2020

Managing, Protecting and Improving During a Global Pandemic

Annual Report

Delaware River Basin Commission

DELAWARE • NEW JERSEY
PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA

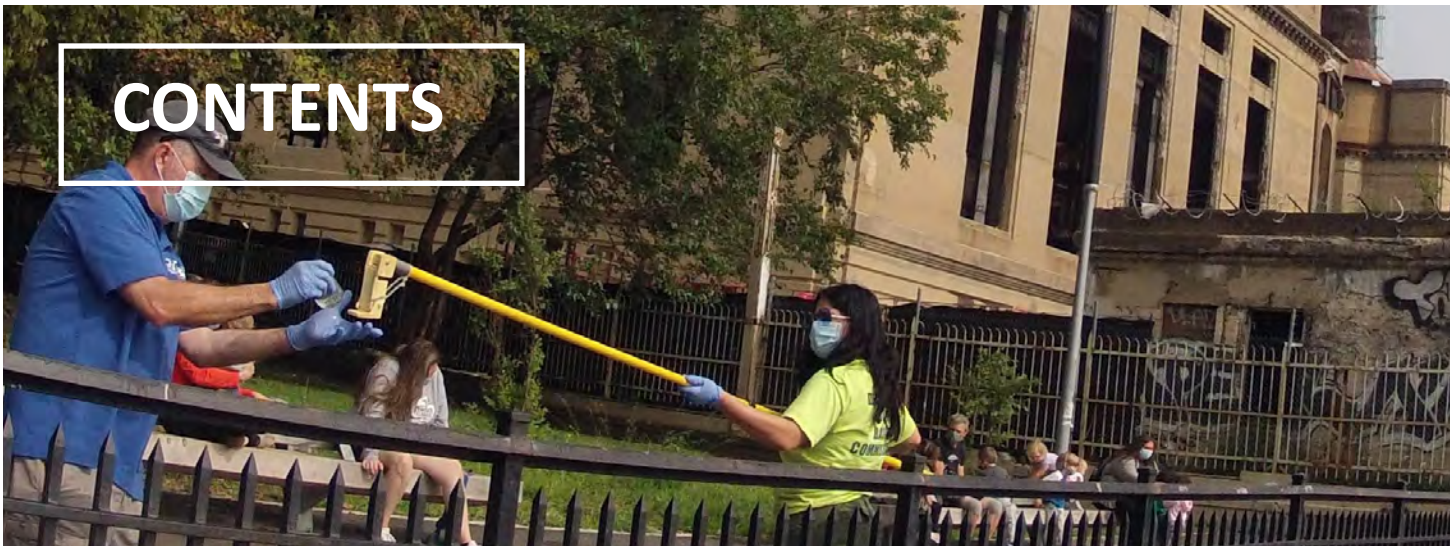
The Delaware River Basin Commission

White House ceremonial signing of the Delaware River Basin Compact, Nov. 2, 1961. Seated in the Oval Office are (from right) President John F. Kennedy, Pennsylvania Governor David Lawrence, Delaware Governor Elbert Carvel and New Jersey Governor Robert Meyner.

The Delaware River Basin Commission is a federal/interstate government agency formed by a compact in 1961 by the federal government, Delaware, New Jersey, New York and Pennsylvania. It is responsible for managing the water resources within the Delaware River Basin without regard to political boundaries. The five commission members are the governors of the four basin states and the commander of the U.S. Army Corps of Engineers' North Atlantic Division, who represents the federal government.

The DRBC has been managing, protecting and improving the water resources of the Delaware River Basin for nearly 60 years. In support of its mission, DRBC convenes and collaborates with its signatory parties—the four basin states and the federal government—to: protect and improve water quality; manage river flows; mitigate droughts and flood loss; provide for the reasonable and sustainable development and use of surface and ground water; and promote water conservation and efficiency.

CONTENTS



DRBC Water Quality Assessment Manager John Yagecic (left) and Water Resource Scientist Elaine Panuccio sample Delaware River water for bacteria at Philadelphia's Penn Treaty Park.

The commission shall make and publish an annual report to the legislative bodies of the signatory parties and to the public reporting on its programs, operations and finances.

Delaware River Basin Compact, Section 14.12

Delaware River Basin Commission

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EXECUTIVE DIRECTOR'S MESSAGE

As reflected throughout this annual report and more importantly, as will be reflected in history, 2020 was a year like no other. When the year began, we could not have imagined how working at the DRBC, and everywhere else, would be dramatically changed, most likely and in some ways, forever.

When the year began, if you had heard of a coronavirus, it was more likely associated with the common cold. In February 2020, I first alerted staff that DRBC was "monitoring the global spread of the novel coronavirus causing the illness referred to as 'COVID-19'". Following guidance from the CDC and our state and federal partners, DRBC actions quickly escalated from monitoring for illnesses, to physical distancing, to sanitary office practices (hand washing, etc.), to limitations on travel. On March 10, 2020, we held our last in person Commission Business meeting in 2020. On March 17, 2020, DRBC closed its offices to staff and visitors and began working from home in support of continuity of operations and support for community public health.

When the year began, we had set a goal to perform environmental justice (EJ) training for all DRBC staff. The events of May 25, 2020, that lead to the murder of George Floyd in Minneapolis, MN, raised US and global awareness to face and address systemic racism. Like others, we at DRBC took action to do our part. EJ training was simply not enough. I opened the June 10, 2020, Business Meeting with the following statement on behalf of the DRBC Commissioners and staff:

After the events of the past couple of weeks, it is not possible to have an official gathering such as this without acknowledging the terrible injustice that people of color have experienced in our country. We also recognize the tragedy and pain of lives lost and the dreadful cost of human potential unrealized due to racial injustice.

At DRBC, our work in managing, protecting and improving the water resources of the Delaware River Basin is stronger: when diverse voices are included and heard; when the gifts of every individual are valued and put to use in our Basin communities; and when all the Basin's water users share equally in the benefits and stewardship of our shared water resources. We commit to listening, learning and finding ways to do more to meet these vital goals.

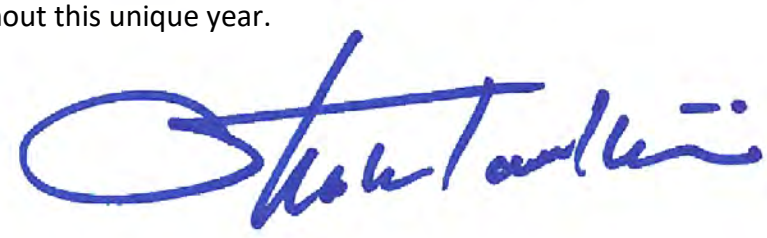
In 2020, our collective DRBC equity and justice lens of how we view our work in the Basin has become clearer and more focused. We know we have so much more to learn and so much further to go on our equity and justice journey. In 2020 our initial

steps included: creating an internal team to develop a Diversity, Equity, Inclusion and Justice Strategic Plan; redesigning our leadership training to address readings and conversations about race and the workplace; revising our holiday and time off policy to be more inclusive; and increasing our DEIJ learning opportunities from and with other partner organizations. Our DEIJ strategic planning work continues into 2021.

Steve Tambini, P.E.
Executive Director

When the year 2020 began we did not know all the challenges ahead. By the end of the year, we had learned so much. Thanks to the support and commitment of an exceptional staff we now know that: we can work remotely efficiently and effectively (and transition with practically no notice); we can embrace new technologies and find new and better ways to ways to work for the long term; we can remotely maintain and even improve our commitment to public access to commission meetings, advisory committees and outreach programs; and we can fully commit to community health and safety practices and, quite frankly, stay safe. In 2020, DRBC had zero recorded staff COVID-19 illnesses. We also enjoyed new ways to stay connected both internally and externally, have fun, support each other, and share pictures (our staff love their pets!). It was a year like no other; however, as this annual report shows, we never lost sight of our mission to manage, protect and improve the water resources of the Delaware River Basin.

Finally, I want to thank all the DRBC Commissioners and Commissioner alternates for their knowledge, support, leadership and flexibility throughout this unique year.



COMMISSIONERS

The ex officio members of the Delaware River Basin Commission include the four Basin state governors and the commander of the U.S. Army Corps of Engineers, North Atlantic Division, who serves as the federal representative.

Each Commissioner has one vote of equal power with a majority vote needed to decide most issues. The Delaware River Basin Compact requires the annual election of a chair and vice chairs, which historically has been based upon a rotation of the DRBC's five members.

Chair

Delaware Governor

John Carney

Vice Chair

Federal Representative

Brigadier General Thomas J. Tickner, Commander, North Atlantic USACE

Second Vice Chair

Pennsylvania Governor

Tom Wolf

Member

New Jersey Governor

Philip D. Murphy

Member

New York Governor

Andrew M. Cuomo

On July 15, Major General Jeffrey Milhorn (left) changed command of the North Atlantic Division of the U.S. Army Corps of Engineers with Brigadier General Thomas Tickner, who now serves as the Commissioner representing the federal government.

ALTERNATES/ADVISORS—2020

DELAWARE

1st Alternate	Shawn M. Garvin, DNREC Secretary
2nd Alternate	Alternate Pending
3rd Alternate	Virgil R. Holmes, Director, DNREC Division of Water: Management Section
4th Alternate	Bryan A. Ashby, Manager, DNREC Division of Water Resources: Surface Water Section

FEDERAL GOVERNMENT

1st Alternate	Lieutenant Colonel David Park, Commander, USACE Philadelphia District
2nd Alternate	Alternate Pending
3rd Alternate	Henry Gruber, USACE North Atlantic Division Deputy Chief of Planning & Policy Division

PENNSYLVANIA

1st Alternate	Patrick McDonnell, PADEP Secretary
2nd Alternate	Aneca Y. Atkinson, Acting Deputy Secretary, Office of Water Programs
3rd Alternate	Summer Kunkel, Acting Director, Compacts and Commissions Office

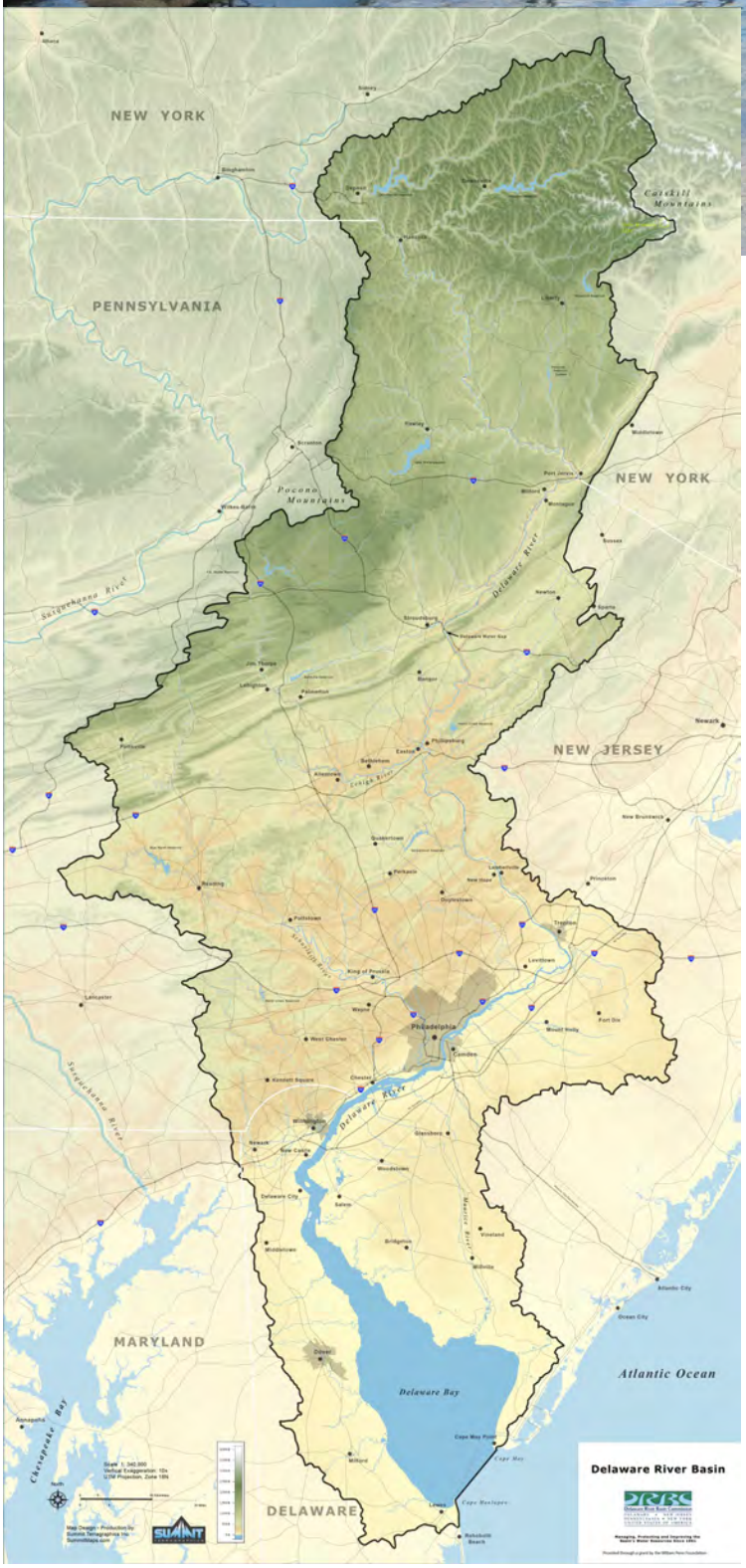
NEW JERSEY

1st Alternate	Catherine R. McCabe, NJDEP Commissioner
2nd Alternate	Michele Putnam, Assistant Commissioner, Water Resource Management (Jan. 1 to Sept. 3, 2020) Pat Gardner, Director of Water Supply and Geoscience (Sept. 3 to Dec. 31, 2020)
3rd Alternate	Jeffrey L. Hoffman, State Geologist

