Issue 4 | March 2013

WateR mAtters

Editor's Welcome

Happy New Year and welcome to the fourth edition of Water Matters, the newsletter of the Institute for Public Administration's Water Resources Agency (WRA) at the University of Delaware. Although it has been some time since our last newsletter, it doesn't mean we haven't been busy—quite the opposite, it's a sign we've been too busy!

First and foremost, on behalf of the staff at WRA, I would like to thank our governments for continued support. The State of Delaware, New Castle County, City of Wilmington, and the City of Newark, have provided WRA with support for more than 35 years. We immensely enjoy and are intellectually challenged by the work we do with and for our funding partners and truly value their partnership and the people with whom we work with on a daily basis. In addition to our locally focused water-resources work, over the past few years we have broadened our scope geographically to include more regional projects. We have expanded our funding streams and have recently supplemented our more traditional sources with funding from the Barnegat Bay Partnership, American Rivers, NOAA, FishAmerica, and the National Park Service.

So what have we been doing over the past few years? Well, to start, colleges within the University of Delaware have been realigned. The WRA was part of that change when our Institute for Public Administration and School of Public Policy and Administration joined the College of Arts and Sciences. This shift has not changed our day-to-day operations or how we conduct business, but it is part of the ever-evolving framework within the University. Secondly, in 2012 WRA updated our Strategic Plan that outlines how we will work to contribute to the six strategic milestones outlined in the University of Delaware's Strategic Plan as part of its Path to Prominence. This plan provides WRA with a road map for strategically working with our governments toward meeting water resources goals for the future (www.ipa.udel.edu/wra/docs/WRAstratplan12.pdf).

In addition to these changes, our staff and students have been working on local and regional water-resources projects related to source-water protection, floodplain mapping, GIS and education, the economics of water resources, dam removal in the White Clay Creek, the Christina Basin and its watersheds, the Delaware watersheds website, and water-resources education both within and outside of the University, just to name a few of our projects.

You can read more about several of these projects in this newsletter or you can get more information about our projects on our website (www.ipa.udel.edu/wra). WRA staff and students strive to provide water-resources expertise throughout the Delaware Valley region, and we hope this newsletter provides you with a snapshot of our efforts over the past few months. Please do not hesitate to contact us or visit us in the Delaware Geological Survey Annex building in Newark (just off Academy Street behind the rain garden) or on the Lewes campus at the Pollution Ecology Lab.

Martha Narvaez
Associate Policy Scientist

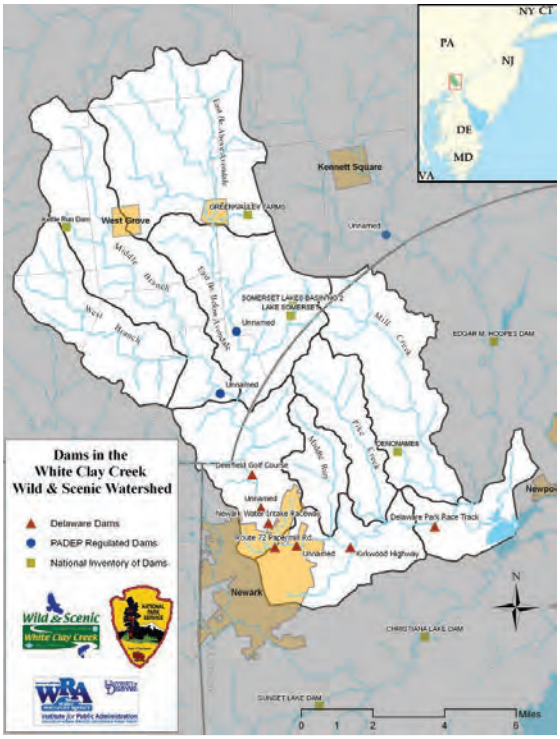
Research and Education

WRA works with partners to restore American Shad to the White Clay Creek—a National Wild and Scenic River

