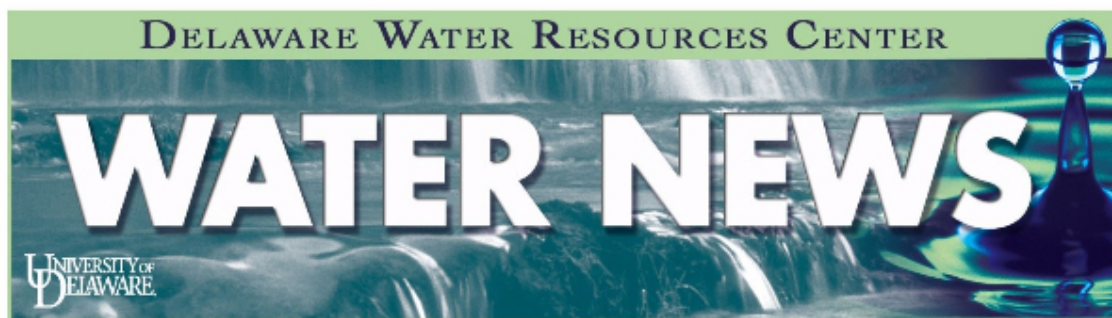


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October 2016

Volume 15

No. 2

Celebrating Our 50th Year!

[View the newsletter online](#)

## Director's Message

During the century-ending drought of 1999, the State Geologist once informed the Governor's Drought Advisory Committee that "a drought always ends when it rains." While no one can predict the future and our warming atmosphere makes it harder to forecast the weather, this adage is always true. This summer we sweated through the hottest August on record in Delaware in 122 years dating to 1895 and our drinking water streams such as the Brandywine have declined to the lowest levels since the record drought of 2002. The Delaware Water Supply Coordinating Council is watching this

closely and a drought watch may be in the offing unless we receive tropical moisture in the name of Matthew, Nicole, or Otto.



Senator Carper visits the Delaware Water Resources Center with (left to right) Gerald Kauffman (DWRC), Sandra Petrakis (Water Science and Policy), Matt Ludington (Water Science and Policy), Andrea Miller (Environmental Studies), Martha Narvaez (DWRC), Andrew Homsey (DWRC), and Laura Askin (Public Administration).

Delaware relies on concordant relationships with our Federal water agencies and neighboring states as a full two thirds of the First State's drinking water flows from four streams that roll down from the Piedmont foothills in Pennsylvania and Maryland across William Penn's 1682 arc into the Coastal Plain of Delaware. Since the UD campus lies by the banks of one of these streams, the White Clay Creek National Wild and Scenic River, our Delaware Water Resources Center (DWRC) students have an ideal outdoor living laboratory at their doorsteps to carry out their research on droughts and floods. On a drought-like August day, our senior Senator Tom Carper, a ranking

member of the Senate Public Works and Environment Committee, stopped by the DWRC offices to discuss these critical water resource issues with our water science and policy and environmental studies students.



Senator Carper discusses water policy issues at the Delaware Water Resources Center with (left to right) Matt Ludington (Water Science and Policy), Laura Askin (Public Administration), Gerald Kauffman (DWRC), Sandra Petrakis (Water Science and Policy), and Andrea Miller (Environmental Studies).

As we enter the 2017 Water Year on October 1<sup>st</sup>, we reflect on our strategic thinking about how to provide more cohesive research opportunities for budding water scientists and students here in Delaware. Therefore, for the first time in 40 years, we are pleased to announce the merger of the Delaware Water Resources Center (est. 1965) with the Water Resources Agency (est. 1977). You can read more about the fluidity of this synchronization at

our new [website](#).

Do you remember Adam Smith who discussed the invisible hand of economics? Well back in 1776 he also wrote about the diamond-water paradox. Water (and the people who study it) are precious resources, that's always been true too!