NEW YORK

1st Alternate	Basil Seggos, NYSDEC Commissioner
2nd Alternate	Mark Klotz, Director, DEC Division of Water
3rd Alternate	Alternate Pending
4th Alternate	Kenneth Kosinski, Chief, DEC Watershed Implementation Section
Advisor	Vincent Sapienza, New York City DEP Commissioner

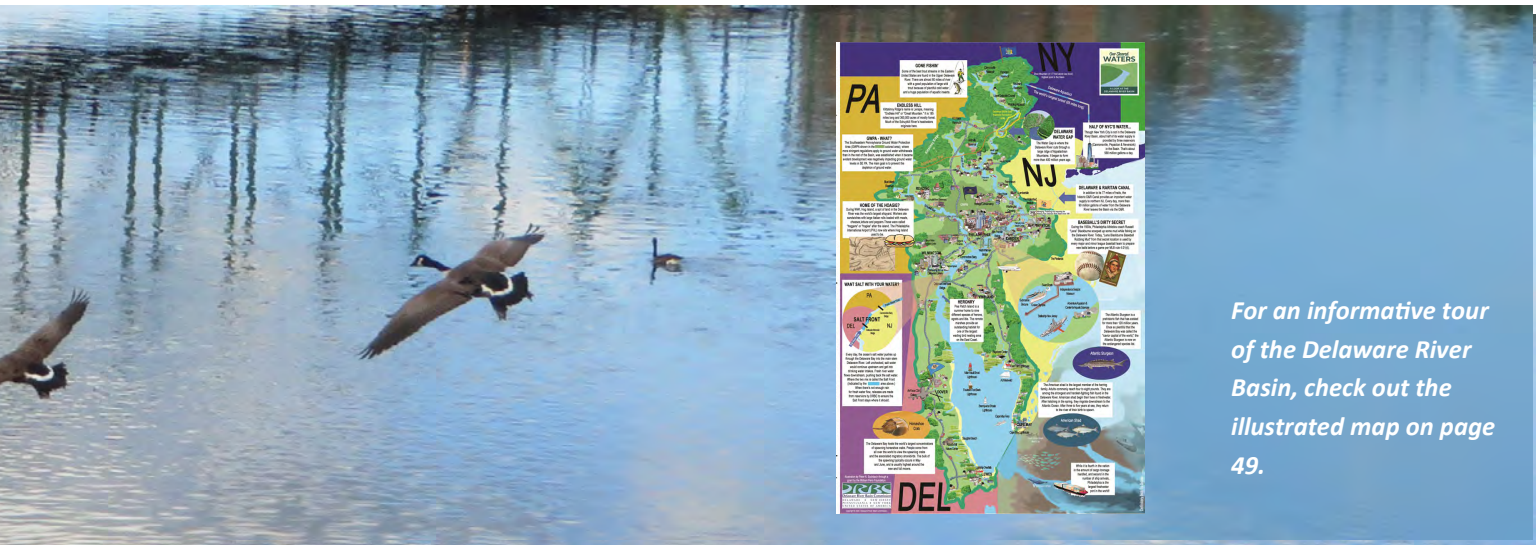
THE DELAWARE RIVER BASIN



Lying in the densely populated corridor of the northeastern U.S., the Delaware River stretches approximately 330 miles from its headwaters in New York State to its confluence with the Atlantic Ocean. The Basin totals 13,539 square miles, including approximately 12,800 square miles of land area, nearly 800 square miles of the Delaware Bay and more than 2,000 tributaries, including many that are rivers in their own right.

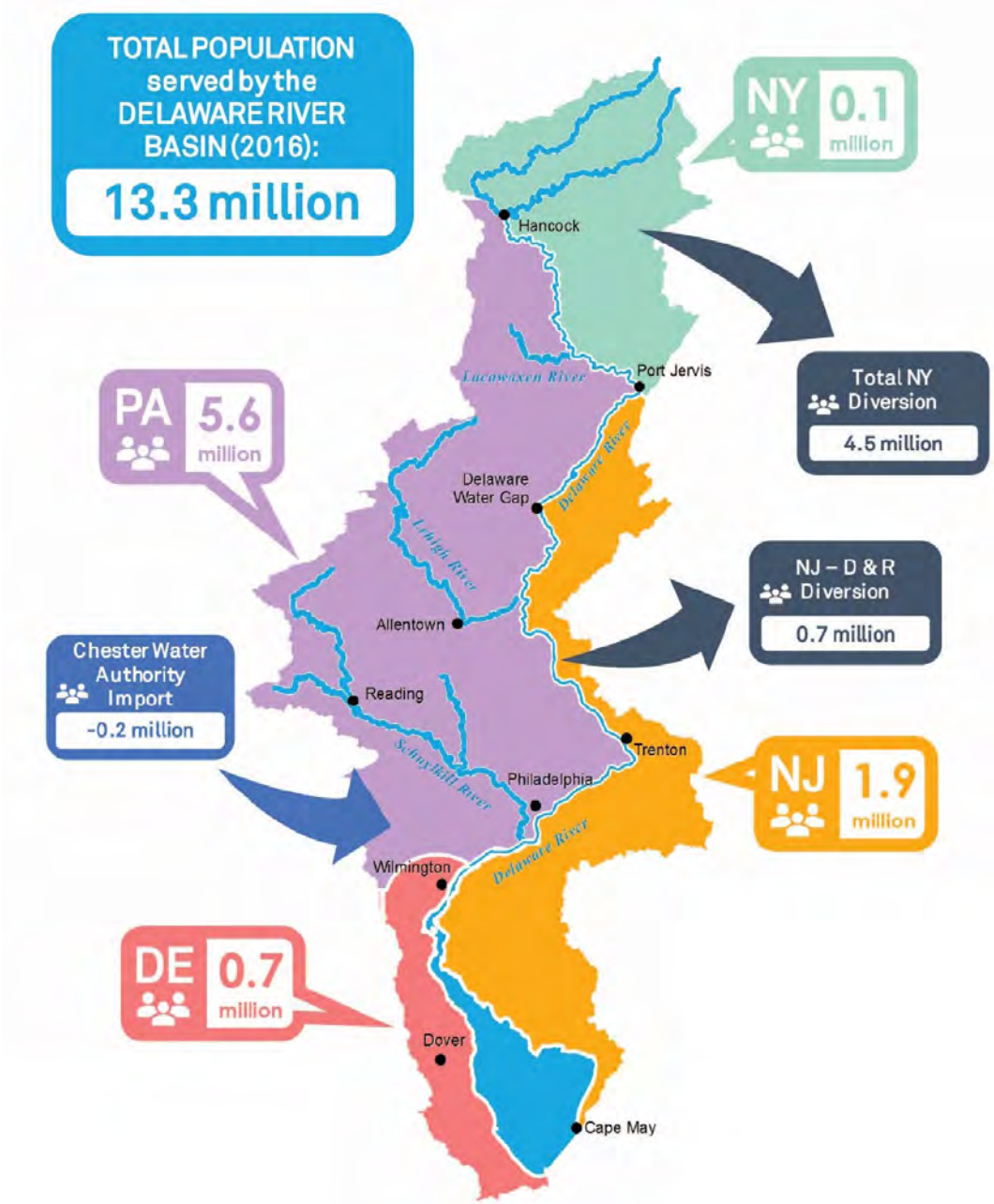
The northernmost tributaries to the Delaware River originate in the forested western slopes of the Catskill Mountains, which reach elevations of up to 4,000 feet. The East and West Branches meet at Hancock, N.Y., from where the Delaware River descends about 800 feet on its journey to the Atlantic Ocean.

The Delaware River is the longest un-dammed river in the U.S. east of the Mississippi River. If one stands on one side of the river, there is a different state on the other side. It is an interstate river its entire length.



For an informative tour of the Delaware River Basin, check out the illustrated map on page 49.

POPULATION SERVED



	POPULATION (2016)
State	
Delaware	725,545
New Jersey	1,936,900
New York	119,265
Pennsylvania	5,561,803
Total DRB Population	**8,343,513**
Import/Export	
NJ – D & R Diversion	670,000
Total NY Diversion	4,500,000
CWA Import	-200,000
Total Import/Export	**4,970,000**
TOTAL ESTIMATED POPULATION SERVED	**13,313,513**

Total NY diversion includes NYC diversion and upstate NY communities

New Road Signs Welcome Motorists to the Basin

An "Entering Delaware River Watershed" sign in N.Y. Photo courtesy of the NYS Dept. of Transportation.

Thanks to the support and efforts of New York and Delaware Departments of Transportation, as well as those of the Coalition for the Delaware River Watershed, Friends of the Upper Delaware River, the Upper Delaware Council and the Delaware Nature Society, road signs were erected in both New York and Delaware to alert motorists that they were entering the Delaware River Watershed.

Elected officials, including Delaware Gov. John Carney, attended signage unveiling events for their states, praising the completion of this project and acknowledging the importance of the river to the region's economy and ecology. The hope is that the signs will help promote education, tourism and stewardship.

"Water basin boundaries do not typically show up on road maps or navigation systems; these new roadway signs will connect residents and visitors to their location in the Delaware River Watershed as they travel through New York and Delaware," said Steve Tambini, DRBC's Executive Director.

(From left) Delaware Speaker of the House Peter Schwartzkopf, Coalition for the Delaware River Watershed State Policy Manager Kelly Knutson, Delaware Nature Society Director of Advocacy and External Affairs Emily Knearl and Delaware Governor John Carney unveil Delaware River Watershed signage at a press event in Lewes, Del.

The opening shot from the video produced by American Rivers to announce the Delaware River being named 2020's River of the Year.

Delaware River Named 2020 River of the Year

In April, national environmental advocacy group American Rivers named the Delaware River their 2020 River of the Year. This honorary designation celebrates the great progress and ongoing work towards clean water and river restoration. As American Rivers President/CEO Bob Irvin explained, "The Delaware shows how a healthy river can be an engine for thriving communities and strong local economies."

Today, what was once a cesspool is a river reborn. Fish populations have returned, and the river now contributes about $25 Billion in annual economic activity. People are flocking to the river for business and pleasure, wanting to reconnect with the river in ways that weren't possible 50 years ago.

DRBC has been at the forefront of the collective efforts to restore the Delaware since its creation in 1961, which was years before the EPA, first Earth Day and the 1972 Clean Water Act (CWA). Detailed plans and science-driven policy by the DRBC have helped lead to way for the river's dramatic improvements we enjoy today. Many partners have also contributed to the river's success story: federal, state, local, NGOs and individual volunteers—dedicated stewards at all levels of government and in our local communities.

American Rivers
RIVERS CONNECT US®

DRBC knows there is more work that needs to be done. We will continue to work with our partners and interested stakeholders all across the Basin to further manage, protect and improve its waters.

Financial Statement

Cooper Lake by Lesa Knowlton

The DRBC operates and maintains two funds for budgeting purposes: a General Operating Fund (GOF) and a Water Supply Storage Facilities Fund (WSSFF).

THE GENERAL OPERATING FUND

The General Operating Fund is the basic and routine operating budget for the DRBC. It includes all revenues and expenses required for the year-to-year operations and maintenance of the agency. Revenues are provided through several key sources, including signatory party contributions, regulatory program fees, compliance revenue, transfers from the WSSF and other sources.