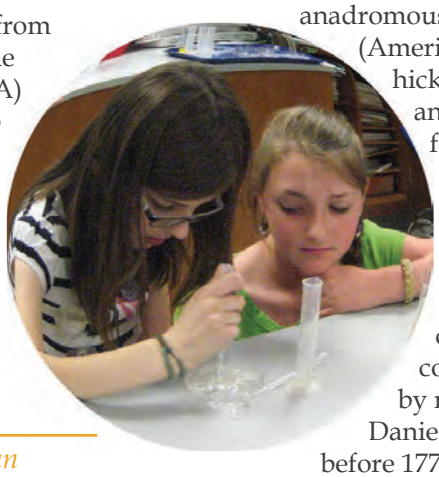
The National Wild and Scenic White Clay Creek will benefit from an $85,606 grant awarded to the Water Resources Agency (WRA) through a national partnership between American Rivers and the National Oceanic and Atmospheric Administration (NOAA). American Rivers selected the White Clay Creek restoration project as one of just six projects from over 200 grant applications submitted nationwide.

Shad in Schools program is an applied experience that educates students, teachers, and the public about the history, problems/decline, and life cycle of American shad while teaching math and science concepts through the balance of water conditions and temperature.

This project is designed to remove White Clay Creek Dam No. 1.



Removing this dam, a historic colonial mill timber-crib dam built around 1777 near present-day Delaware Park, will reopen 3.5 miles and 42 acres of spawning habitat along the waterway in New Castle County for passage of anadromous fish (American shad, hickory shad, and herring) for the first time in over two centuries. Removal of the historic dam, constructed by miller Daniel Byrnes before 1777 Battle of Cooches Bridge during the American Revolution, is planned for later this winter. As the first dam-removal project in Delaware, this is the initial step in a five-year plan to remove six other upstream dams and reopen 14 miles of fish passage—from tidewater inland to the Piedmont through Newark into Pennsylvania.



The American Rivers grant is funding a University of Delaware research team that includes WRA, the Center for Historic Architecture and Design, and the Departments of Geology and Civil & Environmental Engineering. The U.S. National Park Service, White Clay Creek Wild and Scenic Watershed Management Committee, Delaware Division of Fish and Wildlife, United Water Delaware, and Delaware Park, Inc., are project partners.

Public outreach component

In addition to the removal of the dam, an important component of this project is public education and outreach. One way WRA is doing this is through its partnership with the Brandywine Conservancy to coordinate the Shad in Schools program in the Brandywine and White Clay Creek watersheds in Delaware and Pennsylvania. This program began in 2010 with four schools and in 2013 has ten schools participating from throughout the Christina Basin.

The Shad in Schools program is an applied experience that educates students, teachers, and the public about the history, problems/decline, and life cycle of American shad while teaching math and science concepts through the balance of water conditions and temperature. During the Shad in Schools program, students raise fry (baby fish) and release them in local waters to imprint them to the stream and, hopefully, return them again to that same stream in a few years to spawn.

The Delaware Shad Fishermen's Association and Jim Cummins of the Interstate Commission for the Potomac River Basin (ICPRB) have provided significant direction and assistance to WRA and the Brandywine Conservancy on the Shad in Schools program in the Christina Basin.

Gerald Kauffman
Project Director

Environmental Careers

Green Jobs Program

In the summer of 2012, the Water Resources Agency (WRA) and the City of Wilmington partnered with six environmental organizations to launch the second year of the city's summer Green Jobs Program, employing ten teenagers.

The City of Wilmington's Green Jobs Program engages the its youth by providing green-collar work opportunities. The youth participate in hands-on work experience and classroom environmental education that introduce them to environmental issues and careers. By participating in this program, Wilmington's youth can help to transform the city into a greener, cleaner, safer community while experiencing meaningful employment and education opportunities.

Critical to this program is the partnership that makes it work and run so smoothly. WRA and the city's Public Works and Parks and Recreation departments led the program. In addition, those involved in the program include:

- Delaware Center for Horticulture
- Delaware Department of Natural Resources and Environmental Control (DNREC)
- Delaware Nature Society
- Partnership for the Delaware Estuary
- The Challenge Program
- Urban Environmental Center

Each intern works 25 hours per week, earning minimum wage for six weeks. The program begins with an introductory session at the DuPont Environmental Education Center, and then the interns embark on six weeks of hands-on fieldwork, professional development, and exposure to environmental careers and topics.