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## DWRC Selects Cohort of Undergraduate and Graduate Research Students from UD and DSU for 2016-2017

Dr. Gerald J. Kauffman is pleased to announce that the Advisory Panel of the Delaware Water Resources Center (DWRC) has selected the following students in five colleges at the University of Delaware and Delaware State University for the undergraduate and graduate research program during 2016-2017. These competitive undergraduate internships and graduate research assistantships are funded by the U.S. Department of Interior and U.S. Geological Survey through the Water Resources Research Act (WRRRA) signed by Lyndon Baines Johnson in 1964. The DWRC is one of the 54 National Institutes for Water Resources (NIWR) supported by the USGS at land grant universities in the 50 states, District of Columbia, and island territories of Guam, Puerto Rico, and U.S. Virgin Islands. The DWRC is celebrating our 50th anniversary as this Federally supported research center was established on campus in 1965, just a year after LBJ signed the WRRRA. The DWRC is based in the DGS Annex at 261 Academy Street and is part of the Institute for Public Administration in the School of Public Policy and Administration and College of Arts and Sciences.

### DWRC UNDERGRADUATE INTERNSHIP PROGRAM 2016-2017

Intern: Natalie Criscenzo

UD Energy & Environmental Policy and Public Policy major

Advisor: Philip Barnes, UD Institute for Public Administration

Overcoming Policy and Planning Barriers to Resilient and Sustainable Communities in Delaware

Intern: Lauren Glinko  
UD Geography major  
Advisor: Afton Clarke-Sather, UD Department of Geography  
Causes of Change of Irrigation in the Eastern United States

Intern: Madison Gutekunst  
UD Environmental Engineering major  
Advisor: Rodrigo Vargas, UD Department of Plant and Soil Sciences  
Linking Below Ground Greenhouse Gas Concentrations with Water Chemistry in the St. Jones Estuary

Intern: Benjamin Jenkins  
Delaware State University Natural Resources-Fisheries Management major  
Advisor: Dewayne Fox, Delaware State University Department of Agriculture and Natural Resources  
Estimating the Spawning Population of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) in the Delaware River

Intern: Maya Kassoff  
UD Environmental Science major  
Advisor: Gerald Kauffman, UD Water Resources Center  
Water Quality Monitoring in the White Clay Creek National Wild & Scenic River Watershed

Intern: Andrea Miller  
UD Environmental Studies major  
Advisor: Gerald Kauffman, UD Water Resources Center  
Water Quality Monitoring in the White Clay Creek National Wild & Scenic River Watershed

Intern: Courtney Rempfer  
UD Environmental Science major  
Advisor: Rodrigo Vargas, UD Department of Plant and Soil Sciences  
Designing an Automated System to Monitor O<sub>2</sub>, CO<sub>2</sub> and CH<sub>4</sub> from Sediments in a Salt Marsh

Intern: Ilana Schnauffer  
UD Chemistry and Environmental Science double major  
Advisor: Delphis Levia, UD Department of Geography  
Variations in the Residence Time and Isotopic Signature of Stemflow along an Edge-to-interior Transect

Intern: Jacob Shelton  
UD Environmental Studies major  
Advisor: Maria Pautler, UD Plant and Soil Sciences  
Sustained Water Quality Monitoring of Possum Creek and Noxontown Pond, Delaware

Intern: Patrick Wise  
UD Biological Sciences and History double major  
Advisor: Angelia Seyfferth, UD Department of Plant and Soil Sciences  
Variable Regulation of Silicon Transporter Gene Expression in Rice

DWRC GRADUATE STUDENTS

Lauren Lechner (Project Number: 2014DE261B)

Began her Ph.D. program in Environmental Engineering in September 2014. She switched to a M.S. program and finished in July 2016.

Main Advisor: Pei Chiu, UD Department of Civil and Environmental Engineering

Nutrient Removal from Stormwater, Wastewater, and Agricultural Runoff Using Scrap Iron and Biochar

Daniel Sanchez Carretero (Project Number: 2014DE260B)

Began his Ph.D. program in Environmental Engineering in September 2014.

Main Advisor: C.P. Huang, UD Department of Civil and Environmental Engineering

Electrochemical Reduction of Dissolved Carbon Dioxide in Water to Hydrocarbons

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## DWRC to go Down Under to New Zealand in 2017

DWRC Director Gerald Kauffman has been invited to lead a Delaware delegation to New Zealand over November 19-24, 2017 as the keynote speaker at the 5th biennial symposium of the International Society for River Science on the banks of the Waikato River, Hamilton, New Zealand. Sponsored by the University of Waikato, New Zealand Dairy, the Waikato River



DWRC Director Gerald Kauffman shows us where New Zealand lies.