THE WATER SUPPLY STORAGE FACILITIES FUND

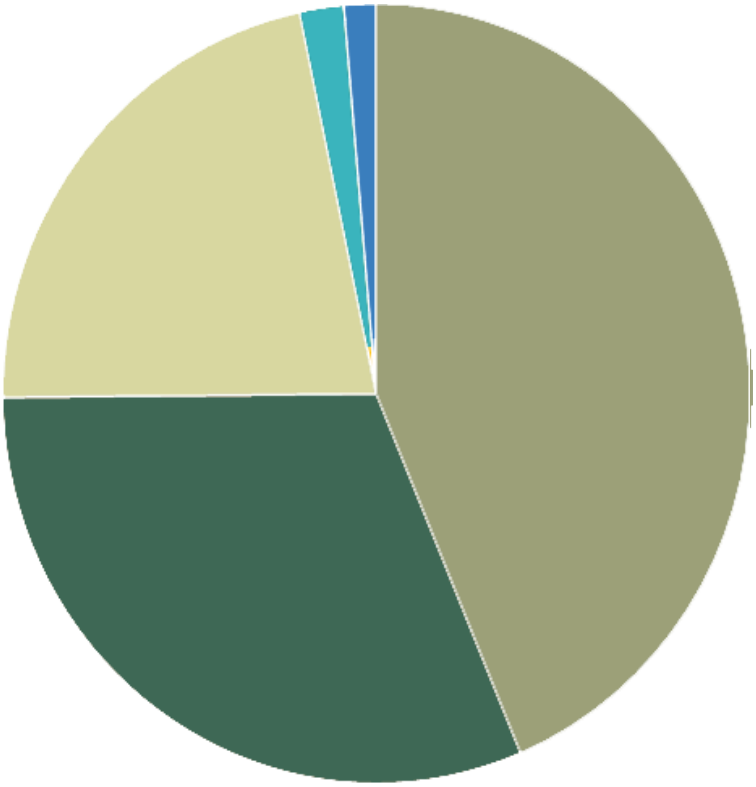
The WSSFF was created to support reliable water supply in the Basin. The WSSFF is used to repay the obligations the DRBC assumed to purchase storage capacity at the federal government's Beltzville and Blue Marsh reservoirs. The WSSFF also supports DRBC's pro rata share of the annual operations and maintenance costs of the two reservoirs, the water supply share of any future required improvements at these two facilities, a share of DRBC operating costs to support a sustainable water supply within the Basin (transfers to the GOF) and any future required storage in the Basin. Revenues for the WSSFF are generated from charges for applicable surface water withdrawals in the Basin. The balance of the WSSFF at the end of FY 2020 was $22,145,570.

INDEPENDENT FINANCIAL AUDIT

DRBC's financial records are audited annually as required by the Delaware River Basin Compact. The most recent annual independent audits are available at https://www.nj.gov/drbc/library/documents/AuditReportFY19.pdf.

2020 General Fund

Revenues $5,115,280



Surface Water Supply Charges
$2,234,467

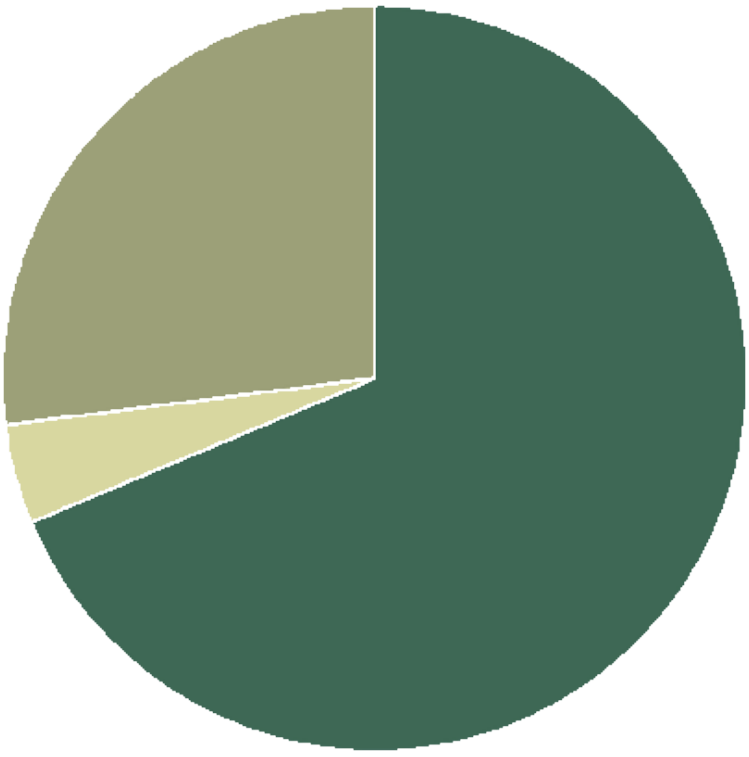
Signatory Contributions
$1,594,755

Regulatory Program Fees
$1,117,540

Compliance Revenue
$97,774

Other
$70,774

Expenses $5,115,280



Salaries & Benefits
$3,516,232

Other Operating Expenses
$1,381,027

Building Improvements & Equipment Acquisitions
$218,021

OPERATING DESPITE COVID –19

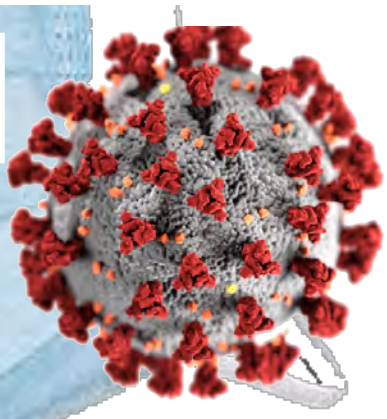


Image: CDC

RE: Novel Coronavirus (COVID-19) Communication #5

Tambini, Steve
To **DRBC All Users**
3/16/2020

Retention Policy Keep Forever (Never) Expires Never

You forwarded this message on 3/16/2020 3:58 PM.

Dear Colleagues,

As we just discussed on the all-staff call, effective tomorrow, we will begin "work from home" for all staff. We discussed the exceptions for periodic office visits on as an needed basis only. The objectives are to support DRBC and community public health measures and to maintain operational continuity. We can expect that "work from home" will last a minimum of two weeks; however, we will plan to go longer.

I appreciate your planning and your continued commitment to keep the great work of the Commission going in this unique way. I will plan another all staff call in a few days. In the meantime if you have any questions please raise them to me or your managers.

Stay safe and thank you again.

Steve

Executive Director Steve Tambini's message to all DRBC staff, announcing that the Commission's work would shift from the West Trenton office to staff homes.

As news of a strange new virus spread across the country, DRBC management monitored the guidance coming from the Basin states and the federal government. In order to contribute to containing the transmission of COVID-19, the decision was made on March 16 for DRBC staff to cease reporting daily to the agency's West Trenton, N.J. building, and begin working remotely.

A day later, computers, monitors and other equipment were packed up and headed to what would become staff offices for the remainder of the year. Office phone messages were updated to indicate the new change.

The phrase "work from home," which had received some discussion prior to March, took on a more serious description of the Commission's work. Remote virtual meetings became commonplace as staff adjusted to using Microsoft Teams, Zoom, Cisco WebEx and other video conferencing platforms.

Most of the DRBC's operations were transferred to remote work. While inconvenienced by the dispersal, staff demonstrated resilience and adaptability as they established workstations on dining room tables, in basements, and sometimes - when the weather permitted - on decks and patios.

Working from their homes, staff continued reviewing and processing docket applications, as well as interacting with a myriad of other federal, state and local organizations, most of which were also coming to grips with this 'new normal.'

The Commission's June 10 Business Meeting was conducted virtually on Go-To-Meeting.

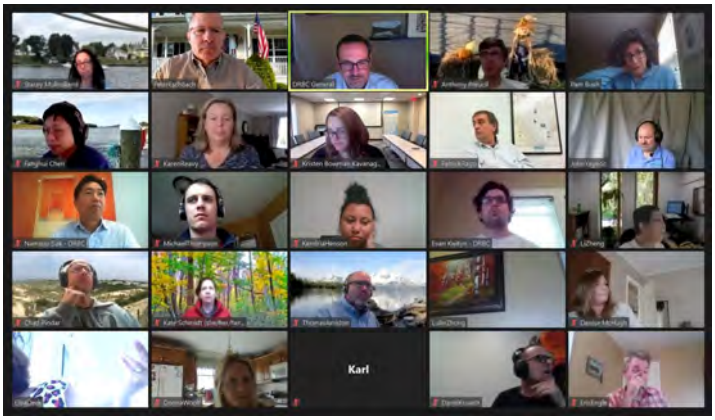
Meeting Virtually

Beginning in the second quarter, the Commission's regular public hearings and business meetings, as well as a special adjudicatory hearing (see page 39), were held virtually. These meetings followed a format similar to regular in-person meetings, with speakers signing up in advance to provide public input on various dockets and resolutions. The public was able to see and hear the Commissioners, as well as DRBC staff presentations. After some experimentation, Zoom Webinar and YouTube were used to ensure public transparency and access that characterizes DRBC public meeting practices.

Water Resource Scientist Elaine Panuccio (standing) provides a socially-distanced sample to Water Quality Assessment Manager John Yagecic, P.E.

Sampling Safely

The DRBC water quality monitoring program faced unique challenges, not the least of which was laboratories where samples would normally be sent for processing were closed due the pandemic. As these labs became available, DRBC staff adjusted their sampling techniques to ensure social distancing. They limited the number of staff sampling at any one time. They traveled in multiple vehicles and they innovated a sampling technique using a long pole to transfer water samples from one staffer to another at a distance.



Members of the DRBC staff attend a virtual session to discuss the fourth quarter business meeting and other issues. By this time, most staff were experienced in several video meeting platforms. Several in this example were using personalized virtual backgrounds.

Staying Connected

Partly due to its small size, the DRBC has enjoyed a socially collegial workplace. From celebrating "Birthday Mondays" to brown bag lunches, the staff has regularly gotten together in friendly gatherings. Not to be thwarted by the pandemic, in 2020 these activities moved online, with a virtual chat area called the "lunchroom." Regular, yet virtual, team meetings occurred, including staff and project meetings, as well as opportunities to celebrate holidays or work milestones.

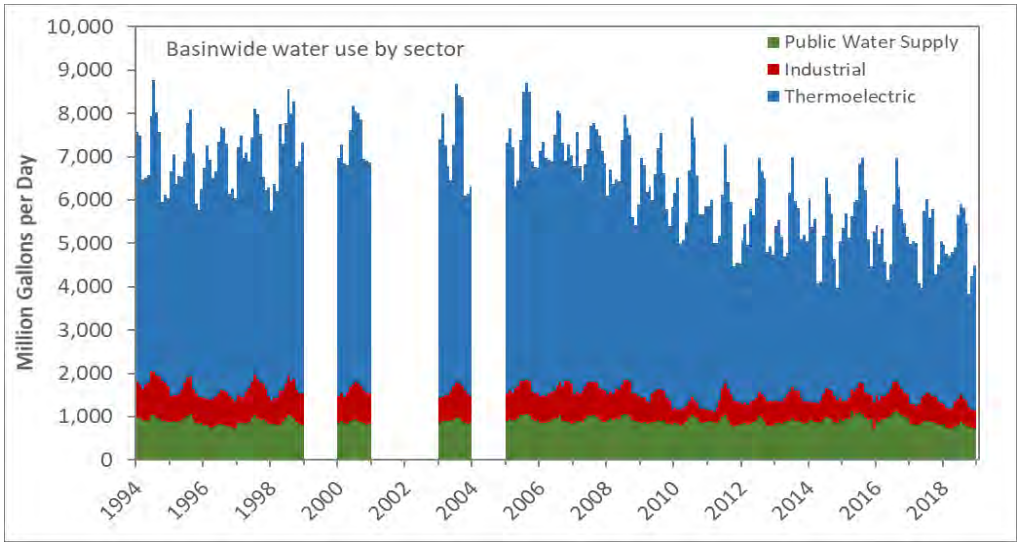
BASIN WATER USE

Understanding water withdrawals, water use and supply is integral to the management of water resources. In recent years, our understanding of the ways in which water is withdrawn and used has improved greatly, as have the underlying systems in place to manage the data, meaning that more timely and comprehensive assessments can be made. The chart on page 16 shows the Basin-wide picture of water withdrawals, exports and consumptive use, by sector, based on 2018 calendar year water use data; the data shown represent daily average withdrawals.

Water withdrawals are tracked throughout the Basin to identify key water-using sectors and trends. Accurate and comprehensive water use information enables the proper assessment, planning and management of water resources. The 2018 water withdrawal data were compiled to generate a Basin-wide assessment by water use sector. All data are based on withdrawals reported to state agencies except for data for the Self-Supplied Domestic (individual homeowner wells) sector, which are based on the population from Census 2010 data for populations that reside outside of public water system service areas.