Some of the hands-on work includes landscaping and removing invasive plants, surveying mussels, maintaining trees, planting gardens, sprucing up parks, and searching for aquatic life called "macroinvertebrates." However, this is just the beginning of a summer of professional tasks they perform. The partnership engages the youth in various environmental careers and helps them to develop skills they will need to work as professionals in any field in their future. So components such as photography and journaling, as well as workshops on résumé writing and public speaking, have been incorporated into the program. Each participant in the Green Jobs Program is also paired with a mentor. These and other experts provide guidance, training, and insight into a variety of environmental careers.

The Green Jobs Program culminates in mid-August with a barbeque at The Challenge Program's new headquarters on the Christina Riverfront. The location of its closing event is no accident; when completed the headquarters will be among the first LEED (Leadership in Energy and Environmental Design) Gold–certified buildings in Delaware.

Over the past two years, this partnership has proven to be an amazing cooperation among eight organizations that have committed staff time and expertise with no monetary compensation. The partnership deserves to be commended for their efforts and dedication to the interns as well as the City of Wilmington and its environment. Plans for the 2013 program are already underway, and the partnership will be providing the youth with experiences that will have an impact that will last a lifetime and help make the City of Wilmington a better place to live and recreate.

Martha Narvaez
Associate Policy Scientist

WRA Acknowledges Two Public Works Professionals

We offer warm wishes to two WRA Board members who have dedicated their careers to the public good and have now retired. We wish them all the best as they commence the second half of their sparkling careers.

Former City of Newark Public Works Director Rich Lapointe retired in January after 20 years of service to the city. He supervised 46 employees who were responsible for streets, stormwater, and drainage. Under his leadership, the City adopted the most progressive stormwater regulations in Delaware and installed the state's first experimental-stream bioengineering project, along the upper Christina River.

Former City of Wilmington Commissioner of Public Works Kash Srinivasan retired after 35 years with the city. He modernized its water and wastewater divisions by hiring a professional staff of highly qualified engineers. Under his water management leadership, the City was able to renovate the 80-year old Hoopes Reservoir, adopt the first stormwater utility in Delaware, and reconstruct the Cool Springs Reservoir and the Market Street Filter Plant along the Brandywine Creek.

Climate Change

This article originally appeared in University of Delaware Research magazine.

Preparing for a "new normal"

When you live in the flattest U.S. state, in a "geological hotspot" that's sinking, where the sea level has already risen a little over a foot in the past century and is predicted to keep on rising, "it loads the dice when storms occur," insists Gerald Kauffman, director of the Water Resources Agency, a unit of the University of Delaware's Institute for Public Administration (IPA).

Kauffman and IPA associate scientist Andrew Homsey recently published a report on the 331 square miles—17 percent of Delaware's landmass—that lies within the 100-year floodplain. Based on recent FEMA flood-insurance studies and other data, they found that there are more than 18,000 structures in Delaware's 100-year floodplain—2,431 in New Castle County, 1,853 in Kent County, and 13,760 in Sussex County.

The watersheds that include the most structures are the Christina River in New Castle County (1,007 structures), St. Jones River in Kent (567 structures), and Indian River Bay in Sussex (3,856 structures). In addition, approximately 621 road miles lie within the state's 100-year floodplain—128 miles in New Castle County, 75 miles in Kent County, and 418 miles in Sussex County.

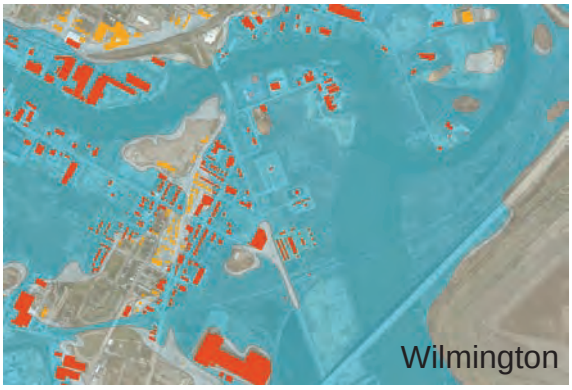
Watersheds that include the most road miles in the floodplain are the Christina River in New Castle County (44 miles), the Murderkill in Kent County (16 miles), and Indian River Bay (106 miles) in Sussex.

With sea level rise comes increased flood risks to residents living in these areas. After massive flooding of the Glenville subdivision along Red Clay Creek near Stanton from Tropical Storm Henri in 2003, state and local government bought out the homes, and the community was abandoned.

