

MEMORANDUM

TO: Commissioners
FROM: Carol R. Collier
DATE: September 2013
RE: **Water Resources Plan for the Delaware River Basin ~ FY 2013 Achievements**

Welcome to our ninth issue of the annual report on progress toward achieving the Key Result Area (KRA) goals of the *Water Resources Plan for the Delaware River Basin*. The variety of programs and projects illustrates how the focused efforts of agencies and local partners continue to restore and protect our water resources and maintain the Delaware River as a system of national significance.

HIGHLIGHTS

NATIONAL & BASIN-WIDE IMPACT

- **Natural Gas: Work Continues**
- **Greater Philadelphia/ Delaware River Watershed Selected** for Urban Waters Federal Partnership
- **Multi-year Funding Dedicated to Basin Watersheds**
- **NRCS Projects Cover the Basin**
- **Coalition for the Delaware River Watershed Formed**

SUB-BASIN IMPACT

- **Schuylkill River Water Trail** delivers substantial economic punch
- **Innovative Aquaculture Development Zones** set to increase production in NJ
- **First State National Monument Established**—Delaware gets a National Park unit
- **Innovative Fix for New York City's Aqueduct**

MAJOR ISSUES & ACHIEVEMENTS

MULTI-AGENCY EFFORTS TO MANAGE NATURAL GAS DRILLING IN SHALE FORMATIONS

How best to minimize the potential effects on water resources of the development of natural gas reserves from shale formations underlying much of the basin remains a major focus of Commission inquiry. While DRBC's revised Natural Gas Development Regulations published on November 8, 2011 remain in draft form, the Commissioners confer in good faith to reach consensus on a path forward for the development of natural gas from shale in the basin. During FY 2013, the Commissioners, staff and member agencies continued to: review new scientific studies released on the subject of shale gas development and water resources; benchmark new regulations and best management practices adopted or proposed by state and federal agencies and organizations; use these models to develop a level of minimum standards—a regulatory floor—for natural gas development that will protect the basin's shared water resources; perform water quality and quantity monitoring under an initiative begun in 2010 to establish baseline conditions prior to the onset of natural gas development; and develop a tool for evaluating the impacts of land-based development on water resources, to facilitate informed planning and assess effects. With input from various partners, new mapping layers have been developed for the upper basin, including high-resolution forest cover (University of Vermont), hydric soils and highly erodible landscapes (NRCS), riparian corridors, and headwater watersheds (USGS).

New York: In February 2013, NYS Health Commissioner announced the need for additional time to complete a review of public health studies on hydrofracking. Implementation of New York's Revised Draft Supplemental Generic Environmental Impact Statement (SGEIS) was delayed, pending the conclusion of an independent study on the public health impacts of hydraulic fracturing. The Revised Draft SGEIS tightens current requirements for well siting, for storage, disposal and monitoring of wastewater and other process materials, chemical disclosure, and other environmental controls and sets certain areas—such as watershed lands for NYC and Syracuse—off limits to surface drilling. The state has had a moratorium on the high-volume hydrofracking process since 2008.

Pennsylvania: In October 2012, the PA Supreme Court heard arguments regarding the constitutionality of provisions of Act 13 which restrict the role of municipal governments in managing where and when drilling can happen. The Commonwealth Court ruled those provisions unconstitutional the previous July. The court decision is still pending. In August 2013, the Environmental Quality Board voted 16 to 2 to approve proposed regulatory changes to strengthen environmental protection performance standards associated with oil and gas drilling activities, allowing a rulemaking on the draft regulations to proceed. The changes are required by the Act 13 drilling law passed in 2012, which was the first comprehensive update and strengthening of the state's oil and gas laws in nearly 30 years. The draft regulations now include provisions to enhance the consideration of impacts to public resources such as parks and wildlife areas; the prevention of spills; the management of waste; and the post-drilling restoration of well sites. Additionally, the draft rulemaking includes standards affecting the construction of gathering lines and temporary pipelines, and provisions for identifying and monitoring abandoned wells close to well sites.

Federal Activity:

- At the request of Congress, the US Environmental Protection Agency (EPA) is conducting a study, involving 18 separate research projects, to better understand the potential impacts of hydraulic fracturing on underground drinking water resources. The scope of the research includes the full lifespan of water in hydraulic fracturing. A progress report was released in December 2012 and a draft report is expected to be released for public comment and peer review in 2014. The US Department of Energy (DOE) is working closely with the EPA as it carries out the study.
- The DOE, through the National Energy Technology Laboratory (NETL) is also collaborating with the Department of Interior to enhance our understanding of the risks.
- USGS has added significantly to the literature on shale gas development in the last year, through studies of baseline groundwater quality; radium, radon and methane analyses; hydrogeologic assessments in the Delaware and Susquehanna basins; and assessments of other landscape and water resource impacts associated with natural gas extraction.

SELECTON OF USGS 2012 PUBLICATIONS RELATED TO SHALE GAS DEVELOPMENT	
<ul style="list-style-type: none"> • Radon-222 Content of Natural Gas Samples from Upper and Middle Devonian Sandstone and Shale Reservoirs in Pennsylvania: Preliminary Data http://pubs.usgs.gov/of/2012/1159/ofr2012-1159.pdf • Water Issues and Marcellus Shale Gas Development in New York http://ny.cf.er.usgs.gov/nyprojectsearch/projects/2457-CP30 • Assessment of Undiscovered Oil and Gas Resources of the Ordovician Utica Shale of the Appalachian Basin Province, 2012 http://pubs.usgs.gov/fs/2012/3116/FS12-3116.pdf • Baseline Groundwater Quality in National Park Units Within the Marcellus and Utica Shale Gas Plays, New York, Pennsylvania, and West Virginia, 2011 http://pubs.usgs.gov/of/2012/1150/ 	<ul style="list-style-type: none"> • Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004–2010 http://pubs.usgs.gov/of/2012/1154/of2012-1154.pdf • Hydrogeology of the West Branch Delaware River Basin, Delaware County, New York http://pubs.usgs.gov/sir/2013/5025/ • Radium Content of Oil- and Gas-Field Produced Waters in the Northern Appalachian Basin (USA): Summary and Discussion of Data http://pubs.usgs.gov/sir/2011/5135/ • Hydrogeology of the Susquehanna River Valley-Fill Aquifer System and Adjacent Areas in Eastern Broome and Southeastern Chenango Counties, New York http://pubs.usgs.gov/sir/2012/5282/ • Baseline Groundwater Quality from 20 Domestic Wells in Sullivan County, Pennsylvania, 2012 http://pubs.usgs.gov/sir/2013/5085/
<ul style="list-style-type: none"> • Dissolved methane in New York groundwater, 1999–2011 http://pubs.er.usgs.gov/publication/ofr20121162 	