Commission and the New Zealand Freshwater Sciences Society (NZFSS), Dr. Kauffman will discuss the economics of investing in coastal watersheds, a topic that Delaware as a small peninsular state and New Zealand as a small island country, have much in common. The conference theme is "integrating multiple values" and addresses a key challenge for water resources managers tasked with achieving outcomes that satisfy growing human demands while protecting environmental values. Science and other forms of environmental knowledge play key roles in understanding issues and developing solutions for

river managers, and the 2017 conference will provide a forum for sharing knowledge underpinning management of rivers for multiple goals. Special session proposals are now being called for, see the conference [website](#) for further details.

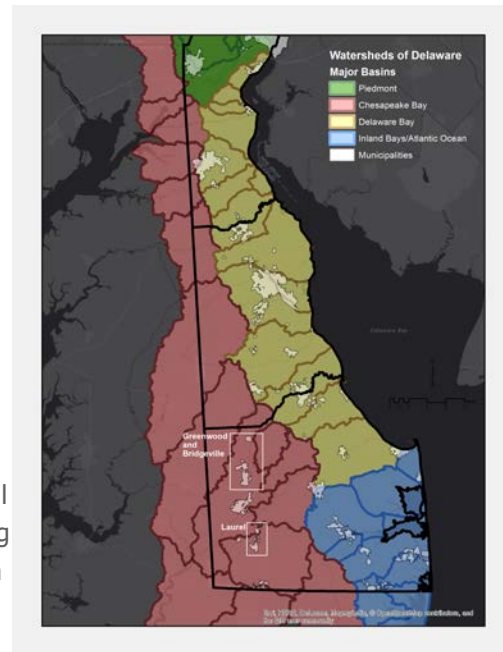
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## A Collaborative Water Movement

Did you know that Delaware is among the six Chesapeake Bay Watershed states? Delaware, Maryland, Virginia, West Virginia, Pennsylvania, New York and the District of Columbia are committed to a federal-state initiative to develop a pollution "diet" that will help restore the water quality of the Bay and its tidal waters by 2025. This means that each jurisdiction is required to develop a Watershed Implementation Plan (WIP) detailing how load goals will be achieved and maintained into the future.

Reaching these load goals takes great collaboration. DNREC, University of Delaware Sustainable Coastal Communities Initiative, Delaware Municipalities (within the Chesapeake Bay Watershed) and the Office of State Planning Coordination are working hard to promote sustainable growth and create strategies which protect local and regional natural resources to ensure that an abundance of these resources are available for future generations.

This article will highlight three towns in Sussex County, Delaware who worked diligently on bringing their communities together (citizens, community leaders, and businesses). These communities recognize the complex interrelationships between social, economic and environmental values in coastal areas and worked together to reach goals on moving forward, creating a sustainable community, which in turn will improve the Chesapeake Bay.



### Bridgeville and Greenwood

Located in the upper reaches of the Nanticoke River, both Bridgeville and Greenwood are facing challenges related to pollution limits for nitrogen and phosphorous in the Chesapeake Bay watershed, which drains half of Sussex County and one third of the State of Delaware. Bridgeville, particularly, has an aging wastewater treatment plant that needs significant upgrades to comply with pollution limits by 2025.

The University of Delaware's Sustainable Coastal Communities Initiative, directed by Edward Lewandowski, coordinated this Master Plan project through sponsored awards from the National Fish & Wildlife Foundation and the Delaware Department of Natural Resources and Environmental Control. Project management, facilitation for the initial public workshops and development of the methodology for mapping growth scenarios and performing build-out analyses was performed by staff from the University of Delaware's Sustainable Coastal Communities Initiative. The Delaware Office of State Planning Coordination worked with both towns and the University to initiate the planning process. Workshops were conducted with leaders of both communities to determine how and where the towns would grow in the context of these water-quality challenges. After using the Community Viz interactive tool, the towns agreed on principles and a growth scenario that would protect water quality while promoting sustainable growth in and around the existing towns. The University hired Cedar Creek Sustainable Planning Services, Lee Ann Walling, to draft and design a master plan for the two communities. Greenwood's Town Commission adopted the master plan in August 2014. Bridgeville's Town Commission voted to approve and adopt the plan on October 13, 2014. The plan can be accessed [here](#).