For public safety in the face of sea level rise, Kauffman, who is a member of the state's Climate Change Vulnerability Steering Committee, advises strengthening building codes by instituting stricter permissible standards—from the 100- to the 500-year floodplain—as well as beefing up the size and height requirements for infrastructure such as roads, dam, and bridges.

Kauffman points out that climate change and rising seas already are affecting the ebb and flow of daily life in Delaware, toward a "new normal." "School districts are reconfiguring their bus routes for portions of State Route 9 that typically flood during a storm," he says. "People call us about how much warmer their drinking water is in summer, and blue crabs have been seen as far inland as the Delaware racetrack."

Gerald Kauffman
Project Director



The maps above show structures, which are displayed in red, within the 100-year floodplain throughout each county in Delaware.

Education and Outreach

WRA receives funding for NPDES-permit education and outreach

In Delaware there are more than 5,000 miles of roadways to maintain and manage. These roadways are a significant source of stormwater runoff. Controlling and managing water that runs off roadways and other impervious surfaces into the state's surface waters is a major responsibility of the Delaware Department of Transportation (DelDOT). As authorized under the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) controls water pollution by regulating stormwater that discharges directly into surface waters. New Castle County, DelDOT, and six municipalities—Bellefonte, Delaware City, the Town of Elsmere, the City of Middletown, the City of New Castle, and the City of Wilmington—are Phase I co-permittees authorized under the NPDES and the laws of the State of Delaware to discharge stormwater from and through all portions of the municipal separate storm-sewer system (MS4) in New Castle County.

In 2010 the Water Resources Agency (WRA) received funding from the Delaware Center for Transportation (DCT) to provide guidance for DelDOT, New Castle County, and the co-permitees for achieving the education and outreach requirements of the NPDES permit. WRA's work, led by Martha Narvaez and Andrew Homsey, intends to make the education and outreach efforts more effective and meaningful for New Castle County, DelDOT, and the six municipalities regulated under the permit. Though the University of Delaware served as the lead agency, this project was conducted using a team approach, with direct consultation provided by representatives from DelDOT and New Castle County.

The project team first compiled and reviewed DelDOT's existing education and outreach efforts regarding stormwater issues. Additionally, information was collected on a number of nationally recognized stormwater-education programs that can be used as a model for DelDOT to implement Delaware-specific programs, based on those that have proven most successful and cost-effective elsewhere. At a workshop hosted by Water Words that Work, LLC, the project team and co-permitees learned about effective outreach and marketing techniques for environmental issues. DelDOT, the co-permittees, and the project team came to understand the importance of the target audience, data, and innovative Web tools to focus in on the target audience, effective design, how to leverage existing resources, and many other valuable lessons.

Using the information collected and the lessons learned from the workshop, recommendations were developed for a set of eight target areas, which are derived from the educational requirements of the NPDES permit. Each one of these recommended approaches provides guidance toward the development of a refined Stormwater Education and Outreach Plan, as required by the NPDES Phase I permit. The final report for this project, which details the data collected, the lessons learned, and the recommended approaches, can be found at http://dspace.udel.edu:8080/dspace/handle/19716/10995.

Martha Narvaez
Associate Policy Scientist

Newark Public Works Database

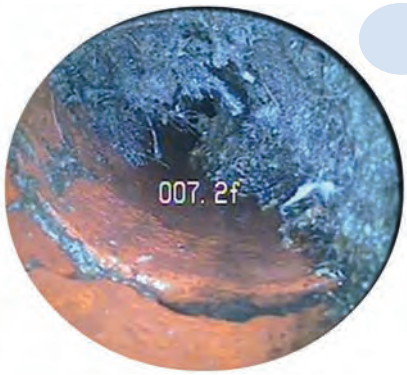
Thinking About Waste Water

The plumbing in our homes is something that most of us do not think about much, at least not most of the time. But when our kitchen sink backs up or our toilet does not flush, it suddenly becomes a high priority! Fortunately, problems like this occur fairly infrequently in our homes, and calls to the plumber tend to be only rare occurrences.

Imagine, however, being responsible for all the plumbing in town—all the sewer pipes under the streets, manholes, pumps, valves, and other parts of the system. It becomes a large (and important) job indeed. A city the size of Newark, as one of the state's largest municipalities, has a complex system of waste pipes. It is the responsibility of the Newark's Department of Public Works and Water Resources to make sure the system performs smoothly.