Delaware's *First State National Monument*

Famous as the First State to ratify the US Constitution, Delaware now has its first national park area. *First State National Monument* was created by Presidential Proclamation on March 25, 2013, making it one of the newest of over 400 units in the National Park system. There are now national parks in all 50 states. The Woodlawn property at *First State National Monument* contains the demarcation line known as the "12-mile arc," part of a circle drawn from the Old New Castle Courthouse that established the boundary between British colonies of Pennsylvania and Delaware in the 17th century. In addition, Delaware has 689 listings on the National Register of Historic Places and 13 National Historic Landmarks. Planning for the park is scheduled to begin in September of 2013. <http://www.nps.gov/frst/index.htm>



Mill race on the Brandywine Creek in DE.
Photo: Hagley Museum and Library

Pennsylvania Recreational Water Trails 2012 Economic Impact Study

Pennsylvania is a recognized leader in recreational water trails, hosting 21 within its three major river basins. To assess the trails' economic impact on local Commonwealth communities the PA Senate (Resolution 2011-143) directed the Legislative Budget and Finance Committee (LB&FC) to conduct a study. The Schuylkill was one of four PA water trails included in the 6-week survey period between July and September 2012. The Schuylkill River was the most visited of the water trails, reporting nearly 6,000 visitor-days and generating a total economic output of \$731,000. The vast majority of water trail users were state residents (91%), accounting for 85% of the economic activity (\$624,000). Over 70% of visitors were on the water trail to fish, canoe, kayak or enjoy motor boating. Other cited activities included picnicking or watching wildlife. Full report at: <http://lbfc.legis.state.pa.us/reports/2012/72.PDF>

New Jersey's Development Zones to Increase Aquaculture Production



Nearshore aquaculture and harvested oysters.
Photos: J. Myers and E. Woodworth, NJ Dept. of Agriculture

A joint effort by NJ Fish and Wildlife, the NJ Shellfisheries Council and the NJ Department of Agriculture has removed permitting uncertainty and opened leasing opportunities in Aquaculture Development Zones (ADZs) in the state's coastal waters, prime locations for shellfish and macroalgae production. New Jersey ADZs expand the oyster production techniques that produce gourmet oysters for the half-shell raw bar market. Macroalgae are the second largest aquaculture sector internationally, providing material for the industrial, pharmaceutical and food production industries. Rutgers University Haskin Shellfish Research Laboratory's Aquaculture Innovation Center in Cape May is producing seed stock for oyster growers in the

development zones. The twelve working leases in the near-shore ADZ-4 alone could nearly double the State's annual aquaculture production value from approximately \$6 million to an estimated \$12 million annually. Plots are available in two ADZs two miles offshore in the Delaware Bay. An increase in aquaculture production will mean more jobs and more revenue for the State from an industry that generates some \$20 million for the Bay region's economy. To learn more about aquaculture opportunities, contact NJDA Aquaculture Specialist Joseph Myers: 609-984-2502 or joseph.myers@ag.state.nj.us.

New York's New Withdrawal Program Takes Full Effect

The state's latest withdrawal regulations, part of the Water Resources Law approved by Governor Cuomo in 2011, became effective in April 2013. While the old law pertained only to public water supply withdrawals, the new law requires a permit of all water withdrawal systems (with some exemptions) having the capacity to withdraw 100,000 gallons per day or more of surface or groundwater.

Consequently, a large number of existing water withdrawal facilities that were not previously required to obtain permits will now need to do so. The law also requires statewide registration of existing agricultural withdrawals that are greater than 100,000 gpd (30 day average) and major basin water diversions of greater than 1,000,000 gpd. Registered agricultural uses (>100,000 gpd), withdrawals that have received approval from the Delaware River Basin Commission or Susquehanna River Basin Commission, and certain other withdrawals are exempt from the permit requirement, but must report annually to the Department of Environmental Conservation (NY DEC). Having very accurate water use data for the entire state will increase the accuracy of future demand forecasts.

<http://www.dec.ny.gov/lands/86935.html#Public>



The upper Delaware River landscape.
Photo: Dave Soete

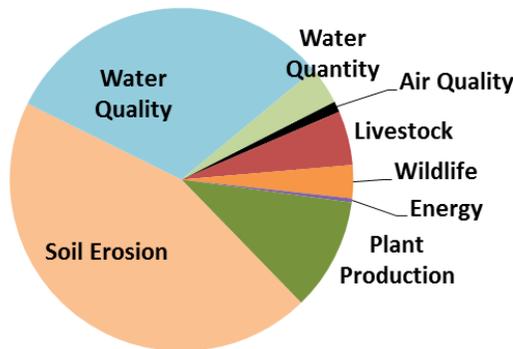
State of the Delaware River Basin 2013 Brochure

In May, DRBC released an update on conditions in the Basin. A sequel to the 2008 *State of the Basin Report*, the abbreviated format provides a quick account of status and trends, and a set of Fast Facts for indicators of population and landscape, water use, water quality and species of special concern. In 2004, the Commissioners directed release of a status and trends report every five years. The 2013 brochure is available online and offers links to many background sources for additional information.

<http://www.state.nj.us/drbc/library/documents/SOTB/2013brochure.pdf>

NRCS Implements 8,000 SWAPA-based Practices in the Basin

The USDA Natural Resources Conservation Service (NRCS), known for planning agricultural conservation practices on private farmland, has assisted with a wide variety of projects in the Delaware Basin. NRCS conservation planners address SWAPA resource concerns—that is **S**oil, **W**ater, **A**ir, **P**lants and **A**nimals—in the recommendations they provide to landowners, and offer conservation programs to help with the cost of installation of conservation practices. Between July 1, 2012 and June 30, 2013, the NRCS offices in the four basin states (NY, NJ, PA, and DE) reported the implementation of nearly 8,000 SWAPA-based practices on projects in the Basin, and included additional data on practices that conserved energy. Together, water quality and soil erosion practices accounted for 76% (6,014) of all practices in the Basin. NRCS operates on a state-wide basis. We are grateful for Greg Westfall and Trish Long of the NJ office for accounting for NRCS’s contribution to water resource protection in the Basin. Click here to download map (pdf 397 KB).