### Laurel

Laurel, a historic Sussex County on the Broad Creek, a tributary of the Nanticoke River, which flows into the Chesapeake Bay, faces economic challenges. However, its Broad Creek waterfront is a striking and valuable natural asset, which is a gateway to outdoor recreation and nature tourism in that region. The successful Laurel Redevelopment Corporation and local stakeholders, including town leaders, partnered on a plan and proposal to revitalize Laurel's waterfront while

safeguarding water quality in the creek.

An interactive Laurel story map was created and features The Ramble redevelopment project along Broad Creek, information about the town's advanced treatment wastewater plant, the Laurel Redevelopment Corporation and its participation in Delaware Economic Development Office's Project Popup, zoning maps and a future growth map. It also includes videos and photos and many links to related data. The series also features extensive demographic information, including a market segmentation analysis that includes Tapestry profiles within the Salisbury, MD-DE Metropolitan Statistical Area. Tapestry, a product of Esri, helps identify an area's lifestyle choices, how people who live in a particular zip code, statistical area or census tract spend their free time, and what they buy.

This [map series](#) is published by the Sussex Economic Development Action Committee with a grant from the University of Delaware's Sustainable Coastal Communities Initiative. The map series was constructed by Nicole Minni, GISP, of the University of Delaware Water Resources Center and Lee Ann Walling, AICP, of Cedar Creek Sustainable Planners.

### In Conclusion

It is an exciting time to work with these Chesapeake Bay communities and have their stakeholders come to the table to develop goals for improving their waterways, allowing for creativity, growth, protection and preservation of the natural resources for all to enjoy. In addition to the Chesapeake Bay Communities, our unincorporated areas are taking action as well. If you have visited Trap Pond, you may have noticed something new floating in the water – a floating wetland. To learn more about this Chesapeake Bay project and others visit the DNREC website [here](#).

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## DEAWRA Hosts Mid-Atlantic AWRA Conference

On September 15th and 16th, the Delaware Section of the American Water Resources Association (DEAWRA) in conjunction with the National Capital Region Section, New Jersey State Section, Pennsylvania State Section, and Philadelphia Metropolitan Area Section hosted the 2016 Mid-Atlantic Conference (MAC) of the American Water Resources Association (AWRA). The conference was titled: Solving Tomorrow's Water Resource Challenges Today and was held in n Wilmington, Delaware with over 200 attendees, one of the highest attended MAC conferences.

This year marks the 17th MAC conference hosted by AWRA's Mid-Atlantic Sections. The first MAC conference was held in 1991, in West Point, NY focusing on the challenges for the river basins in the Middle Atlantic region. Since 1991, the conferences have been held in New Jersey, New York, Pennsylvania, and Delaware and focus on water resource topics and issues related to the Mid-Atlantic region.

This year's conference was led by co-chairs Joanne Rufft and Dani-Ella Betz (Chester County Water Resources Authority) and technical chairs, Kathy Hale (New Jersey Water Supply Authority) and Jim Eisenhardt (RK&K). Additional conference committee members included members of the National Capital Region Section, New Jersey State Section, Pennsylvania State Section and Philadelphia Metropolitan Area Section. The conference planning committee worked diligently for over a year to plan such a successful conference.

The conference was kicked off by Mr. Dennis W. Doll, Chairman, President & CEO of Middlesex

Water. In his keynote, Mr. Doll shared his perspectives on water supply management in the context of the Flint, MI crisis: "Infrastructure Failures - The Role of Money and Politics in the Causes and Solutions". On Friday morning, Mr. Chris Crockett, P.E., Ph.D. Vice President/Chief Environmental Officer with Aqua America and Former Deputy Commissioner of Philadelphia Water Department served as the keynote. Dr. Crockett lead us down the path of several possible futures of water resources in the region looking at these factors and challenge attendees to determine which future they want to help make for the regions water resources. In addition to the two keynotes, Secretary David Small of Delaware's Department of Natural Resources and Environmental Control (DNREC) welcomed the conference attendees to Delaware and provided an overview of challenges and opportunities facing (DNREC). The City of Wilmington's Director of the Office of Economic Development, Jeff Flynn, welcomed the conference attendees to the City of Wilmington. Additionally, Ken Reid, AWRA Executive Vice President, and Martha Narvaez, AWRA President, provided national updates from AWRA. The conference also included a robust technical program spanning two days.