"We need to be able to refer to an incident by pipe-segment number, street address, and manhole, to make sure that the needed repairs were made and no further problems have cropped up. Going through the pile of reports and videos can get cumbersome."

Recently, the Department approached WRA to assist in the development of an inventory system to aid in tracking the maintenance operations of the city's sewer system. Currently, every time a problem is reported or discovered, a crew goes into the field to determine the nature of the issue. They can send small, robotic "pigs," outfitted with video cameras, down the pipe to see what the problem is. For each incident, a video is generated and a report drafted. Many times, a follow-up video is produced to verify that the problem has been solved. Storing, searching, and accessing the huge amount of data from this process quickly becomes problematic. As Tom Coleman, engineer with the department, notes, "We need to be able to refer to an incident by pipe-segment number, street address, and manhole,



This house has a root problem! This video still shows the cause of the home's plumbing issues.

to make sure that the needed repairs were made and no further problems have cropped up. Going through the pile of reports and videos can get cumbersome."

In cooperation with Coleman, WRA's Jonathan Barton and Andrew Homsey developed a database system to consistently and centrally store the data on pipes, and designed a Web-based storage and retrieval system. As new data are produced, they can be easily placed in the database and immediately become accessible through a user-friendly interface.

Department personnel can access the database from anywhere and search for information by street address or other identifier. Currently, the site is under testing, but future enhancements could include a mapping interface, allowing users to get the information just by clicking on a representation of a pipe.

Taking care of the City of Newark's pipes is a big job indeed. Keeping the water flowing, into and out of your house, and throughout the town, is full-time work. WRA is glad to be a part of the effort and looks forward to continuing its long-standing partnership with Newark's chief "water stewards!"

Andrew Homsey
Associate Policy Scientist

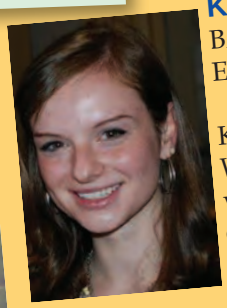
The engineering drawings are in the process of being converted into a "GIS-friendly" format, so that they may more easily be mapped, and accessed through web-based applications.

Meet Our Students

Jonathan Barton

MS, The Pennsylvania State University 2011,
Computer Science & Engineering
MS, University of Delaware 2008,
Electrical & Computer Engineering
BS, University of Delaware 2005,
Computer Engineering

Jonathan is currently working on all things technology-related at the Water Resources Agency. He is in charge of the websites, servers, and various systems throughout the building. Jonathan was a WRA research assistant while receiving his first master's degree. When not working (or receiving another degree), Jonathan enjoys playing with his niece and watching college sporting events.



Kate Miller

BA, University of Delaware 2012,
Environmental Studies

Kate is currently enrolled in the brand new Water Science and Policy graduate program with a concentration in water policy. She expects to graduate in 2014. Kate is a lifelong resident of the Christina River Basin, but, when work and school permit, she enjoys exploring what other river basins have to offer—preferably ones in exotic locations.

Joseph Brown

BS, University of Delaware 1999,
Civil Engineering

Joe is currently pursuing an MA in Urban Affairs and Public Policy with a concentration in Urban and Regional Planning. Joe is expecting to graduate in May 2014. With almost 15 years of experience in land development and stormwater management, Joe hopes to help develop public policy that promotes the importance of local and regional planning in the preservation and remediation of our water resources. When not busy being a student and Public Administration Fellow for WRA, he enjoys duck hunting on the Susquehanna River.

Catherine Cruz-Ortíz

MEEP, University of Delaware 2012,
Environmental Policy
BS, Pennsylvania State University 2010,
Environmental Resource Management
BS, Pennsylvania State University 2010,
Community, Environment, Development

Having recently completed her master's degree in environmental policy, Catherine devotes her time and efforts to various projects at WRA and being an environmental instructor at the Brandywine Valley Association. When not working, she involves herself in sports such as rugby, soccer, and the Korean martial art Tang Soo Do.

About Us

Our Mission

The mission of the Water Resources Agency is to provide water science and policy assistance to governments in Delaware and the Delaware Valley through the land-grant public service, education, and research role at the University of Delaware.

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