SWAPA	Number of Practices Applied
Air Quality	81
Animals - Livestock	403
Animals - Wildlife	246
Energy	30
Plant Production	836
Soil Erosion	3,515
Water Quality	2,499
Water Quantity	277
Total	7,887

Multi-year Funding Dedicated to Delaware River Watersheds

The William Penn Foundation, established in 1945 in Philadelphia PA by businessman Otto Haas and his wife Phoebe, is dedicated to improving the quality of life in the Greater Philadelphia region. In 2012, The Foundation awarded \$21 million in Delaware River Watershed Protection program grants to maintain healthy watersheds through the advancement of scientific research, improvement of policy and practice, promotion of conservation, and empowerment of constituencies. This year the Foundation launched a new place-based investment strategy to integrate monitoring and research with active restoration and protection activities. Eight watershed clusters were chosen within the Delaware River basin for special focus, including:



- Poconos & Kittatinny
- New Jersey Highlands
- Upper Lehigh
- Middle Schuylkill
- Schuylkill Highlands
- Upstream Suburban Philadelphia
- Brandywine & Christina
- Kirkwood-Cohansey Aquifer

The Academy of Natural Sciences, the Open Space Institute, and the National Fish and Wildlife Foundation are providing guidance and technical assistance to 34 organizations selected for their involvement in the targeted watersheds. Strategic plans are due in September; priority elements of the plans will be eligible for implementation funds in the first 3-year grant round in January 2014, with a potential total of \$33 million in funding over three years.

<http://www.williampenfoundation.org/WatershedProtection.aspx>

KEY RESULT AREA 1 - SUSTAINABLE USE & SUPPLY

1.0 WATER SUPPLY & WATER QUALITY PLANNING & MANAGEMENT

- 1.1 EQUITABLY BALANCE DEMANDS
- 1.2 ENSURE ADEQUATE SUPPLY OF SUITABLE QUALITY WATER FOR ECOSYSTEMS
- 1.3 ENSURE ADEQUATE SUPPLY OF SUITABLE QUALITY WATER FOR PUBLIC & COMMERCIAL NEEDS
- 1.4 ENSURE ADEQUATE & SUITABLE QUALITY FLOW FOR RECREATION

New Online Water Supply Charges Program (WSCP) Reporting System

In January 2013, the DRBC launched an online reporting system for its Water Supply Charges Program (WSCP). The WSCP is designed to simplify surface water use reporting as it eliminates the need for paper reports. The new system is easier for end users, as calculations are performed automatically by the online system, and for staff as the information enters DRBC databases directly instead of having to be manually input from the paper reports. The availability of the online reporting system marks the completion of the first step of a multi-phase technology upgrade by DRBC. Future phases include online acceptance of project applications and the development of a web portal to easily share electronic information with the public. Details on the reporting system, including step-by-step instructions, can be found on the commission's web site at:

<http://www.state.nj.us/drbc/programs/supply/charging/>.

Accounting for "Lost" Water

In April 2013, the DRBC began receiving the first annual Water Audits from basin public water suppliers under a new reporting requirement. The water audit requirement marks another milestone in DRBC's well-established and effective water conservation program. The Water Audit is a



Unidentified leaks can result in "lost" water and lost revenues.

Photo: AWWA.

means of assessing accountability for a public water supplier as it evaluates how effectively water moves from the source to the customer and is used to identify areas of water loss. A resolution requiring an annual Water Audit to be completed and submitted to DRBC was approved in 2009, however calendar year 2012 water audits represent the first mandatory reports. Prior to 2012, the audit was voluntary as DRBC outreach efforts prepared public

water suppliers for completing the water audit. Proceedings of a 1-day workshop held in April 2011 and a list of Frequently Asked Questions on the water audit can be found on the DRBC website. Water Audits are required from all public water suppliers within the Basin who have been issued approvals by the DRBC to withdraw and use in excess of 100,000 gallons per day

<http://www.state.nj.us/drbc/programs/supply/audits/>



Vintage photograph of New York City's aqueduct during construction, 1937-1944.

Photo: NYC-DEP archives

Innovative Aqueduct Fix

The leaking, 80-year old Delaware Aqueduct that carries drinking water from upstate New York to NYC will be the test site for a new way to seal tunnel cracks. NYC-DEP's \$4 million pilot project is using lime, carbon dioxide and other chemicals poured into flowing water at various rates to seal hairline cracks in the concrete pipes. If successful, the technique developed by Syracuse University will be used to patch the 85-mile aqueduct that was built between 1937 and 1944. The full \$2.1 billion plan includes building a three-mile tunnel bypass around another leaking section of the aqueduct, which is expected to be completed in 2021. New York City has the largest unfiltered surface water supply in the world, providing about a billion gallons of drinking water daily. For more information, visit www.nyc.gov/dep or www.facebook.com/nycwater.

Accolades for CCMUA

The Camden County Municipal Utilities Authority (CCMUA) has progressed from being a serious concern to NJ DEP, to achieving stellar endorsements for its improved environmental performance. The CCMUA's wastewater plant treats 60 million gallons of sewage per day to levels several times NJ state standards. As a result,



KEY RESULT AREA 1 - SUSTAINABLE USE & SUPPLY

Camden County's zone of the Delaware River is much cleaner and healthier than it had been. The entire wastewater treatment plant was upgraded while still holding rates lower—about 35% lower in inflation-adjusted dollars—than they were 17 years ago in 1996. Noticed by state and national agencies as well as professional organizations, CCMUA has been featured in *The Water Resources Utility of the Future: A Blueprint for Action*, a joint publication of the National Association of Clean Water Agencies, the Water Environment Federation and the Water Environment Research Foundation. CCMUA has been named a top Environmental Steward by NJDEP; selected by US EPA as a model for best environmental, economic and community service practices; and noted by Sustainable Jersey for Best Sustainable Collaborative. And we're not finished: CCMUA has received the NJ Governor's Excellence Award for Camden's Green Infrastructure Program, the NJ Association of Environmental Authorities' WAVE award for Environmental Management, and has been designated as "Savior of the Environment" by the NJ Alliance for Action. <http://www.ccmua.org/>

National Park Service Installs Easy, Low-cost Stormwater Filtration System

Aware of a local need for inexpensive, easily installed and low maintenance stormwater filtration systems in the Upper Delaware River valley, National Park Service Superintendent Sean McGuinness investigated stormwater filtration media



Installation of a low cost, low maintenance stormwater filtration system at the National Park Service Upper Delaware office.

