOPS

- Sediment monitoring from RSMP
- Fish passage and post-passage monitoring
- Dam removal/prioritizing dam removal
- Shell planting
- Protecting freshwater wetlands
- Protect forests along waterways, riparian areas
- Collect and share soil data (to know where to plant/install; how to restore)
- PDE's Freshwater Mussel Recovery Program

- Continue ongoing sturgeon research on spawning locations and habitat
- Research the full scope of impingement and entrainment and its impact on fish populations on a cumulative estuary-wide level
- Horseshoe crabs (telling the story, continue citizen science through counts)
- MACWA
- Forests and invasive species
- Stewardship plans for forests
- Freshwater mussel and intertidal oyster research
- Restoration in the urban corridor

#### IMPORTANT CONCEPTS ACROSS HABITAT TYPES

As articulated in the Workshop Presentations and Structures section, the Healthy Habitats workshops did not rotate break-out groups in the same manner as the Healthy Communities and Healthy Habitats workshops. As a result, it is not possible to identify repeated concepts across groups. Instead, RK&K identified the following concepts below as important across habitat types for all Healthy Habitat workshops.

- General comments/topics
- Research and Monitoring Actions
  - Creating a prioritization or evaluation system for habitat restoration efforts, and subsequently prioritizing specific locations for restoration was recommended for all habitat types across all workshops.
    - For wetlands, experts recommended prioritizing areas important to restoring natural flow, areas prone to marsh migration, and landowner assistance programs that are well-used.
    - For forests, experts recommended creating a ranking system to protect forested areas and related features that take into consideration ecological, recreational, historic, and cultural values.
    - For aquatic connectivity, experts recommended prioritizing which dams to remove or culverts to fix, as based on habitat value (not stream miles), interactions with climate change impacts, and cultural/historic needs of the community.
  - Inventorying and monitoring projects with a project registry was recommended by participants. Participants felt that having all information collected in one place could help the scientific community to better understand trends, more thoughtfully prioritize projects, and more efficiently share information.
  - Establishing baselines from which to track change was important across the board.
  - Researching and promoting awareness of plant communities was recommended for both forest and wetland habitats. In wetlands, plant species help identify soil type, which is important for identifying the best restoration techniques. In forests, plant communities help to communicate overall forest health.
  - Participants in both forest and wetland habitat groups recommended defining what is meant by a healthy forest or a healthy wetland.
  - Monitoring the impacts of climate change was recommended by participants in each group. For wetlands, monitoring sea level rise and its impact on wetlands was

- recommended; for forests, salt water intrusion and temperature changes were called out. For freshwater mussel and fish habitat, it was recommended that flows be monitored.
- Climate change impacts to habitats and resources were acknowledged as a major issue across all goals.
  - R&D was identified as important for the wetlands goal as well as for bivalves and fish in regards to the urban corridor.
  - Research questions exploring the link between resources and water quality were recommended for all three goals.
- Outreach, Education, and Collaboration Actions
- Participants identified the importance of helping local communities to develop affinity for habitats—specifically for forests and wetlands.
  - Both wetlands and forests groups discussed the importance of advocacy education for the public in support of legislation for the given habitat type.
- Best Management Practices and Restoration Actions
- It was recommended to provide financial incentives for people to preserve forests, or for waterfront landowners to install living shorelines rather than bulkheads.
  - Both wetlands and forests groups discussed the importance of protecting freshwater wetlands.
  - Restoring natural flow was identified as an important action for aquatic connectivity and wetlands.
  - Targeting resources in the urban corridor was called out across all goals. At the wetlands goal, participants wanted to learn more about ecosystem values of urban tidal wetlands. In the forests goal, participants wanted to identify the most important urban forests. Finally, with bivalve and fish goals, participants wanted to map urban corridor habitats, install BMPs, and otherwise restore resources in urban environments.

## UNIQUE AND CREATIVE CONCEPTS EMERGING FROM THE WORKSHOPS

Based on a review of all the workshop notes, RK&K also identified certain unique and creative ideas that emerged from the workshops, presented here by theme.

### HEALTHY WATERS

- Gather information on Chlorophyll A in order to understand DO, then use satellite monitoring to detect Chlorophyll A in water.
- Educate the general public by showing the impacts of poor water quality (show eutrophication, not the BMP used to fix it).
- Create ‘industry champions’ in agricultural, industry, and wastewater utilities; allow people to tour sites.
- Work with developers to achieve zero discharge from construction sites.
- Establish a water credit program.

- Work with municipalities on new construction ‘wish lists’ that include things like cisterns, which can’t be added to buildings later.
- Outreach to Exelon and power plants on management practices of water and reservoirs in relation to future climate adaptation needs.
- Use activated carbon (pellets placed on top of sediment in water bodies, e.g. ponds).
- Encourage and enhance bioremediation with bacteria (bacterial degradation).
- Integrate water conservation goals into LEED standards.
- Expand “Green Acres” and “Blue Acres” programs to include water storage parameters.
- Integrate green infrastructure into state capital sources.