The 2016 MAC Conference Committee

In addition to an extensive program of water resource presentations the conference included a variety of networking and educational events. The conference committee organized a scavenger hunt which sent conference attendees chasing clues along the Christina River waterfront. The conference hosted several field tours including: the Ed Oliver

Golf Club, the DuPont Environmental Education Center and the Wilmington Riverfront. The conference also included the "Celebrate in the First State" dinner banquet on Thursday evening and several raffles throughout the conference.

The conference committee, Mid-Atlantic region AWRA sections, and the conference sponsors are commended for their hard work and support of one of the most successful MAC conferences!

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## DWRC Joins the Clean Water Campaign

On March 4, 2015, through funding from the William Penn Foundation, the Delaware Nature Society, along with partners Partnership for the Delaware Estuary and Center for the Inland Bays, launched a statewide clean water campaign, Clean Water: Delaware's Clear Choice. This July (2016), DWRC and the Brandywine Red Clay Alliance (BRCA) joined these partners on the clean water campaign's steering committee.

The Clean Water: Delaware's Clear Choice campaign will:

- Build an alliance of Delaware stakeholders to support sustainable funding for clean water.
- Support efforts to ensure that funding for clean water improvement projects places an emphasis on green infrastructure projects.
- Lay critical groundwork to further educate and connect residents to their local waterways and empower them to take action to improve the quality of these waterways.

As a primary partner, DWRC will serve on the clean water campaign's steering committee and will participate in communications, aid in strategic direction of the campaign, and support the dissemination of materials. DWRC will implement a strategic and wide spread outreach campaign throughout the state to support sustainable funding for clean water in Delaware. The outreach campaign will include activities such as: communicating about the campaign through social media and email; educating local businesses, retailers and organizations; conducting community workshops and tabling events; recruiting Clean Water Alliance members; and promoting Water Warrior trainings.

The Clean Water Campaign is directly in line with DWRC's mission to provide water resources planning and policy assistance through the University's land grant public service, education, and research role. Through our work as a member of the Alliance's Steering Committee we will work toward securing funding for clean water which can lead to a cleaner environment, healthier crops and food sources, improved economy, and increased tourism.

To learn more about the campaign itself and show your support visit their website [here](#).

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## Spotlight on DWRC Intern Natalie Criscenzo

UD Energy & Environmental Policy and Public Policy major and UDWRC intern Natalie Criscenzo took some time from typing up her final report to provide an update on her internship: "This summer I was able to work on a research project supervised by Dr. Phillip Barnes titled 'Achieving Resiliency in Delaware Communities: Local Policy and Planning Recommendations.' I worked within the Institute for Public Administration and got to see firsthand how policies and planning interact with my passion for the environment. Coming into this project, my specialties definitely fell within the environmental science side of things, but this has allowed me to get a much greater view on the topic.

"Initially we began the project looking at individual, municipal, and state levels of planning sustainably. As more research was completed, I soon realized the importance of policies on a local level. As federal and state level initiatives can sometimes get backed up by red tape we thought it best to look at what local communities can do now in order to not only make changes to prepare for the consequences of sea level rise, but also what they can do to increase their town's overall sustainability. The two largest sections of recommendations fell under sea level rise and flooding, as the issue of water creates some of the





most urgent and large-scale problems in Delaware. In Delaware, we are incredibly vulnerable to the upcoming risks of sea level rise and the increased flooding that comes with it since all of Delaware is at less than 500 feet above sea level.

"Other sections included recommendations on housing, food, land use, transportation, and infrastructure. My report focuses on community policies that can positively affect a town both environmentally and economically. This ultimately has been the perfect combination of my passion for public policies and aspects of the natural world. While my final draft is far from complete, I am proud of the work I have completed so far and look forward to being able to share my recommendations."