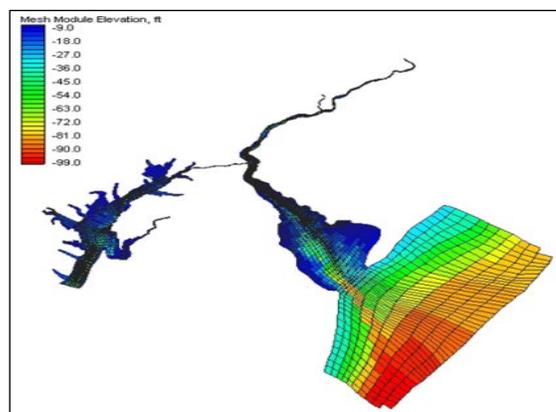
Photo: *River Reporter*

and delivery system options for the Upper Delaware Headquarters. With minimum investment, the system is installed into existing roadside drains or catch basins. Located just below the grate, it captures and filters the water as it drains through. Maintenance costs are very low, involving only occasional vacuuming and geotextile bag replacement. According to the manufacturer, "Stormwater filtration systems also assist

municipalities, agencies, storm water managers and contractors in meeting the EPA storm water regulations regarding runoff from new construction site activities." For more information contact NPS Chief of Maintenance Pat Connolly at 570-729-7137.

Protecting Drinking Water Intakes & Adapting to Climate Change

A hydrodynamic salinity modeling project was initiated through a cooperative agreement between the US States Army Corps of Engineers, Philadelphia District and DRBC to develop two computer models to evaluate relationships between freshwater inflows and salinity in the Delaware Estuary. The effort focuses on comparing and evaluating existing hydrodynamic models developed by each agency. Once the project is completed, the one dimensional hydrodynamic/salinity model will be used as a screening level tool linking with the DRBC's reservoir operations model (OASIS) to evaluate multiple alternative reservoir operation and management scenarios in relation to future water use and climate change. The more complex, three-dimensional hydrodynamic model will then be used to consider salinity trends in the estuary for detailed evaluations of selected scenarios.



Example of bathymetric grid used in CH3D-Z model developed by the Army Corps.

New Continuous Water Quality Monitors for the Upper Delaware

This past year, the National Park Service, with technical assistance from the U.S. Geological Survey, site selection input from DRBC, and help from New York State Department of Transportation, installed three multi-probe data sondes with satellite telemetry at strategic locations in the Upper Basin. These installations monitor dissolved oxygen, pH, specific conductance, temperature, turbidity, and depth, and provide real-time water quality data for the Delaware River at Lordville, at the Barryville gage location above the Lackawaxen River, and at

KEY RESULT AREA 1 - SUSTAINABLE USE & SUPPLY

the Rowland Bridge on the Lackawaxen River. View details for each gage, including maps and water quality data, by entering the sites's NWSL ID number in the appropriate box at www.nws.noaa.gov/oh/hads.

- Lordville: LDQN6
- Barryville: BRQN6
- Rowland: ROQP1



The Science of Source Water

Information on impacts of future land use and climate change in the Delaware Basin, economic aspects of these impacts, and the value of ecosystem services provided by the headwaters forests is in short supply. On June 18, 2013 the Pinchot Institute and Common Waters Partnership convened scientists and technical experts from agencies, universities, industry, and NGOs (with expertise on watershed hydrology, modeling, water quality, climate change, economics, and land use change) to identify the top information needs that are critical to managing future water-related risks in the Basin but are not being met by existing studies or models. This workshop is just one part of the increased attention to the Delaware River and the ecosystem services it provides within and beyond its boundary. Common Waters and the Pinchot Institute intend to continue the dialogue to:

- Prioritize and further define research questions;
- Identify studies underway (or planned) that may answer these questions and work to incorporate these questions into projects where possible [a clearinghouse has been started]; and,
- Identify partnerships and sources of support to launch new studies targeted to these questions.

www.commonwatersfund.org/science



Pinchot Institute at Grey Towers, Milford PA

Photo: Pinchot Institute for Conservation

NYC Prepares Demand Management Plan 2021

New York City's Department of Environmental Protection (NYC-DEP) is the largest municipal water utility in the nation, delivering more than one billion



gallons of drinking water to over nine million customers and treating 1.3 billion gallons of wastewater each day. About half of the City's drinking water comes from its Delaware Basin reservoirs. Building on past success at successful reduction in per capita water use, the City is embarking on a program to achieve a reduction of 50 million gallons per day, including a 10% reduction from wastewater treatment plants. Five key strategies will be used:

1. Work closely with municipalities to develop cost effective strategies to reduce potable water usage through fixture replacements, reuse, and leak detection;
2. Incentivize toilet replacements in residential buildings and sustainably reuse replaced toilets;
3. Develop public-private partnerships. Encourage reuse and alternative water use, conduct cost-benefit analysis, establish long-term compliance management and maintenance requirements; provide appropriate incentives;
4. Optimize system performance and accountability through increased leak detection, meter installations and replacements, particularly of large users; and
5. Update water shortage/drought rules, improve use restrictions and establish emergency rates.

The Plan will have its public debut this autumn.

2.0 WATERWAY CORRIDOR MANAGEMENT

- 2.1 FLOOD WARNING, MITIGATION AND MANAGEMENT
- 2.2 ENHANCEMENT OF WATER-BASED RECREATION
- 2.3 PROTECTION & RESTORATION OF RIPARIAN ECOSYSTEMS

Bay Beaches Restored Just in Time



On a newly restored beach, horseshoe crabs lay eggs that will feed shore birds migrating from South America to the Arctic.