TRENDS

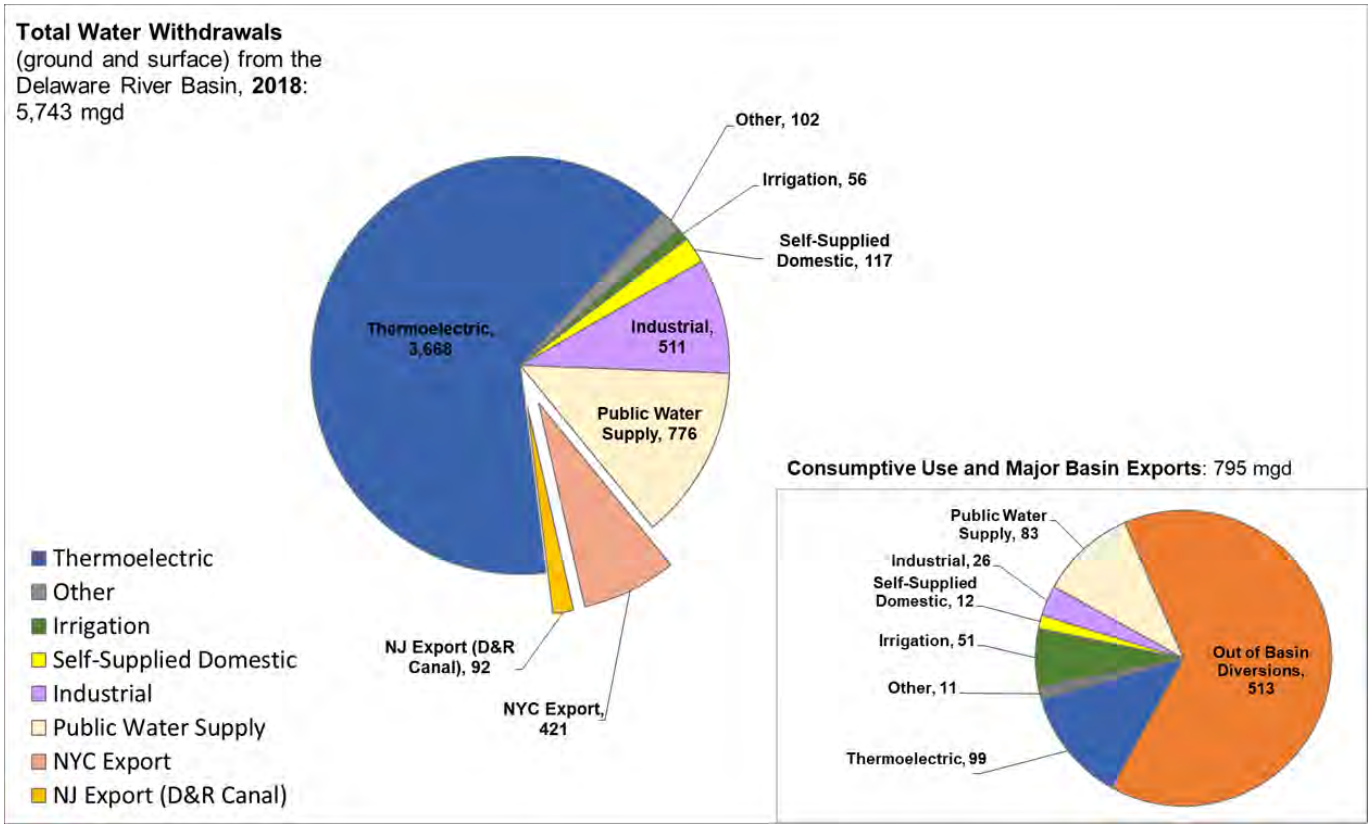
DRBC tracks withdrawals in three sectors closely: public water supply, industrial and thermoelectric. Long-term data for these key sectors extend through calendar year 2018 and provide a monthly time series spanning a period of over 20 years (see graphic on right). The public water supply sector's neutral trends are primarily attributed to the influence of conservation practices neutralizing population increases, while industrial use trends are more likely the result



An aerial view of the Delaware River with the Trenton Water Works on the river at left, just below the Calhoun St. Bridge. On the Pennsylvania side (right), the site of Morrisville Municipal Authority's original pump house and plant are just above the bridge.

of facilities entering or exiting the industrial sector. The thermoelectric sector displays an overall decreasing trend in total water withdrawals.

The public water supply sector has maintained a relatively stable rate of withdrawals and consumptive use despite increasing population in the DRB. This pattern is primarily attributed to the influence of raised public awareness of conservation practices and changes in plumbing codes enacted in the early 1990s. Historic data for industrial withdrawals show a decline from levels in the early 1990s. The closing of the Bethlehem Steel plant in Bethlehem, Pa. in 1995 contributed significantly to the overall decline in water use for this sector. Over the past decade, industrial water use has declined slightly despite numerous facilities changing hands. Several large refineries in the Basin have seen considerable turnover in recent years. It is likely that public water supply withdrawals and consumptive use will continue to decline relative to population growth as conservation initiatives result in more efficient use of water for public supply.



WATER QUALITY

Aquatic Life Designated Use Study Updates

DRBC's Aquatic Life Designated Use Study began in September 2017 with the Commissioners' approval of Resolution 2017-04. The resolution provided for a formal study and rulemaking process to define new designated uses and new dissolved oxygen criteria for the Delaware Estuary.

The multi-year project includes water quality data collection, development of an eutrophication model (see page 19), determination of the dissolved oxygen needs of key estuary fish species, development of technical reports and an analysis of how social and economic factors affect the attainment of improved designated uses.

Also included is a nitrogen reduction cost estimation study to evaluate the capital and operating and maintenance costs for the twelve largest wastewater treatment facilities in the Delaware Estuary to attain various levels of nitrogen reduction. In July 2018, DRBC entered into a contract with consulting firm Kleinfelder to perform the engineering evaluation and cost analysis. The Kleinfelder contract was supported with grants from the Delaware Watershed Research Fund and Pennsylvania Coastal Zone Management program.

The Kleinfelder report will inform the Commission about the feasibility and cost of achieving new, more protective dissolved oxygen levels in the Delaware Estuary. The majority of the work was completed in 2020, and DRBC expects to release the final report in early 2021.

In September 2020, the Commissioners approved a Resolution for the Minutes that modified the schedule adopted by Resolution 2017-04. While significant progress on the study has been made to date, the change to the schedule was necessary in light of COVID-19-related mitigation measures that affected monitoring

Frequent water quality data collection continued in 2020 for this project once laboratories opened and safety protocols were approved for implementation. DRBC Aquatic Biologist Jake Bransky preserves a sample for analysis collected from the Falls Bridge, Schuylkill River. Photo by DRBC.

efforts, as well as funding constraints.

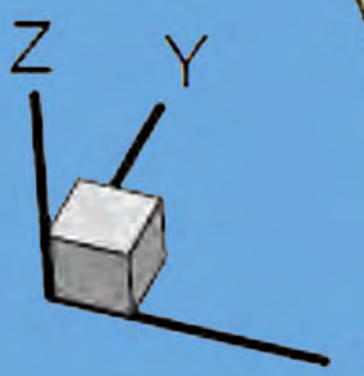
DRBC is leading this groundbreaking effort through a collaborative process informed by an Expert Panel of scientists and engineers and in close consultation with its Water Quality Advisory Committee (WQAC), a group representing state and federal co-regulators, NGO's, academic institutions, municipal and industrial dischargers and water purveyors. See page 43 for a list of WQAC members.

Additional study information can be found at https://www.nj.gov/drbc/programs/quality/designated-use.html.

Sr. Environmental Toxicologist Dr. Ron MacGillivray records a water quality reading from the Darby Creek. Photo by DRBC.

DRBC staff collects a water sample to monitor nutrient concentrations from the Calhoun St. Bridge, connecting Trenton, N.J. and Morrisville, Pa. Photo by DRBC.

Modeling Eutrophication Processes in the Delaware Estuary



DRBC staff is developing a coupled hydrodynamic and water-quality model to quantify the impacts of nutrient loads on dissolved oxygen (DO) dynamics in the Delaware River Estuary.

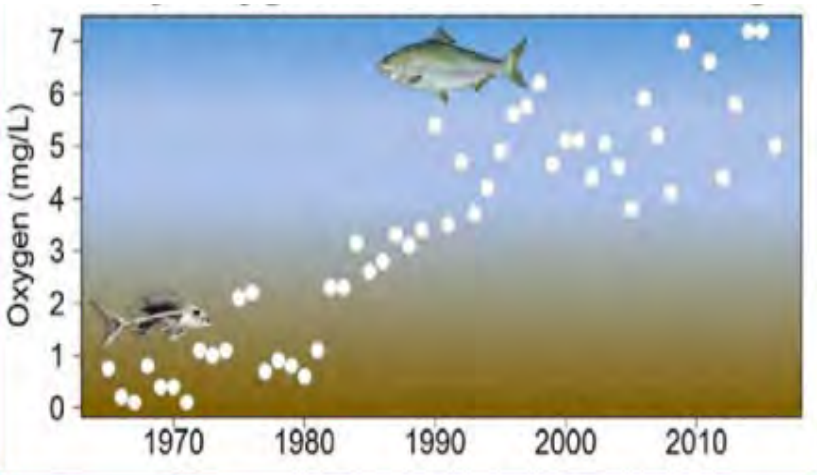
Why DO?

DO is among the most critical environmental parameters directly affecting fish communities. The water quality and aquatic life uses of the Delaware River Estuary have substantially improved since DRBC adopted designated uses and water quality criteria for these reaches in 1967. Still, significant DO sags occur in Zones 3 and 4, around Philadelphia and Camden, especially during the summer months, limiting the degree of fish propagation in this stretch of river.

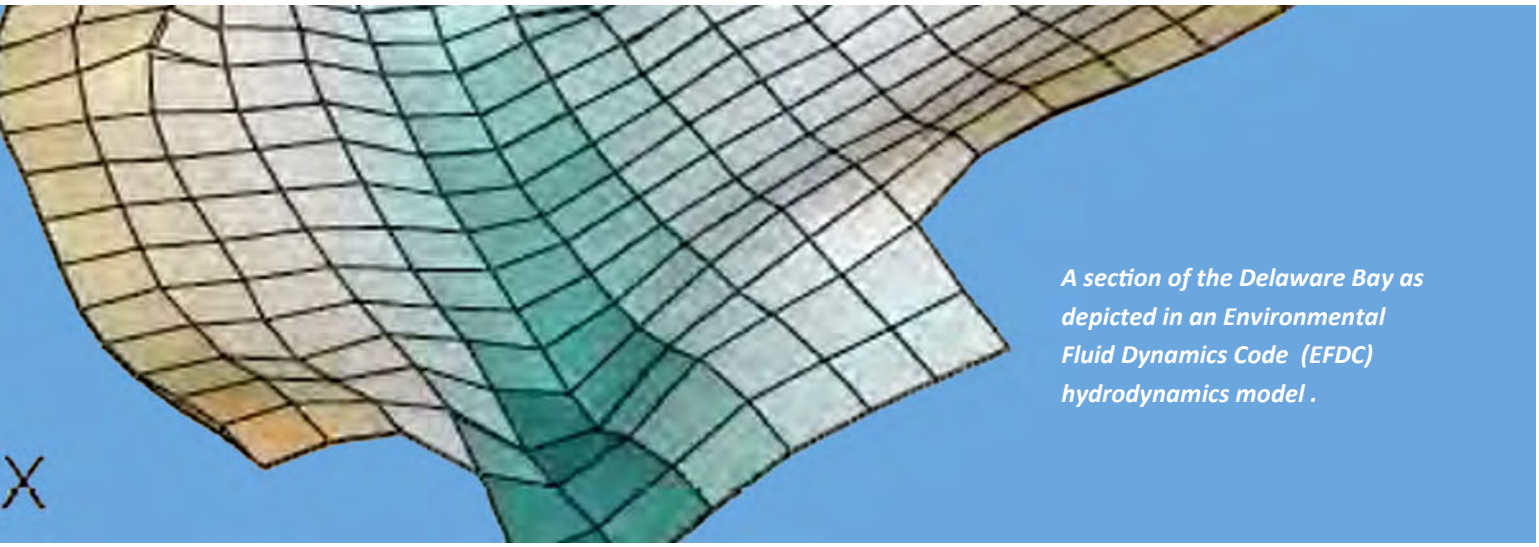
In accordance with its Resolution 2017-04, which affirms the important goal of continued water quality improvement, the DRBC is conducting a comprehensive scientific and engineering evaluation of water quality to determine if higher levels of DO can be attained to better support fish populations.

The study is ongoing and has multiple components. One is developing a eutrophication model (more on next page) to determine the water quality impacts of various nutrient loadings. Specifically, how do nutrient loadings affect DO levels in the river? Can higher DO levels be achieved if nutrient loadings are reduced?

Once the study is complete, Resolution 2017-04 directs DRBC to initiate a formal rulemaking process to revise the designated aquatic life uses and establish revised water quality criteria to protect those uses, consistent with the results of these scientific and technical studies, as well as with the federal Clean Water Act.



The data in this graphic were generated from sampling during July on the Delaware River at the Ben Franklin Bridge, which connects Philadelphia, Pa. and Camden, N.J. It shows a steady improvement in dissolved oxygen (DO) levels since the mid-1960s.