## HEALTHY COMMUNITIES

- Bring historic groups into environmental and resilience planning efforts
- Start a “master waterfront steward” program (stewards would be people who love both the watershed and history)
- Conduct outreach on how to create a land bank
- Develop a toolkit for explaining ecosystem services
- Create a program for training maintenance crews on invasive species and habitats
- Educating landscapers on native and non-native plants, and proper chemical applications
- Create an upstream/downstream education program to showcase how they are connected to one another
  - Start with student exchange program (virtually or in-person) between upstream and downstream
  - Organize a bus tour from upstream to downstream to increase understanding
- Use ‘agro-tourism,’ ‘heritage asset-based tourism’ rather than ‘ecotourism’ to describe opportunities for tourists
- Create a working group to discuss compensatory restoration actions
- Provide messaging on ‘the future of waterfronts’ in regards to both climate impacts and opportunities
- When possible, have people within the industry show others within their community of practice (farmers showing other farmers)
- Partner with paddle/kayak/sailing organizations to learn about “secret” access points
- Train the tourism industry to be better stewards
- Engage sportsman/fisherman communities as advocates, not as eco-tourists
- Find designs for trail design that can both be ADA accessible and protect habitat.
- Enhance resiliency of certain access points like boardwalks and piers that are being lost
  - Develop a ‘sponsor-a-dock’ program, like adopt-a-highway

## HEALTHY HABITATS

- Include a goal to utilize or establish a mitigation banking program- would provide more funding and larger amounts of money that could be used for higher priority projects if have a list or project registry available

- Systems like forests are noisy, making traditional metrics difficult to use. Evaluate the feasibility of using social science indicators.
- Get fishermen to count how many glochidia are attached to fish gills (using a group that is already catching fish to do research)
- Research how seasonality of prescribed burns relates to impacts on water
- Use MACWA data and analysis for education and make useful tools for different audiences
- Market/advertise the Regional Sediment Management Plan
- Encourage a LAL tax or other type of give-back from the pharmaceutical industry for habitat restoration for horseshoe crabs
  - Outreach to legislators about issue and need for some type of tax or revenue from permits
  - Outreach to pharmaceutical companies, recommend that a percent of revenue from product goes back to the resource (like beer)
- Foster a landowner connection with a forestry professional.
- Create a crowd sharing app to identify and report invasive species.
- Create an investment plan for oysters
  - Can't meet existing demand for commercial oysters in the summer
  - Promote public advocacy for the resource
  - Create a constituency willing to advocate
  - The Oyster Task Force already exists- use it
- Install BMPs to help at/with water treatment plants.
- Create more forest management products for industry (ex., in NJ, no mills with certified lumber—certification is expensive)
- Strategically place organizations/business with respect to forestry and industry (e.g. placement of Home Depot)- store wood closer to the source
- Support/continue the derelict pot/ghost crab pot removal program
- Get funding for reuse of underutilized state-owned fish propagation facilities; consider working with sturgeon

## APPENDICES

A: List of workshop attendees (attached)

B: Notes from individual workshops (available upon request from [EBaumbach@DelawareEstuary.org](mailto:EBaumbach@DelawareEstuary.org))



## APPENDIX A: WORKSHOP PARTICIPANTS

<b>Prefix</b>	<b>First Name</b>	<b>Last Name</b>	<b>Organization, Agency, or Company</b>
Mr.	Robert	Adams	PA Horticultural Society
Ms.	Jennifer	Adkins	Partnership for the Delaware Estuary
Ms.	Kelly	Anderson	Philadelphia Water Dept
Ms.	Bonnie	Arvay	DNREC Delaware Coastal Programs
Mr.	Matt	Babbitt	Delaware Nature Society
Mr.	Shaun	Bailey	Partnership for the Delaware Estuary
Mrs.	Carrie	Barron	John James Audubon Center
Mr.	Mark	Biddle	DE DNREC Watershed Assessment
Ms.	Sarah	Bouboulis	Partnership for the Delaware Estuary
Ms.	Bridget	Brady	Delaware Riverkeeper Network
Ms.	Kesha	Braunskill	Delaware Forest Service
Mr.	Gregory	Breese	US Fish & Wildlife Service
Mr.	Lance	Butler	Philadelphia Water Department
Ms.	Elizabeth	Butler	U.S. Environmental Protection Agency
Mr.	Gregory	Cavallo	DRBC
Mr.	Kurt	Cheng	Partnership for the Delaware Estuary
Dr.	Anastasia	Chirnside	University of Delaware
Mrs.	Kaitlin	Collins	Partnership for the Delaware Estuary
Ms.	Stephanie	Dalke	Pinchot Institute for Conservation
Ms.	Rachel	Dawson	National Fish and Wildlife Foundation
Ms.	Doryan	De Angel	TTF Watershed Partnership
Mr.	Justin	Dennis	New Jersey Conservation Foundation
Dr.	Kathryn Goddard	Doms	Ursinus College & DCVA
Ms.	Dionne	Duphily	Delaware Forest Service
Miss	Maria	Dziembowska	The Nature Conservancy
Mr.	John	Ewart	University of Delaware
Dr.	Sheila	Eyler	U.S. Fish and Wildlife Service
Ms.	Ann	Faulds	PA Sea Grant
Mr.	Francis	Faunt	Delaware River and Bay Authority
Ms.	Lisa	Ferguson	The Wetlands Institute
Dr.	Thomas	Fikslin	Delaware River Basin Commission
Mr.	Russell	Furnari	PSEG
Mrs.	Beth	Garcia	EPA
Dr.	Rick	Greene	Delaware DNREC
Ms.	LeeAnn	Haaf	Partnership for the Delaware Estuary
Ms.	Kim	Hachadoorian	The Nature Conservancy
Mr.	Simeon	Hahn	NOAA
Ms.	Becca	Hanus	The Nature Conservancy
Ms.	Elizabeth	Haskin	Betsy's Cape Shore Salts