Photo: northjersey.com media

In a race against time, national conservation organizations, resource consultants, and the State of New Jersey joined together to restore NJ's Delaware Bay beaches in time for a critical spring event. Each May, the western hemisphere's largest population of horseshoe crabs lays eggs on Delaware Bay beaches, providing a critical food source for migrating shorebirds. Many beaches were badly damaged by Superstorm Sandy in October 2012, especially 2.5 miles between Moores Beach and Pierces Point in Cape May County NJ. Work to restore the beaches began in mid-March and continued through April to be ready for the May migration. Substantial grants—nearly \$1M combined from the National Fish and Wildlife Foundation and the NJ Recovery Fund—were put to immediate use. Permits were reviewed and expedited by cooperative federal and state agencies. The timing was especially crucial for the red knot whose previously dwindling numbers had placed it on the list of NJ threatened and endangered species. A second phase of work to remove rubble, old pilings, bulkheads and abandoned structures for long-term habitat enhancement is ongoing.

<http://www.littoralsociety.org/images/PDFS/HRP/als-postsandyhscrestfactsheet.pdf>

More Projects for the Bay

The twelve-member Alliance for Comprehensive Ecosystem Solutions (ACES), a project of the Partnership for the Delaware Estuary (PDE), selected six restoration projects for 2013 to improve the tidal Delaware River and Bay. Valued at a total of \$1.2 million, the projects include:

- Re-introduction of freshwater mussels in the West Branch of Skippack Creek (PA)
- Horseshoe crab/shorebird beach restoration
- Addressing polluted runoff before it flows into the nearby Delaware River at Peters Creek in Audubon Park (NJ)
- Peters Creek buffer restoration and bioretention system, Audubon Park (NJ)
- Three tidal wetland projects, critical for flood control, clean water, and healthy fish and wildlife.

DuPont has invested \$20,000 through its *Clear Into the Future* program for the fresh water mussel project and as seed money for additional beach restoration.

www.DelawareEstuary.org/Registry/Index.asp



Delaware Bay

Photo: NASA

http://www.striperPopntspace.com/delaware_bay.html

Easton PA: A Leader in Flood Management

Easton has invested about \$400 million in flood plain management over the last seven years. Initiatives include adopting a 500 year flood standard, revising ordinances, upgrading infrastructure, installing waterfront parks in lieu of development, and road “dieting” to reduce impervious cover. Easton's efforts have made its river corridor a strong environmental, recreational, and economic draw, and the city now enjoys three prosperous riverfronts. Easton's efforts were featured in “*Proactive Flood and Drought Management*” published by the American Water Resources Association in August 2013.

http://aquadoc.typepad.com/files/awra_report_proactive_flood_drought_final.pdf

Dam Removals to Improve Fish Passage & Water Quality in the Lehigh Valley

In March 2013, the Wildlands Conservancy, the Pennsylvania Fish & Boat Commission and other project partners, released a fish passage feasibility study for Easton and Chain dams, the first two dams on the Lehigh River. Constructed during the 1800s, the dams have contributed to the near extirpation of American shad (*Alosa sapidissima*) and other migratory fishes from the Lehigh, the Delaware River's 2nd largest tributary. The purpose of the study was to determine how to facilitate the access of migratory fish into the Lehigh River while ensuring that the Delaware and Lehigh Canals remain watered. Complete removal of the two dams—in conjunction with pumping systems to feed the canals—was the most environmentally and economically beneficial alternative evaluated. The study has prompted broad discussion in the Easton area about the associated project costs, funding, flooding impacts, and aesthetics as well as boating and recreation concerns.

<http://fishandboat.com/water/rivers/lehigh/LehighFishPassageFeasibility.pdf>



Initiating the removal of dams on Jordan Creek in Allentown PA.

Photo: <https://vimeo.com/71418784>

Elsewhere in the Lehigh Valley...On July 29th, 2013, the Wildlands Conservancy, in cooperation with the City of Allentown PA, started the removal of the first of nine dams on Jordan Creek, a tributary of the Little Lehigh. The removal of the Jordan Park dam is part of a larger watershed restoration plan for the Little Lehigh Creek watershed, where dam removals will open up several miles of habitat for resident species, and greatly improve water quality.

Lower Delaware River Mussel Study

To help fill the the gap in understanding freshwater mussel occurrence and species distribution, the DRBC and the USGS Northern Appalachian Research Laboratory leveraged National Park Service (NPS) monies, other funding resources and in-kind contributions to



Freshwater mussels are filter-feeders and very important for water quality.

conduct surveys of the Lower Delaware River in the summer of 2013. The surveys began near the Portland-Columbia footbridge (RM 208) and extended through the entire Lower Delaware to the head-of-tide at Trenton, NJ (RM 133). Surveys were conducted in 3 phases and included 7 weeks of surveys. A final report will be completed for the NPS by May 2014.

Increasing Resiliency: Delaware Bay & River Coastal Flood Risk MAP

Risk Mapping, Assessment, and Planning (Risk MAP) is a new FEMA program that provides communities with flood information and tools to enhance local mitigation plans and protect residents. Basin communities in FEMA Regions 2 and 3 are engaging in a watershed-focused process to identify, assess, communicate, develop, and ultimately implement plans to mitigate flood risks. The non-regulatory Risk MAP products allow flood management teams to quickly implement the tools that best mitigate flood impacts for their watershed regions. In contrast, the Flood Insurance Rate Maps (FIRMs) are regulatory products subject to longer approval processes. Delaware Bay coastal mapping is being produced through 2014. FEMA's September 2012 presentation on the Delaware Bay and River Risk Study, with web links for Regions 2 & 3, can be viewed at: http://www.state.nj.us/drbc/library/documents/Flood_Website/FAC/FEMA-MainPresentation-091912.pdf



Diagram of FEMA's Risk MAP process.

3.0 LINKING LAND & WATER MANAGEMENT

- 3.1 PRESERVE AND RESTORE NATURAL HYDROLOGY
- 3.2 MAINTAIN FUNCTION OF HIGH VALUE WATER RESOURCE LANDSCAPES
- 3.3 INTEGRATE WATER RESOURCE CONSIDERATIONS INTO LAND USE PLANNING & GROWTH MANAGEMENT
- 3.4 ENCOURAGE DEVELOPMENT & REDEVELOPMENT WHILE PROTECTING WATER RESOURCES.
- 3.5 CONNECTING COMMUNITIES TO SOCIAL, HISTORIC, CULTURAL RECREATIONAL AND ECONOMIC LINKAGES.