A section of the Delaware Bay as depicted in an Environmental Fluid Dynamics Code (EFDC) hydrodynamics model .

DRBC's Eutrophication Model

In support of this effort, DRBC began to develop a technically sound eutrophication model for the Delaware Estuary and Bay. The eutrophication model will enhance DRBC's understanding of the impact of nitrogenous and carbonaceous oxygen-demanding loads on DO conditions. It will also look at re-aeration, sediment oxygen demand and phytoplankton photosynthesis and respiration. Given the complexity of tidal dynamics and pollutant sources, the spatial extent of the model includes the entire tidal Delaware River and Bay. The model is designed to estimate ambient DO levels that can be expected for various levels of pollutant reductions using a dynamic (time-varying), long-term simulation of diurnal dissolved oxygen patterns.

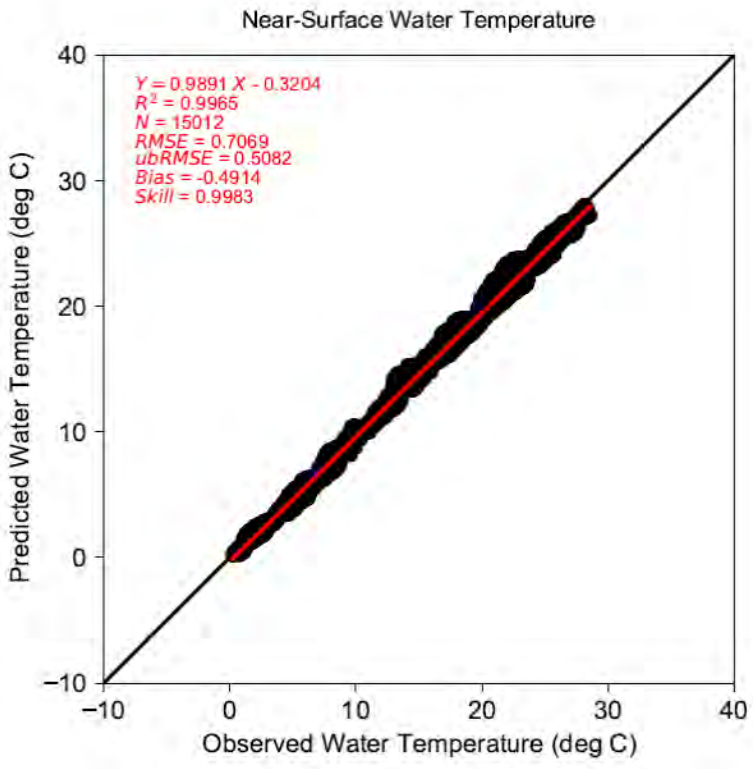
Modeling eutrophication requires an understanding of the complex interactions among many processes: the circulation of water, distribution of temperature and salinity, cycling and transformation of nutrients, algal dynamics and solute exchange across the sediment-water interface. The DRBC's overall modeling approach is as follows:

- Develop a linked hydrodynamic and water quality model of the system using Environmental Fluid Dynamics Code (EFDC) and Water Quality Analysis Simulation Program (WASP8).

- Assess available data and conduct additional monitoring of both pollutant sources and ambient water to fill gaps as needed.

- Calibrate linked hydrodynamic and water quality model to our intensive monitoring period (2018-2019), as well as select historical periods, primarily 2012. Together these periods represent a full range of hydrologic conditions.

- Conduct forecast simulations with the calibrated model to determine the levels of external sources required to achieve varying levels of ambient dissolved oxygen conditions in the tidal river and estuary.



Key Modeling Tasks Performed by DRBC in 2020

- Finalized a three-dimensional spatial grid that comprises 11,490 computational cells and 1,876 horizontal grid cells from the head of tide at Trenton to the outlet of the Bay, with up to ten vertical layers in the navigation channel.

- Developed code modifications to ensure internal consistency for water and mass balances between hydrodynamic and water quality models; implemented various procedures to optimize model performance and efficiency.

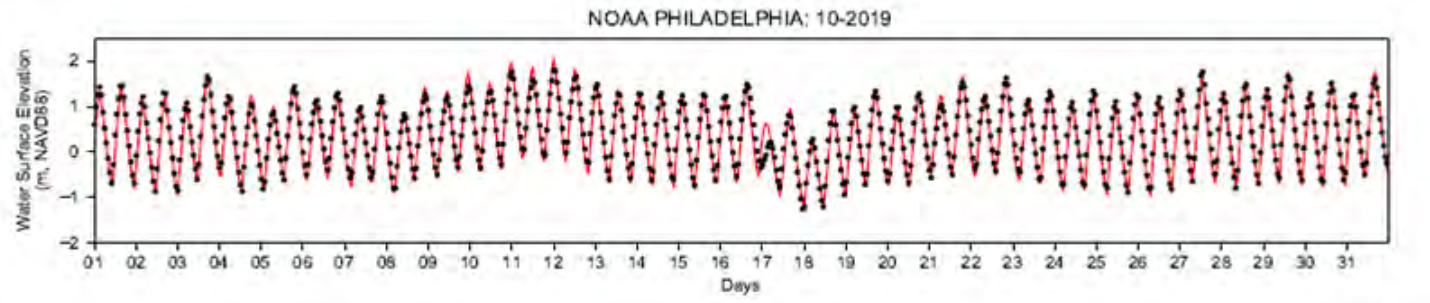
- In cooperation with the USGS, developed a statistical sub-model based on a regional analysis of shared features to estimate watershed flows into the system, as well as mass loads from point and nonpoint sources. There were 124 sub-watersheds delineated, each requiring flow and water quality boundaries. Sub-watersheds without active gages were related to the 105 active stream gages within or near the estuary watershed based on hydrologic similarity characterized by a suite of characteristics known to influence streamflow. The GIS-based analysis was supplemented by loading models developed to analyze tributary and effluent data and predict concentrations during periods when they were not monitored.

- Completed calibration of a three-dimensional hydrodynamic model, the objective of which was to simulate transport information (e.g., water depth, current velocity, salinity, water temperature and mixing coefficient) over a range of hydrologic and loading conditions with the degree of accuracy and confidence necessary to drive the water quality model calibration and application. The hydrodynamic model was developed and calibrated for the periods of 2018-2019 and 2012, representing a wide range of hydrologic conditions. Model performance was evaluated by comparing observations of water surface elevation, current velocity, water temperature and salinity in the estuary with model predictions. The Expert Panel unanimously agreed in May 2020 that the hydrodynamic model is appropriate and sufficiently calibrated to be used as the basis for the eutrophication model. DRBC will publish the hydrodynamics modeling report in 2021.

- Developed methodology to translate measured water quality constituents into state variable boundary conditions and completed boundary conditions for all three calibration years.

- Modified algorithms for calculating light extinction and reaeration based on both empirical data analysis and mechanistic approaches.

- Developed post-processing tools to manage and visualize model output. Performed a preliminary sensitivity analyses and captured results in a database to assist with calibration.



2020 Water Quality Assessment Report

Every two years, DRBC compiles a Delaware River and Bay Water Quality Assessment Report, which provides an assessment of the Delaware River and Bay's support of various uses during previous years. The Basin states use the DRBC mainstem water quality assessment as part of their reports to the U.S. EPA.

The uses assessed are: aquatic life; drinking water; primary recreation; secondary recreation; fish consumption; and shellfish consumption.

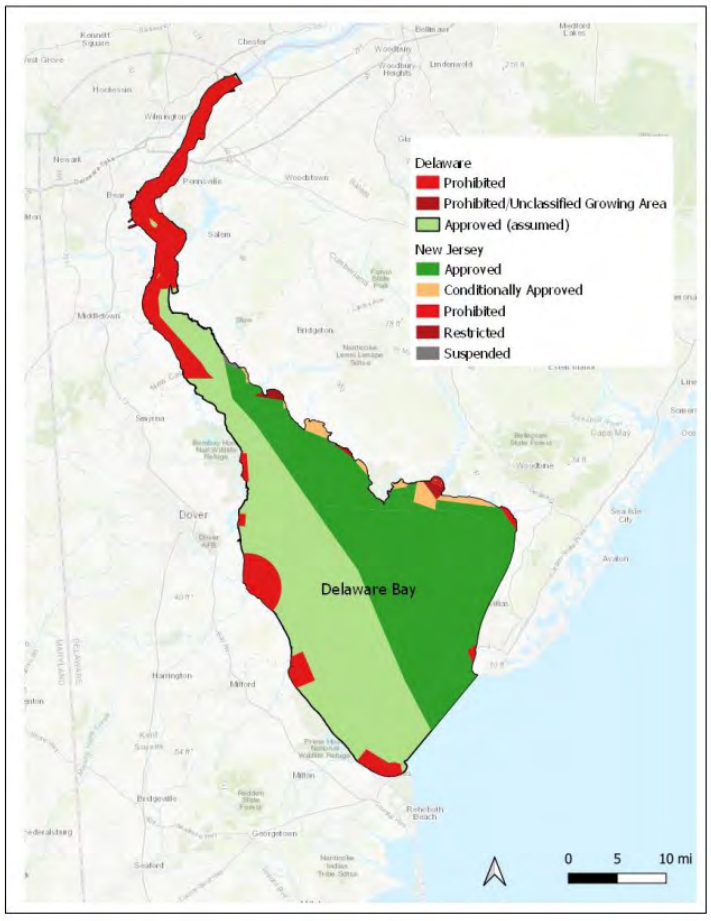
The assessment primarily involves comparing levels of key water quality indicators with DRBC stream quality objectives and identifying those waters that do not meet DRBC's water quality regulations.

Water quality indicators include traditional water quality parameters, such as dissolved oxygen, bacteria and pH, along with other indicators like toxics, macroinvertebrate assessment and fish/ shellfish consumption advisories.

In 2020, DRBC made several changes to modernize its Water Quality Assessment Report. Data compilation, management and analysis procedures were automated via the development of R scripts. Additional changes included methodological revisions to allow the report to better assess today's large continuously-collected datasets.

Similar to past reports, assessment results were mixed. Support of uses varied depending on specific location and use.

Full results of the 2020 assessment can be viewed at https://www.state.nj.us/drbc/library/documents/WQAssessmentReport2020.pdf.



Shellfish Consumption Classifications designated by New Jersey and Delaware for the Delaware Bay.

Bacteria Monitoring & Recreation

Elevated concentrations of bacteria (E. Coli, Fecal Coliform, and Enterococci) in the water can make humans sick if they come into contact with it.

To maintain water quality in the Delaware River, the DRBC has adopted criteria for bacteria that is protective of recreation, which is one of the river's designated uses.

There are two levels:

(a) primary contact recreation, such as swimming, jet skiing and kayaking; and

(b) secondary contact recreation, such as fishing and boating

Primary contact activities allow for closer contact with the water than secondary; therefore, primary contact recreation waters have stricter bacteria criteria.

Manager of Water Quality Assessment John Yagecic, P.E. (left) and Water Resource Scientist Elaine Panuccio collect water samples for bacteria monitoring along the Delaware River.

In the Delaware River, primary contact recreation is a designated use for all zones except within a 27-mile long stretch around Philadelphia and Camden. Here, elevated bacteria levels due to stormwater runoff and/or combined sewer overflows during and after heavy rains mean that the designated use is set at secondary contact recreation.

However, primary contact recreation - such as tubing and jet skiing - has been observed. To see if bacteria levels meet the criteria for this type of close-contact recreation, DRBC initiated a focused bacterial monitoring effort in 2019 in this urban stretch of the tidal Delaware River. Sites chosen for sample collection were where recreational activities were observed or anticipated and where access was readily available.