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Dr.	Molly	Hesson	Philadelphia Water Department
Mr.	Kent	Himelright	Berks County Conservation District
Mr.	Barney	Hollinger	Delaware Bay Shellfish Council
Mrs.	Karen	Holm	Delaware County Planning Dept.
Ms.	Elizabeth	Horsey	Partnership for the Delaware Estuary
Ms.	Ann	Hutchinson	Natural Lands Trust
Ms.	Kate	Hutelmyer	Partnership for the Delaware Estuary
Mr.	Douglas Janiec	Janiec	Sovereign Consulting Inc.
Dr.	Desmond	Kahn	Fishery Investigations
Dr.	Josef	Kardos	Philadelphia Water Department
Mr.	John	Kennel	DNREC
Mr.	Todd	Keyser	DE DNREC
Ms.	Kathy	Klein	WRA/DRB
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Mr.	Jeff	Lapp	US EPA Region 3
Mr.	Grant	LaRouche	National Wildlife Federation
Mr.	Jeffrey	Long	Partnership for the Delaware Estuary
Mr.	Jeff	Long	PDE
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Mr.	Alvin	Maiden	Environmental Consulting Services, Inc.
Mrs.	Rhonda	Manning	PADEP
Mr.	Michael	Mansolino	US EPA Region 3
Mr.	Mike	mansolino	US EPA Region 3
Mrs.	Jessica	Martinsen	US EPA
Ms.	Maggie	McCann	Camden County
Ms.	Angela	McFadden	U.S. EPA
Dr.	Thomas E. (Tom)	McKenna	University of Delaware, Del Geol Survey
Mr.	Richard	McNutt	Tidewaters Gateway Partnership Inc.
Ms.	Betsy	McShane	USDA Natural Resources Conservation Service
Mr.	Joshua	Moody	PDE
Ms.	Jane	Morton Galetto	CU Maurice River
Mrs.	Susan	Myerov	Pennsylvania Environmental Council
Dr.	Kristin	Mylecraine	New Jersey Audubon
Dr.	Kenneth	Najjar	DRBC

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Dr.	Kurt	Philipp	Wetlands Research Services
Ms.	Joni	Powell	Kleinfelder
Dr.	Ryan	Rebozo	Pinelands Preservation Alliance
Mrs.	Kristin	Regan	US EPA Region III
Mr.	Robert	Reitmeyer	Burlington County SCD
Ms.	Jessica	Rittler Sanchez	DRBC
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Mr.	Erik	Sildorff	DRBC
Ms.	Julie	Slavet	TTF Watershed Partnership
Ms.	Kelly	Somers	US EPA
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Mr.	Patrick	Starr	PA Environmental Council
Mrs.	Elena	Stewart	DNREC, Parks and Recreation
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Mr.	Ben	Stowman	Maurice River Township
Mr.	Ken	Strait	PSEG
Dr.	Namsoo	Suk	Delaware River Basin Commission
Mr.	Roger	Thomas	The Academy of Natural Sciences Drexel U
Mrs.	Jennifer	Totora	Independence Seaport Museum
Mrs.	Madeline	Urbish	Coalition for the Delaware River Watershed
Ms.	Kelly	Valencik	Delaware National Estuarine Research Reserve
Ms.	Maya	van Rossum	Delaware Riverkeeper Network
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Dr.	David	Velinsky	Academy of Natural Science of Drexel
Mrs.	Jennifer	Walls	DNREC Division of Watershed Stewardship
Mr.	Peter	Williamson	Natural Lands Trust
Ms.	Christina	Wirtz	DNREC
Ms.	Anne	Witt	NJDEP
Mr.	Richard	Wong	Delaware Division of Fish & Wildlife

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Ms.	Meghan	Wren	Bayshore Center at Bivalve
Mr.	John	Yagecic	Delaware River Basin Commission