Urban Waters Partnership



The Delaware River’s highly urbanized waterfront.
Photo: US EPA

The Greater Philadelphia Area/ Delaware River Watershed is one of eleven newly selected locations for the nation’s Urban Waters Federal Partnership. This partnership will reconnect overburdened or economically distressed communities with their waterways. Through coordination and collaborating among federal agencies and community-led revitalization efforts, improvements to our nation’s urban waterways will promote economic, environmental and social benefits. Specifically, the Urban Waters Federal Partnership designed to break through federal program “silos,” develop local efforts with community partners, leverage area resources to stimulate local economies and job creation, and build on early gains for long term success—including the incorporation of existing local efforts. For more information, visit www.urbanwaters.gov and <http://www.urbanwaters.gov/pdf/DelawareRiverBasinBackgrounder.pdf>



HM King Carl XVI Gustaf and HM Queen Silvia visited Wilmington DE in May.
Photo: Ben Szmidt

Delaware’s Rivers Receive Royal Treatment in Advance of 375th Anniversary

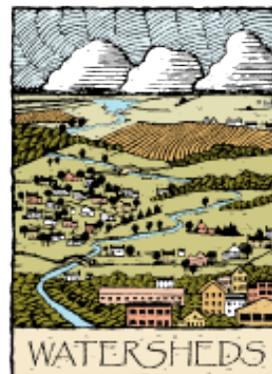
In anticipation of a May visit by the Royal Swedish couple, King Carl XVI Gustaf and Queen Silvia, organizers for the Christina River Watershed Cleanup targeted key sites across New Castle county. The royal visit celebrated the 375th Anniversary of New Sweden’s founding by Queen Christina, for whom the Christina River is named. Mr. Eero Olavi Heinälouoma, Speaker of the Parliament of Finland, joined the royal couple. When the original merchant vessel *Kalmar Nyckel* arrived on the banks of the Christina River, Finland was part of Sweden, and the ship carried both Finnish and Swedish settlers. Public ceremonies included a re-enactment of the ship’s 1638 landing at “The Rocks” in Fort Christina State Park.

<http://www.christinarivercleanup.org/>

Chester County’s Countywide Act 167 Plan Approved

In March, after more than a decade of assessment and planning, Chester County PA adopted its “County-wide Act 167 Stormwater Management Plan” (CW167). PADEP approved CW167 in July. Incorporated as an addendum to *Watersheds*, the County’s water resource management plan, and as an amendment to *Landscapes2*, the County’s comprehensive plan, CW167 is fully integrated into County policy and Chester County is well-prepared for integrated management of its land and water resources.

The new plan encourages sound practices and design to preserve and restore stream morphology, flood capacity, and natural runoff regimes; conserve groundwater, and protect groundwater recharge areas. The Stormwater Management Plan relies on municipal



KEY RESULT AREA 3 - LINKING LAND & WATER RESOURCES

adoption of stormwater ordinances and strong local support, which was evident at the first implementation workshop in August when 68 of 73 municipalities (93%) participated. All Chester County municipalities must adopt the required standards in CW167 by January 2, 2014.

<http://www.chesco.org/index.aspx?nid=158>

First Segment of Delaware River Trail Opens in Northern Liberties



SPRING GARDEN STREET GREENWAY
RIVER TO RIVER. NEIGHBORHOOD TO NEIGHBORHOOD

On June 17, The Delaware River Waterfront Corporation (DRWC) achieved a key milestone in implementing the *Central Delaware Master Plan* and transforming the Delaware River waterfront into a walkable and bikeable destination. The first 1,400 feet of a planned 5 mile trail includes:

- Philadelphia's first separated on-road bicycle and pedestrian trail
- rain gardens to collect the first inch of stormwater
- beautiful and distinctive street furniture, including benches, bike racks, and innovative solar lighting
- a crucial bicycle network connection for region as part of the East Coast Greenway and the Circuit;

www.delawareriverwaterfront.com

Stroud™ Introduces Watershed Restoration Group to Ensure Water Quality



The Stroud™ Water Research Center has established the **Watershed**

Restoration Group to utilize its groundbreaking freshwater science in the research, development, implementation and monitoring of restoration projects throughout and beyond

Pennsylvania. This effort will bring the Center's mission full circle by sharing knowledge of best management practices (BMPs) and helping landowners, stakeholders, and the general public to implement them. The Watershed Restoration Group has already secured three grants. A grant from National Fish and Wildlife Foundation (NFWF), with additional funding from the US EPA, USDA Natural Resources Conservation Service (NRCS), and the Altria Group will implement BMPs by provide technical assistance to farmers and advance nutrient trading. More than a dozen public agencies and private groups—an estimated 27 farms in Lancaster and surrounding counties—will participate. A companion grant, provided by the PA DEP will expand these efforts to additional farms. A NFWF grant, with companion funding from the US EPA and US Forest Service, will demonstrate low-cost alternatives to existing buffer reforestation methods, focusing on natural regeneration, direct seeding, and live staking.

[http:// www.stroudcenter.org/restoration/](http://www.stroudcenter.org/restoration/)



Restoring streamside buffers can protect stream water quality from agricultural runoff.

Photo: NRCS

4.0 INSTITUTIONAL COORDINATION AND COOPERATION

- 4.1 IMPROVE COORDINATION & COLLABORATION
- 4.2 INCREASE SHARING OF DATA & IDEAS
- 4.3 SECURE ADEQUATE RESOURCES FOR COOPERATIVE PLANNING AND MANAGEMENT
- 4.4 ENSURE ACTIONS IN ACCORDANCE WITH THE BASIN PLAN
- 4.5 USE DRBC REGIONAL AUTHORITY TO FACILITATE COORDINATION & COOPERATION

Public-Private Collaboration



In July, a new organization to increase cooperation among Berks County (PA) water and sewer providers was launched in

July. Hosted by the Center for Excellence in Local Government (CELG) at Albright College, the inaugural event drew more than 125 service providers, municipal and state representatives, and vendors to discuss ways to protect the water supply and improve emergency response to contamination events. Initiated by municipal leaders to ensure a coordinated approach to the interconnected problems of water and sewer, the association includes about 40 entities and 120 individual members—including a few from beyond Berks County. The CELG serves as fiduciary agent for the association which is designed to share resources and information, expand training, improve service, and promote long-term planning and cooperation for source water protection.