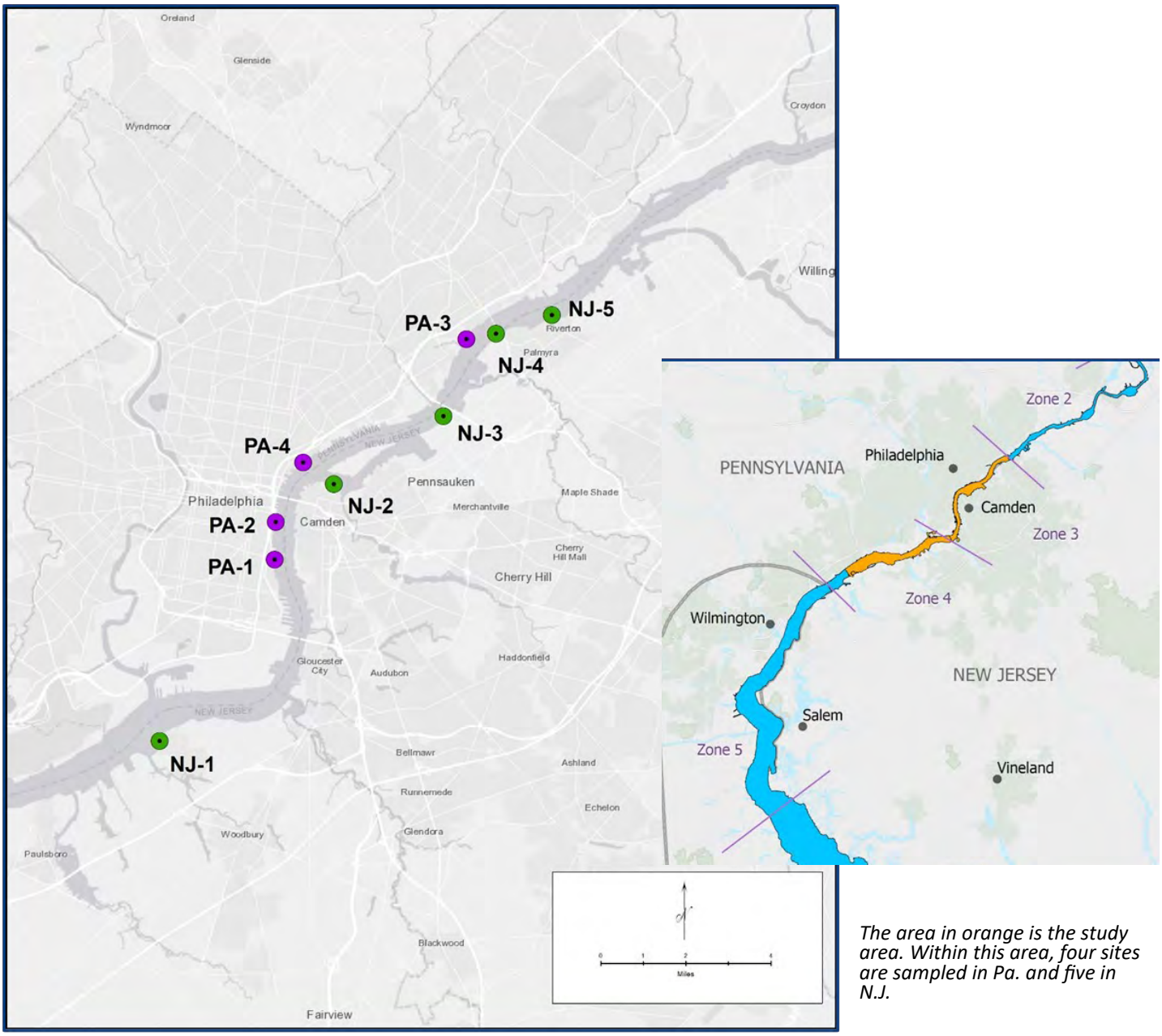
Data collection continued in 2020, although the start was delayed due to the pandemic. Data were collected at the same sites as in 2019, with the addition of Penn Treaty Park, Philadelphia, Pa., which was closed for construction in 2019. In total, four sites in Pennsylvania and five sites in New Jersey were sampled (see map on next page).

This shore-based monitoring effort complements our existing Delaware Estuary Water Quality Monitoring Program, which collects bacterial data from the river's center channel.

Results from 2020's monitoring effort were discussed in December at a meeting of DRBC's Water Quality Advisory Committee. Results continued to be mixed, with some sites at some times meeting the more stringent criteria and others not. View the presentation at https://www.nj.gov/drbc/library/documents/WQAC/120320/Yagecic_Review2020BacteriaData.pdf.

DRBC is coordinating with its WQAC regarding data assessment and next steps. The monitoring effort is planned to be continued in 2021.

DRBC Shore-Based Monitoring Program: 2020 Sampling Sites



The area in orange is the study area. Within this area, four sites are sampled in Pa. and five in N.J.

Sampling Sites (in above map):

In Philadelphia, Pa.

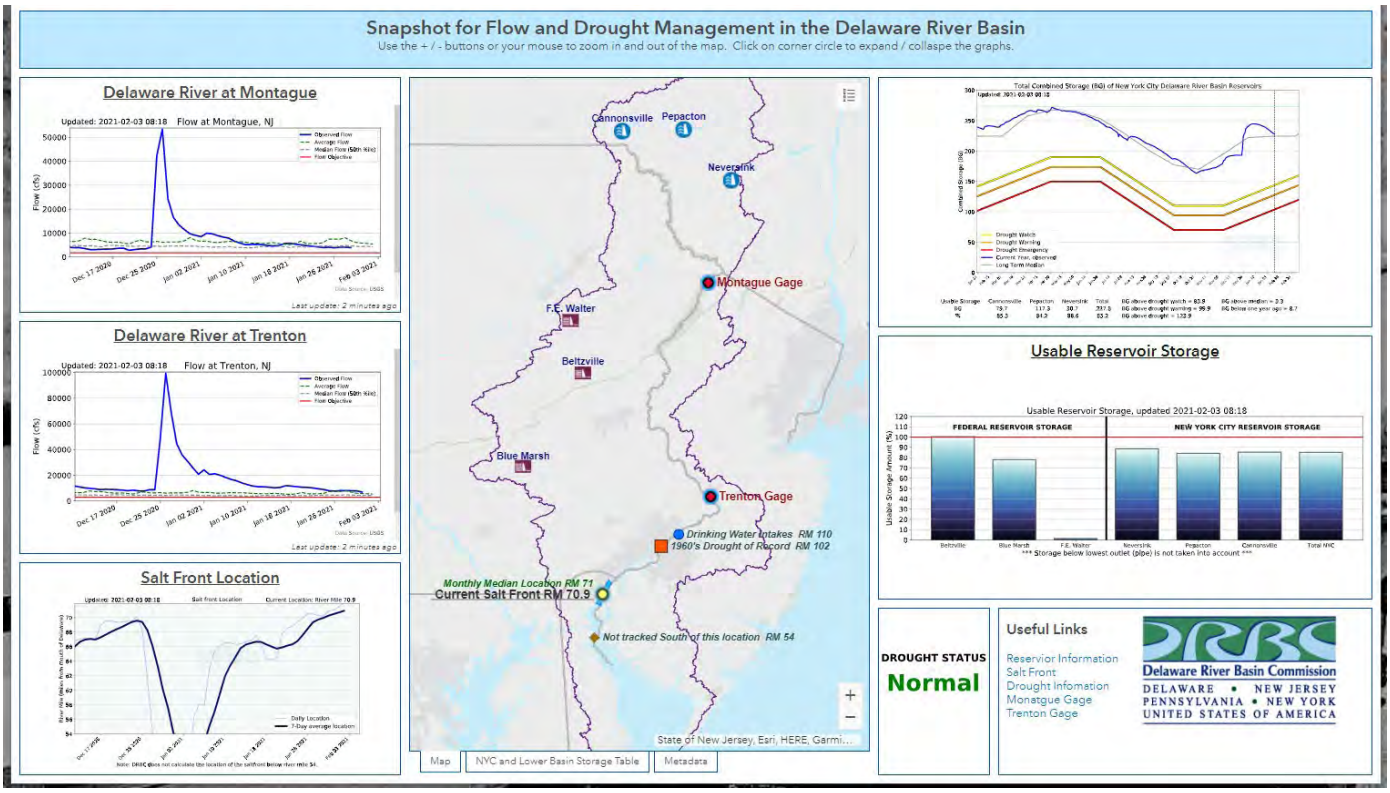
- Washington Ave. Green (PA-1)
- Penn's Landing Lagoon (PA-2)
- Frankford Arsenal Boat Ramp (PA-3)
- Penn Treaty Park (PA-4)

In New Jersey

- National Park (NJ-1)
- Pyne Poynt Park, Camden (NJ-2)
- Pennsauken Access (NJ-3)
- Palmyra Cove Nature Center (NJ-4)
- Riverton Yacht Club (NJ-5)

HYDROLOGIC REPORT

NEW HYDROLOGIC TOOLS FOR THE PUBLIC



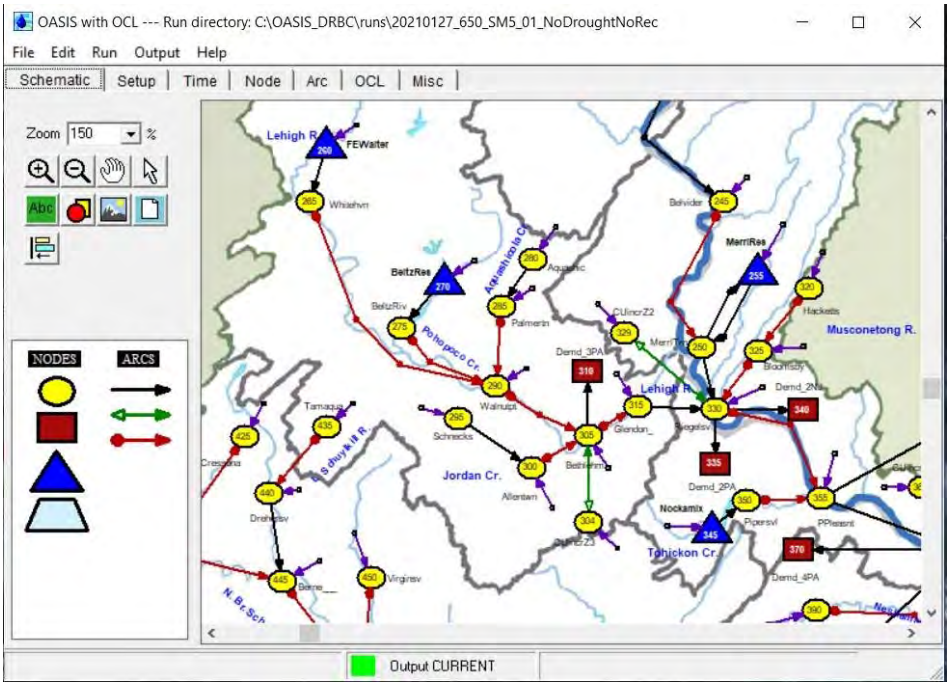
HydroSnap

DRBC established a new website Hydrosnap.drbc.net (above). It provides users with a snapshot of flow and drought management indicators for the Delaware River Basin. In the left column, the top two panels provide the recent daily flow in cubic feet per second at Montague N.J. and Trenton N.J. The hydrographs also display the median flow (50th percentile) and the average flow. Respective flow objectives for each location are shown as well. The bottom panel on the left shows the salt front location over the past several weeks, or the location of the 250 mg/L chloride concentration, in river miles (river mile 0 is located at the mouth of the river/Delaware Bay). The daily salt front location, as well as the seven-day averaged location, is shown. In the middle, an interactive map allows users to pan around the basin and obtain information by clicking on reservoirs shown, as well as visualize the location of the salt front in the river. The monthly median location is

Neshaminy Creek, Newtown, Pa., by Kate Schmidt, DRBC Communications Specialist

shown to give an idea of whether or not the salt front location is normal. The right column contains information on usable storage in the basin. The combined New York City storage over the past year is shown in the top panel, and the storage for each individual reservoir including USACE reservoirs is shown in the middle panel. The bottom two panels on the right display the drought status in the basin based on the storage in the NYC reservoirs, and the other panel provides useful links to other sources of data concerning flow management in the basin. Underneath the map, tabs are available to switch to a view of the approximate storage levels in each reservoir or the metadata (documentation) for all information in the HydroSnap dashboard.

DRB-PSTv2.3 Water Model



A new release of the Delaware River Basin Planning Support Tool (DRB-PSTv2.3) was released in February of 2020. DRB-PST is a publicly available tool used by DRBC and stakeholders to examine flow and drought management alternatives. The release includes additional output locations for fisheries evaluations, improvements to model code, code for operations not previously simulated, changes to model parameters (specifically storage-area-relationships based on new bathymetric surveys) and the ability to simulate various existing or former programs for comparisons of future flow management options (Flexible Flow Management Programs [FFMP]: FFMP2017, FFMP2011, FFMP2008 and D77-20 CP (Revision 1). The model will be used over the next few years to evaluate different alternatives being developed and considered for the FFMP 2017 studies.

Main Hydrologic Events

Winter

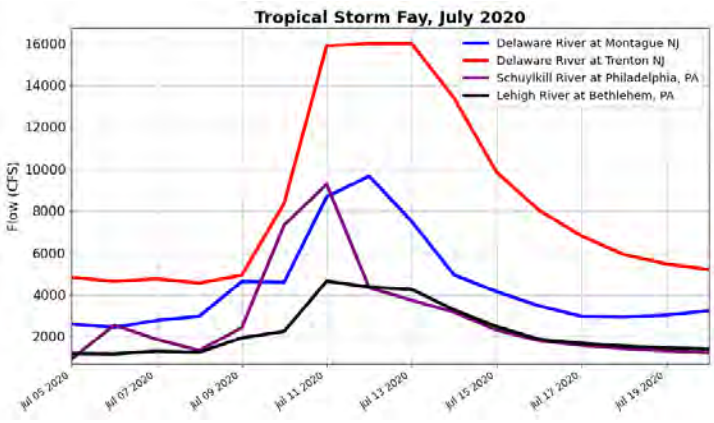
The winter of 2019 – 2020 was record breaking for the Basin. The Philadelphia region recorded its second lowest snowfall of 0.3 inches total for the season. Little snow fell across the southern half of the Basin as well. Although the upper Basin received more than of 45 inches of snow in most areas (near normal), snow totals were much lower in southern portions of the Basin. Large portions of the lower Basin received less than an inch of snow over the entire season.