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## Virtual Field Trips with EarthEcho International

Over the next 6 months, EarthEcho International will be hosting 3 separate virtual field trips - a great way to experience different aspects of the water environment from the comfort of your classroom! Hosted from the Research Vessel (R/V) Falkor, these one of a kind experiences are aimed at middle and high school students, and give students an interactive look into many of the jobs, tools, and topics associated with environmental research - and it just so happens that the first three are focused on water! Information and registration can be found [here](#).

Monday, October 17, 2016, 2pm Eastern

Exploring Careers at Sea -

"Join EarthEcho International and Schmidt Ocean Institute aboard the [Research Vessel \(R/V\) Falkor](#) as we explore the many different types of jobs that keep a ship like the Falkor running. From scientists to captains to cooks, we will explore the many ways to embark on a career on the ocean."

Wednesday, December 7, 2pm Eastern

ROV SuBastian in Action -

"Schmidt Ocean Institute's Research Vessel Falkor will spend the months of [November and December near the Mariana Trench](#), home to the deepest spot on the planet. Scientists aboard Falkor will explore three new hydrothermal vents that were discovered last year. The team is returning to categorize lifeforms found there with Schmidt Ocean Institute's new 4500m ROV SuBastian. Join EarthEcho International for an interactive conversation with leading experts in seafloor exploration and a look at the technology that makes it possible."

Wednesday, February 1, 2017, 2pm Eastern

Back to the Surface -

"For this cruise Schmidt Ocean Institute joins forces with NASA aboard the R/V Falkor to examine surface-level particle interaction between the air and sea . EarthEcho International will facilitate a discussion between scientists and classrooms from both coastal and landlocked communities exploring ocean acidification, human impact, and how we can all have a positive impact."

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## Jobs and Internships in Water Resources

UD College of Agriculture and Natural Resources - Jobs and internships are listed [here](#).

UD College of Earth, Ocean, and Environment - Jobs and internships are listed [here](#).

Delaware Environmental Institute (DENIN) - Jobs and internships are listed [here](#).

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## Upcoming Water Conferences and Events

City of Newark's Fall Community Clean Up, October 8th  
Come spend the day with family and friends continuing to make Newark beautiful! Information on this activity for all ages can be found [here](#).

The Nature Conservancy and First State National Historical Park Clean Up, October 22nd  
Join the Stream Stewards clean up event at First State National Historical Park on October 22, 2016. Information on this activity can be found [here](#).

Susquehanna Delaware River Conference, Bucknell University  
Jerry Kauffman will deliver the keynote at the Susquehanna Delaware River Conference at Bucknell University on Nov 2, 2016.

UD Hosting Lecture on Sea Level Rise and the Greenland Ice Sheet  
On Tuesday, November 3rd, UD will host Dr. Laurence C. Smith who will give his talk on Supraglacial Rivers on the Greenland Ice Sheet. More information can be found [here](#) for this great opportunity!

AWRA Annual National Conference and Passing of the Torch!  
Martha Narvaez will pass the gavel to President-elect Rafael Frias (Black & Veatch) at the upcoming American Water Resources Association (AWRA) Annual Conference, November 14-17, 2016 in Orlando, Florida. More information on the conference can be found on their website [here](#).

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## Water Resources Readings and Information

Mt. Cuba, UD Researchers Partner to Study Stream Health  
Beginning during the summer 2016, students with UD began working, in partnership with Mt. Cuba Center, to collect data on Hickory Run Stream. The stream runs through the middle of Mt. Cuba's lands, and can provide valuable information on the effects of the thorough restoration work being done on site, which is largely focused on bringing back native plant species.  
"We're teaching students how to characterize a stream so we can get a baseline of its health," Kauffman said. "We want to be able to measure the changes – hopefully, improvements – in the stream's health over time, especially as the restoration progress continues." Read the article [here](#).

## Newark Water Quality Report Available Online

Questions about your water? Newark's latest water quality report is available on Newark's homepage [here](#).

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Welcome new subscribers! Contributions, comments and questions are always appreciated. Water News serves citizens interested in topics on Delaware water resources and is published by the Delaware Water Resources Center, University of Delaware.

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