A Decade of Accomplishments: SAN's 10th Anniversary

The Schuylkill Action Network (SAN) marks its 10th anniversary in 2013. SAN's mission is to improve the water resources of the Schuylkill River Watershed by working in partnership—with federal, state, and local agencies and governments, local watershed organizations land conservation organizations, businesses, academics, and water suppliers—to transcend regulatory and jurisdictional boundaries in the strategic implementation of protection measures for the entire watershed. To celebrate a decade of watershed achievements, SAN held a luncheon event with presentations, speakers, awards, and networking on May 9, 2013 at the John James Audubon Center at Mill Grove, Audubon PA. Keynote speakers included Peter

Grevatt, Director of the Office of Groundwater and Drinking Water at EPA, and Shawn Garvin, Administrator of EPA Region 3. In the past decade, SAN partners have helped to guide the leveraged investment of more than \$400 million and hundreds of projects, including 175 projects to address agricultural runoff, 45 projects to reduce the impacts of abandoned mine drainage, \$365 million in infrastructure upgrades—including the elimination of unpermitted discharges—and more than 200 stormwater projects. Also notable is the development of an Early Warning System for early notification of spills. DRBC Executive Director Carol R. Collier offered closing remarks and expectations for the next ten years. <http://www.schuylkillwaters.org/>



SAN Coordinator Tom Davidock and DRBC Executive Director Carol Collier at the SAN anniversary celebration.
Photo: Schuylkill Action Network

Coalition for the Delaware River Watershed

The Coalition for the Delaware River Watershed formed this year to coordinate the protection and restoration of the Delaware River, its tributaries, and surrounding landscapes. The Coalition held its 1st Annual Conference entitled "Watershed United" in Lambertville NJ on June 10-11, 2013. Attendees from across the watershed enjoyed a mix of panel discussions, working sessions, and



Participants at the 1st conference of the Coalition for the Delaware Watershed on June 10-11, 2013.
Photo: Coalition for the Delaware River Watershed

networking opportunities to learn more about the current health of the watershed, effective approaches being used to protect and restore its resources, and coalition initiatives to support similar efforts across the basin. For more information contact Ms. Kim Beidler at: kim.beidler@njudubon.org.

WREN-Grants Fund Source Water Protection Collaboratives in Pike & Berks County

The Water Resources Education Network (WREN) Project, a collaborative program of the League of Women Voters of Pennsylvania and other agencies and organizations, awarded \$12,000 in grants from PADEP' Source Water to support source water protection and education between July 2013 and June 2014. Two of the three grants were provided for efforts in the Delaware River basin. The Hemlock Farm Conservancy will put its \$5,000 grant to work in Pike County, working with Milford Water Authority, Hemlock Farms Community Association Water Company, Milford Water Authority, Twin & Walker Creeks Watershed Conservancy, Blooming Grove Twp., Pike County Conservation District, the Lackawaxen River Conservancy and the Pennsylvania Rural Water Association as the *Pocono Source Water Protection Collaborative*. The goal of the Pocono Collaborative is to maintain the excellent drinking water quality of the area and prevent pollution. The Pocono Collaborative will form a SWEET (Source Water Environmental Education Team) to encourage local responsibility for preventing contamination. A \$7,000 grant was awarded to the Center for Excellence in Local Government at Albright College to form a county-wide collaborative in Berks County to implement an effective Source Water Protection program. Read about the inaugural of the Berks Water and Sewer Authority, whose members are partners in source water protection, above.

Pennsylvania's Stormwater Authorities Law Clarified

Responding to local governments concerns, the PA legislature in June amended Title 53 to expressly enable the formation of local stormwater authorities as a way to pay for the escalating costs of stormwater management and flood mitigation. In 1978, Pennsylvania Act 167 required counties to prepare stormwater management plans, but local implementation has often been hampered by a lack of funding and a concern about legal challenges to

stormwater fees. Now, stormwater management plans and projects can be implemented with funds collected by utility user fees based upon impervious surface cover for property owners within a watershed. Incentives for stormwater management that reduces stormwater flow and thus costs to the authority are possible, as well. The Act also allows municipalities to create a joint authority with neighboring municipalities to collaborate on watershed based plans that cross political boundaries. Urban municipalities can implement new MS4 NPDES Phase II permit responsibilities, especially in impaired watersheds, through a coordinated framework.



Stormwater authorities give PA communities a tool for financing flood mitigation.

5.0 EDUCATION AND STEWARDSHIP

- 5.1 ESTABLISH A BASIN-WIDE SENSE OF PLACE
INCREASE WATER RESOURCE AWARENESS,
UNDERSTANDING & PARTICIPATION AMONG:
 - 5.2 YOUTH & STUDENTS
 - 5.3 THE PRIVATE SECTOR
 - 5.4 LOCAL PUBLIC OFFICIALS

River of Revolutions Interpretive Center



Visitors learn about the unique importance of the Schuylkill in the context of three revolutions.

Photo: SRHA

The grand opening of the new *River of Revolutions Interpretive Center* took place this spring at the Schuylkill River Heritage Area (SRHA) headquarters in Pottstown PA. The new center is interactive and educational with displays portraying the role of the Schuylkill River in three revolutions: the American, Industrial and Environmental. Also a visitor center, information is available about recreational opportunities and visitor sites in the five counties that make up the Schuylkill River National and State Heritage Area: Schuylkill, Berks, Montgomery, Chester, and Philadelphia. <http://www.schuylkillriver.org/Detail.aspx?id=5666>

DRBC Tweets!



The DRBC began utilizing several social media communication tools in March 2013 to reach a broader audience with news on commission activities and related information. Links to the commission's Twitter, YouTube, and Flickr social media sites as well as to RSS feeds can be found on the top right corner of every DRBC web page. The DRBC web site, www.drbc.net, will remain the agency's primary internet

presence. Over 376 billion bytes of information was sent over the DRBC web site during fiscal year (FY) 2013, an increase of 13% over FY 2012. In most cases, content posted to DRBC social media sites will also be available on the commission's web site, and links to relevant web pages will be included in social media posts for those seeking more information on a particular topic. www.drbc.net

She Swam the Bay!



Megan Wren, Executive Director of the Bayshore Center at Bivalve, swam 13.1 miles across Delaware Bay to raise money and interest in Bay resources.