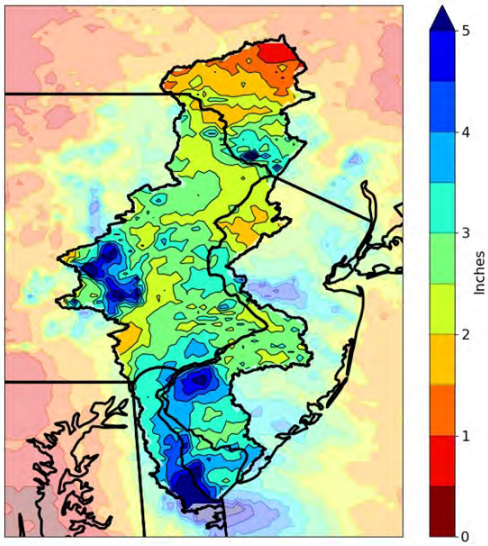
Spring Storm

From April 30 – May 1, a strong low-pressure system made its way across the basin. The largest amount of rain fell along a corridor from the western-central Basin through northeast Pennsylvania and into the New York. These areas received greater than 2.5 inches. Flows in tributaries and the main stem increased as a result of the runoff. Peak flows were two to three times higher than the flow prior to the event and the salt front moved approximately ten miles downstream in response to the event. The three New York City Delaware Basin reservoirs were filled and began spilling. Cannonsville spilled approximately 4.5 BG over twelve days. Pepacton spilled approximately 7.5 BG over ten days. Neversink spilled approximately 2.5 BG over five days.

Tropical Storm Fay

On July 10, Tropical Storm Fay made landfall east of the Basin just north of Atlantic City, N.J., producing heavy rain in the southern half of the Basin. The figure (below, right) shows the precipitation totals from the event, which were mainly concentrated in the southern regions of the basin. Resultant streamflows were three to four times the normal amount. Although the streamflows were high, the salt front only moved downstream by approximately one mile, and flooding did not occur on the main stem. Due to the isolated location of large rainfall amounts, Fay had a limited impact on the hydrologic conditions in the Basin.





Precipitation Totals from Tropical Storm Fay from July 9 – July 10. The highest amounts were in the southern half of the Basin, with some areas receiving greater than five inches of rain.

Tropical Storm Isaias

On August 3 and 4 the remnants of Hurricane Isaias passed over the Basin after it was downgraded to a tropical storm. In contrast to Fay, the heavy rain occurred over the central Basin and northern basin, with

maximum amounts in eastern Pennsylvania of 7.5 inches. The resulting streamflows from Isaias were the third highest streamflow for the year at Montague, the second highest stream flow for the year at Trenton, as well as on the Lehigh River, and the highest flow of the year on the Schuylkill. The Schuylkill River and its tributaries experienced flooding from this event. The Little Lehigh Creek at Allentown and the Perkiomen Creek at Graterford reached their highest levels for the period of record, which was 30 years for the Little Lehigh and 34 years for the Perkiomen. Prior to Isaias, the salt front was near RM 69. When data again became available on August 14, 2020 (ten days after Isaias), the salt front was approximately 4 miles further downstream.

Thermal Releases

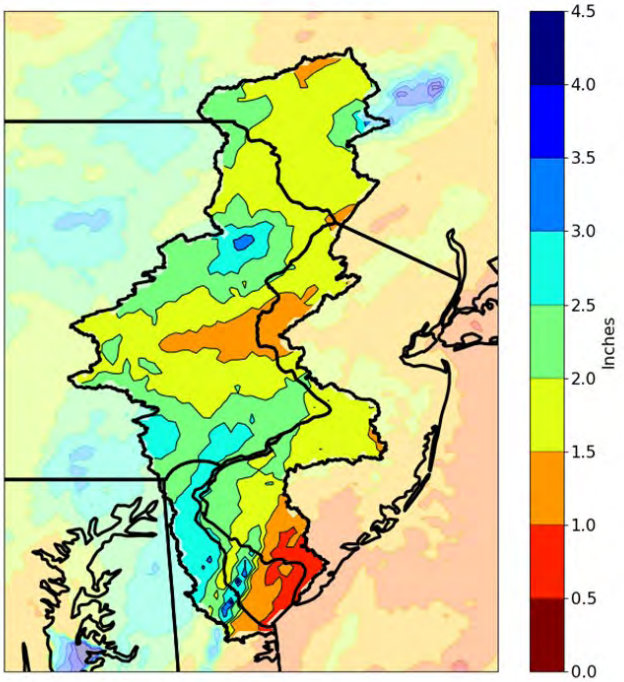
Eight multi-day warm temperature events required thermal releases for a total of 34 days from June 9, 2020 – August 1, 2020. Approximately 2,330 cfs days (approximately 1,506 million gallons) of the 2,500 cfs-day thermal mitigation bank were used. Water temperatures at Lordville exceeded 75^{O}F on one day in June and seven days in July. The water temperature at Lordville reached a high of 76.3^{O}F on both June 22, 2020 and again on July 20, 2020.

Dry conditions

Due to dry conditions in the fall, approximately 19.7 billion gallons of water was released between September 10 and October 30 from the three New York City reservoirs located in the upper Basin (Cannonsville, Pepacton and Neversink) to meet the flow objective at Montague. Water was released on one day at the start of the period from Blue Marsh Reservoir to meet the Trenton Equivalent Flow Objective (133 million gallons). On October 29, the three upper basin reservoirs were at the lowest combined storage for the year of approximately 163.4 BG, 53.4 BG higher than drought watch. On October 31, 2020, the salt front was at its most upstream location of the year near river mile 76, just north of the mouth of Stoney Creek, Del.

Snowstorm and Flood Event

A winter storm impacted the region on December 16 and 17. Areas in the Pennsylvania portion of the Basin received greater than 8 inches of snow, with larger amounts of up to 30 inches reported in the northern regions of the Basin. On December 24, temperatures nearing 60s Fahrenheit followed by a period of heavy rain resulted in the melting of the snowpack and high river rises. The streamflows from snowmelt were the highest of the year for Montague, Trenton and the Lehigh and the second highest streamflow of the year for the Schuylkill River. Several locations in the Basin experienced flooding, including tidal areas and the main stem. New York City reservoir storage increased from 193.1 to 236.5 BG in just 5 days. Neversink Reservoir began to spill on December 25 and continued to spill through the end of the year; a total of 616 MG spilled. The reservoir continued to spill an additional 10 MG on January 1, 2021 before stopping.



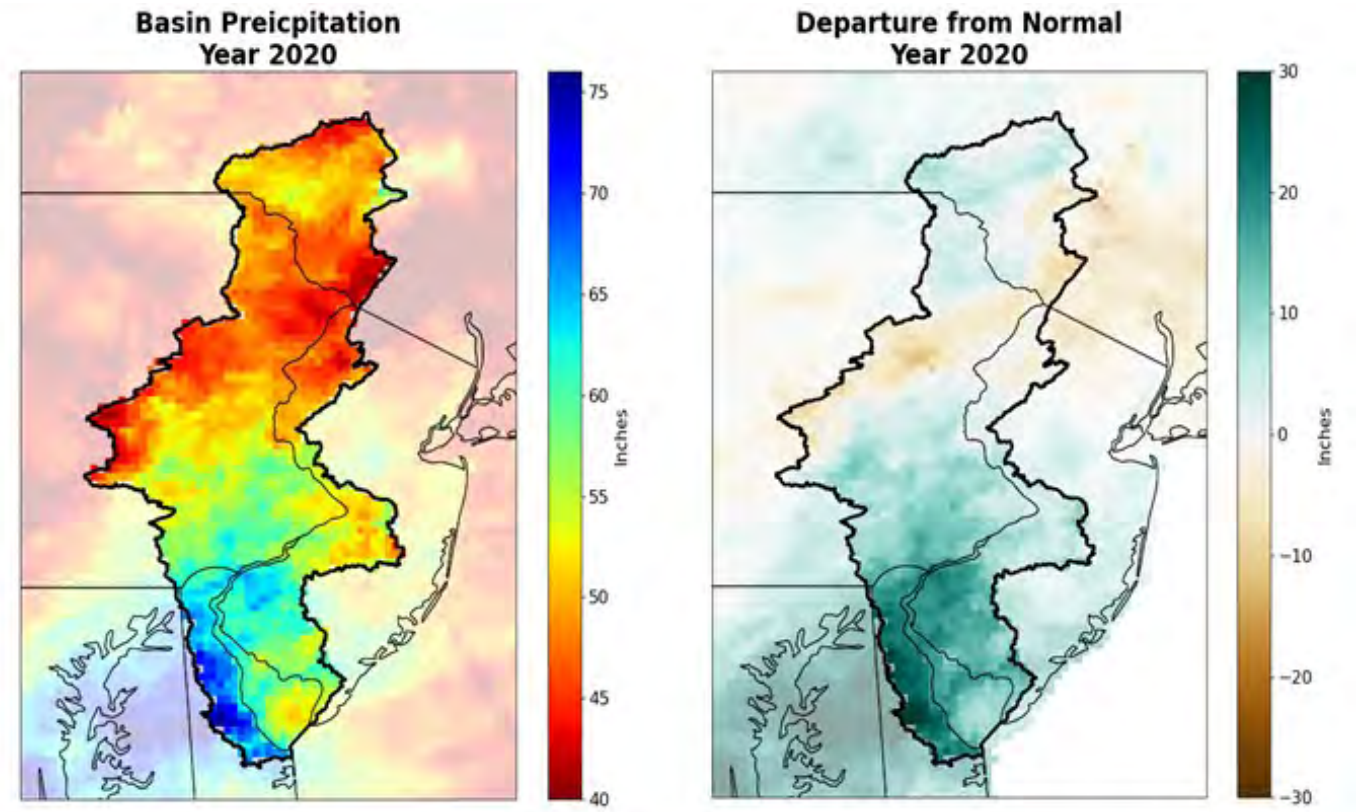
Precipitation (rain and snow water equivalent) was highest in Pennsylvania and Delaware. Most areas received 1.5 inches or more.

Precipitation

Annual total precipitation ranged from 40 inches in the western portion of the Basin to 76 inches in southern portion of the Basin. The figures below present maps of precipitation amounts and departures from normal (using the 30-year average spanning 1981 – 2010).

Dry conditions occurred in western regions of the Basin extending northeast towards New York. Some of these areas received precipitation amounts that were between 10-15 inches below normal. In the southern part of the Basin, especially Delaware, annual precipitation was approximately 30 inches above normal. In 2020, Callicoon, N.Y. received the most precipitation and Sussex, N.J. received the least.

August 2020 precipitation was greater than normal due to Tropical Storm Isaias. August precipitation ranked in the top ten wettest for each of the nine representative stations for their respective periods of record, excluding the Sussex, N.J. airport (which is located just outside the Basin). Reading, Pa. ranked second, Callicoon, N.Y. ranked third, and both Wilmington, Del. and Mount Pocono, Pa. ranked fourth. In contrast, May was dry for four locations and was the second driest on record for Reading, Pa. For other stations, the precipitation for May was normal.



Precipitation for 2020. Delaware had the most precipitation. A drier than normal corridor occurred in the western portion of the Basin northeast into NY.

Streamflow

During the low-flow period from late September through the end of October, streamflow at all gages remained at or below the median flow except one precipitation event at the end of September.

The comparison of monthly average flows to normal monthly flows is similar to that of precipitation. In August, average streamflows were 175 percent of normal in the main stem and 200 to 300 percent higher than normal in the tributaries. High flows also occurred in December, ranging from approximately 150 to 200 percent of normal for most gages.

Flooding occurred during both major rainfall events this year. In Berks County, near Reading, Pa., an intense series of thunderstorms produced approximately six inches of rain, which led to an increase of approximately 7,000 cfs in the Schuylkill River two days prior to the impacts from Tropical Storm Isaias.

During Isaias, several tributaries experienced minor to moderate flooding. During the high flows, a barge broke loose and crashed into a bridge over the Schuylkill River.

In the last week of December, a combination of melting snow and heavy rain led to moderate to major flooding around the basin, including some tidal/mainstem locations.

The confluence of Stony Run and Brodhead Creek, with Targa Falls just a bit upstream. Courtesy of the Brodhead Watershed Association.