Photo: Cindy Hepner, *South Jersey Times*

Twenty five years ago, Meghan Wren started a crusade to restore the historic oyster schooner, the *A.J. Meerwald*. On August 3, the executive director of the Bayshore Center at Bivalve became the first person to successfully swim across Delaware Bay in adherence with English Channel rules, that is, without wetsuit or life jacket, and under her own power! Crossing the 13.1 mile distance between Port Mahon DE and Fortescue NJ took 8 hours and 45 minutes. Escorted by her team, two boats and two kayaks, she also had assistance from the U.S. Coast Guard Auxiliary, the Port Norris Fire Company, and Fortescue Fire and Rescue who helped keep her on course and were on shark alert. Ms. Wren undertook the challenge "...for the Delaware Bay and for its people. We have an amazing place here, and I don't think it gets enough attention, or enough investment [for] the future." As of August 3rd, the event had raised \$17,000 toward a goal of \$25,000.

<http://www.ajmeerwald.org/>

Newton Creek—Revisited

Newton Creek is a little known waterway in Camden County (NJ). The creek's small 13.6 square mile watershed has a range of landscapes, from natural (Sadler Woods old growth forest) to urban (Camden waterfront) with a broad spectrum of community types and issues (superfund sites, invasive species, and lots of stormwater runoff). The Creek is the common thread binding diverse communities—such as Haddonfield and Gloucester City—on its 6 mile journey to the Delaware River. While it is cleaner than it was 30 years ago, the stream is still considered to be impaired. Last fall the Delaware Riverkeeper Network (DRN) hosted a tour of the watershed for representatives of area environmental commissions, Camden's *Urban Promise* and the New Jersey Conservation Foundation. The result has been a resurgence of interest in improving conditions and the resurrection of a defunct Newton Creek Watershed Association. Still in its formation, the fledgling watershed group intends to address riparian buffer integrity, water quality issues and invasive species. Among events to be scheduled this fall are a snakehead fishing contest and a joint project with the Camden County Utility Authority to engage students in water quality testing. It seems community gardeners in Camden would like to use the Creek as a source of irrigation water if its quality passes muster. As DRN spokesperson Fred Stine noted "the Creek has a voice again."



Fred Stine of the Delaware Riverkeeper Network led a tour of Little Newton Creek to raise local awareness.

Photo: Kevin Riordan, *Philadelphia Inquirer*

Trash It—Doctors Orders!



Photo: US EPA

Physicians for Social Responsibility (PSR) Philadelphia took the lead in producing a Fact Sheet entitled, "Medicines: The Right Way to Throw Away." It is one of the outreach tools developed for their *Diverting Unwanted*

Pharmaceuticals from Waterways Project focusing on proper disposal of pharmaceuticals. PSR is testing the fact sheet with "low literacy" audiences in Norristown. The target audience is elderly customers which represent the largest percentage of prescription users.

<http://psrphila.org/pharmaceuticals/>
Fact Sheet:

http://static.squarespace.com/static/50804b1484ae863ca6c1e36a/t/518274abe4b04f94760e0e85/1367504043979/MedsFlyer_2013.pdf

Signing for Water Supply



The City of Allentown and Lehigh County Authority Source Water Protection Coalition created a *Water Supply Signs* brochure as a part of their, **Road Signs for Improving Source Water Protection** project. The goal is to protect drinking water supply areas in the Lehigh Valley from potential contaminants, such as spills on transportation corridors,

agricultural, urban runoff and other identified risks. Posting "Water Supply Area" signs is one way to raise awareness about protecting drinking water and alert motorists to the presence of the drinking water supply area. Motorists can help by quickly reporting spills along the roadways to 911.

<http://www.allentownpa.gov/Portals/0/files/Water/Water-Supply-Area-Brochure.pdf>

TIDE Camp:

Taking Interest in Delaware's Estuary:



Students go with the TIDE.

Photo: Franklin Newton

The University of Delaware (UD) has launched **TIDE Camp**, for high school students intrigued by science and the sea. The two-week overnight program gives campers hands-on field experience in marine environments and a variety of topics including habitat loss, saltwater marshes, sediment transport, climate change and alternative energy. The students will experience classroom instruction and discussion paired with field excursions, research lab visits and a tour of the University's research ship; recreational activities such as volleyball, kayaking and movies are also included. The program is hosted by the UD's College of Earth, Ocean, and Environment and supported by the Delaware Sea Grant College Program.

<http://www.udel.edu/udaily/2013/feb/tide-camp-021513.html>

Natural Capital Value of the Christina Basin

Building on previous investigations of the economic value of water resources-generated natural capital, the Institute for Public



The arches of the CSX railroad bridge crossing the Brandywine Creek in Wilmington DE.

Photo: DNREC

Administration's Water Resources Agency at the University of Delaware completed an extensive study on the economic value of the Christina Basin and its watersheds. The series of "Economic Value" reports uses three measures for natural capital's economic values:

- the direct relationship of resources
- goods and services provided by the watershed systems and
- value from direct and indirect employment.

The water, natural resources, and ecosystems in the Christina River Basin contribute an economic value of approximately \$7 billion annually to the Pennsylvania, Delaware, and Maryland economies. For more information about the Water Resources Natural Capital studies see: <http://www.wra.udel.edu/>

Rain, Rain, Don't Go Away



For Monroe County's "Retain the Rain" project, locally decorated rain barrels are installed to illustrate the art of water conservation.

Photo: Trish Attardo, MCCD

The Monroe County Conservation District (MCCD), Brodhead Watershed Association, Pocono Arts Council, Monroe Career and Technical Institute and the Brodhead Creek Regional Authority partnered in *Retain the Rain*, a rain barrel art project merging public art and water conservation. Based upon the successful *Trout Trails and Tales* program, *Retain the Rain* gathered local artists of all ages to paint twenty rain barrels. The project kicked off with a rain barrel workshop, followed by a gallery display at the Pocono Arts Council. The painted barrels were ultimately installed for a public self-guided tour at homes, businesses, and public places in Stroudsburg and East Stroudsburg.

<http://www.mcconservation.org/default.asp?contentID=13>.



DRBC welcomes submittals of information on programs and projects that realize the goals and objectives of the *Water Resources Plan for the Delaware River Basin (Basin Plan, 2004)* and exemplify an integrated approach to water resources management.