Reservoir Storage and Releases

Lower Basin

Both Beltzville Reservoir (located on the Pohopoco Creek, a tributary of the Lehigh River) and Blue Marsh Reservoir (located on the Tulpehocken Creek, a tributary of the Schuylkill River) maintained storage in the normal range during 2020. The Delaware River Basin Commission's (DRBC) Lower Basin drought operating plan was not implemented because the requirements (reservoir elevations) were not met.

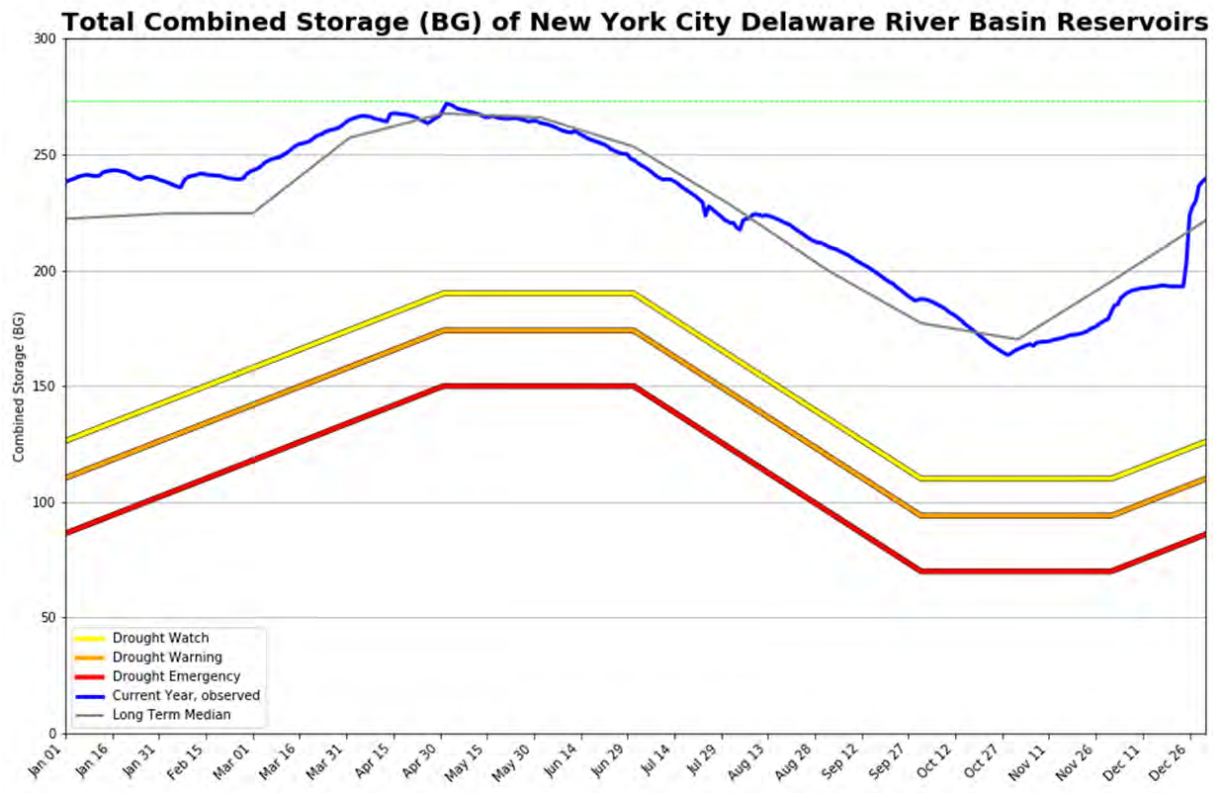
A release of water from Blue Marsh Reservoir was made on one day at DRBC's request on September 23 to support the Trenton Flow Objective. A total of 55 million gallons were used. No water was needed from the Excess Release Quantity in 2020, a volume of water in the NYC reservoirs reserved for use by the lower Basin. Beltzville and Blue Marsh remained near or above their normal pool elevations for most of the year. Blue Marsh reservoir has both a summer and a lower winter elevation. The purpose of the lowering the pool is to provide additional flood control storage in the winter and spring.

Upper Basin

Releases from the three NYC Delaware River Basin Reservoirs were made in accordance with the 2017 Flexible Flow Management Program. The River Master directed releases from the NYC reservoirs to meet the Montague flow objective. The volume of water released for Montague was approximately 21.4 BG, starting on June 23 and lasting until October 27. Releases for thermal mitigation and rapid flow change mitigation totaled 1506 MG and 530 MG, respectively. Thermal mitigation releases were made for eight multi-day

events (34 days total) in June, July and August. Thermal releases are made when the water temperature at the Lordville, N.Y. gage is forecasted to be greater than 75° F, in order to protect established cold-water fisheries. Rapid flow change mitigation releases were made for three events in October. Rapid flow mitigation releases are made when the water level is forecasted to decrease too fast for aquatic life to naturally adjust to, so extra water is released to mitigate the rapid decrease.

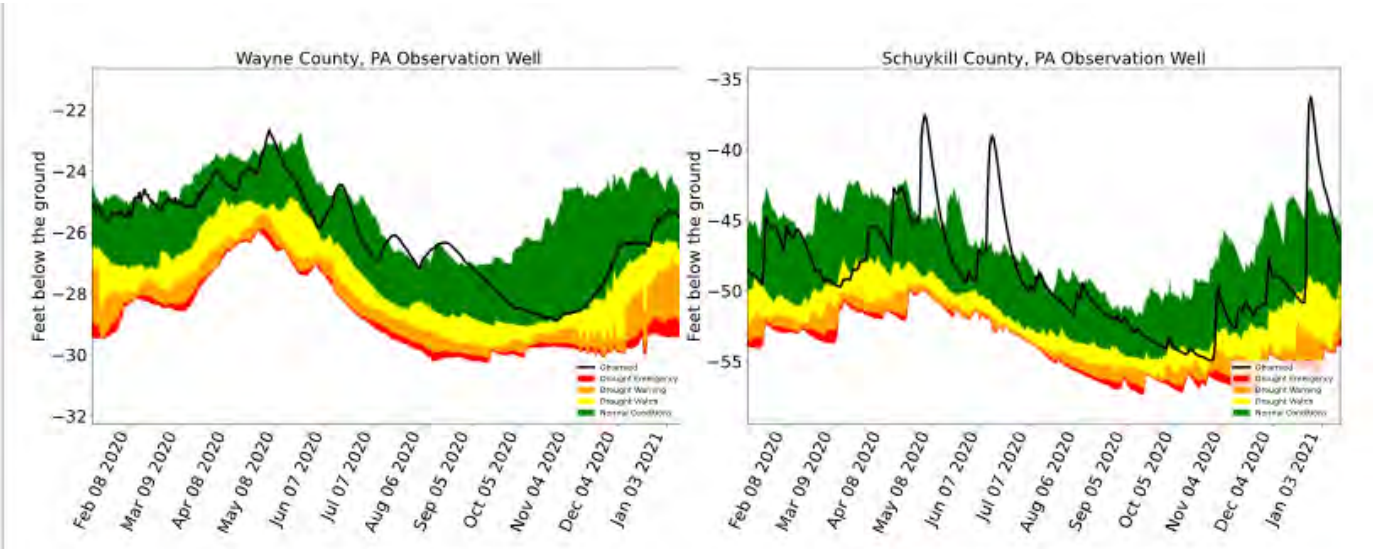
The figure below presents the time-series of combined storage in the New York City Delaware Basin Reservoirs. As of January 1, the combined storage was approximately 237 BG. The storage increased until May 2 when storage was 271.9 BG. During this period, all three reservoirs spilled. The total volume spilled was 14.5 BG. Storage increased briefly above the median from Tropical Storm Isaias, but then decreased through October 29, when combined storage was at the minimum value for the year of 163.4 BG, approximately 53 BG above drought watch. The combined storage then increased to 239 BG by the end of the year. The majority of the increase was the result of the rain event on December 24 - 25.



Groundwater

Groundwater levels in the twelve indicator wells in the Basin remained mostly in the normal or above normal range for the year. Most wells experienced a decrease in groundwater levels starting in June and July, following the normal annual trend in groundwater levels. Five wells in the western and northern parts of the Basin reached drought watch levels in October before increasing with recharge from a series of storms during November. At year's end, levels in 6 wells were at normal levels, with the remaining 6 wells having above normal levels due to the rain event December 24-25.

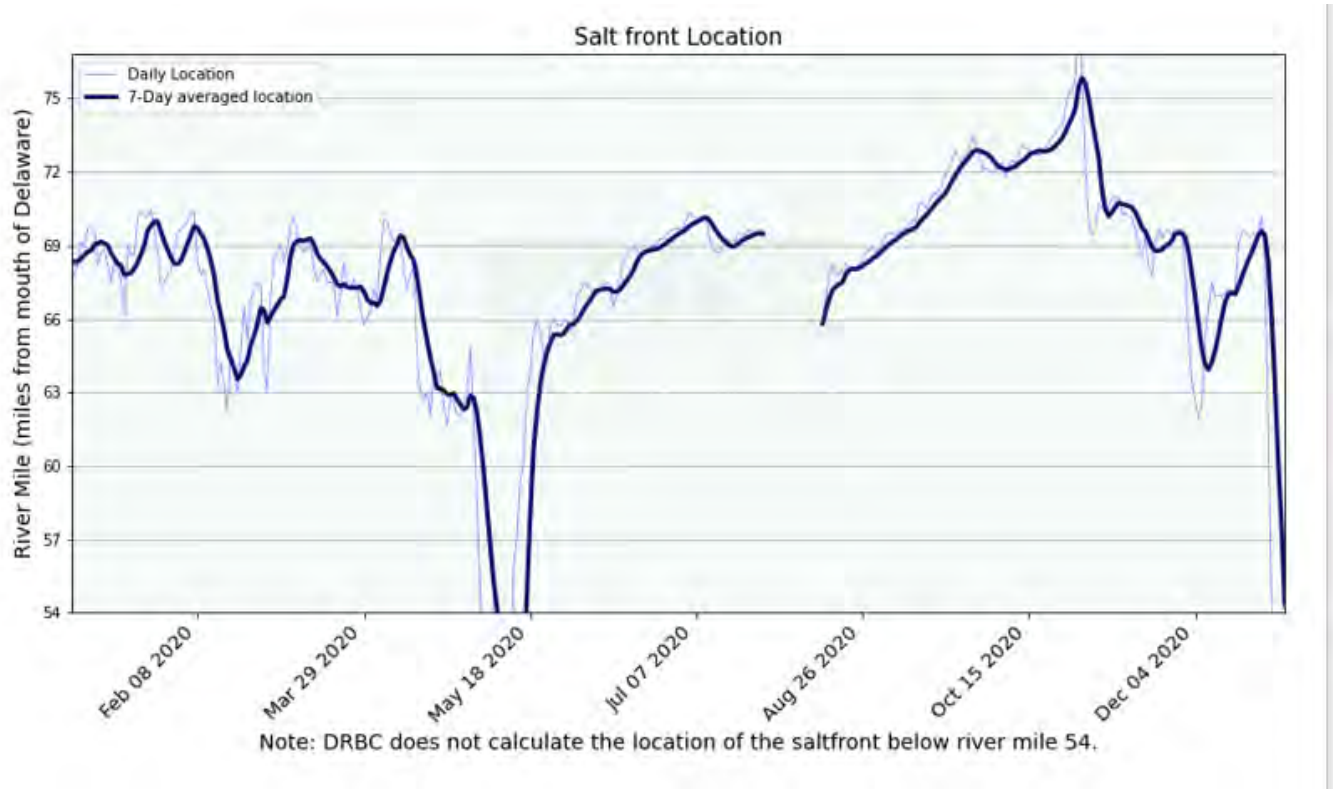
The graphs on the next page show representative groundwater well levels in the Delaware River Basin for the upper basin (Wayne County) and mid-upper basin (Schuylkill County). As with the other representative basin wells, conditions were normal for most of the year; however, both of these wells did dip briefly into drought watch levels at the end of October.



Salt Front

The salt front is defined as the 250 parts-per-million isochlor (line of constant chlorinity). The seven-day average location of the salt front is used by DRBC as an indicator of salinity intrusion in the Delaware Estuary for reservoir operations.

In 2020, the salt front began the year in the normal range. For the first half of the year, the salt front was within the normal range. In May, the salt front was below Reedy Island (river mile 54). In June and July, the salt front began to move upstream until August, when it began to move downstream due to the increased flows resulting from precipitation from Tropical Storm Isaias. The salt front then moved upstream in September and October when flows were low. The most upstream location of the seven-day average salt front was near river mile 76 in late October; it then began moving downstream after a high flow event. The salt front fluctuated within the normal range for the remainder of the year, until the rain event on December 24-25 moved the salt front below Reedy Island once again. A time series for the salt front in 2020 is below.



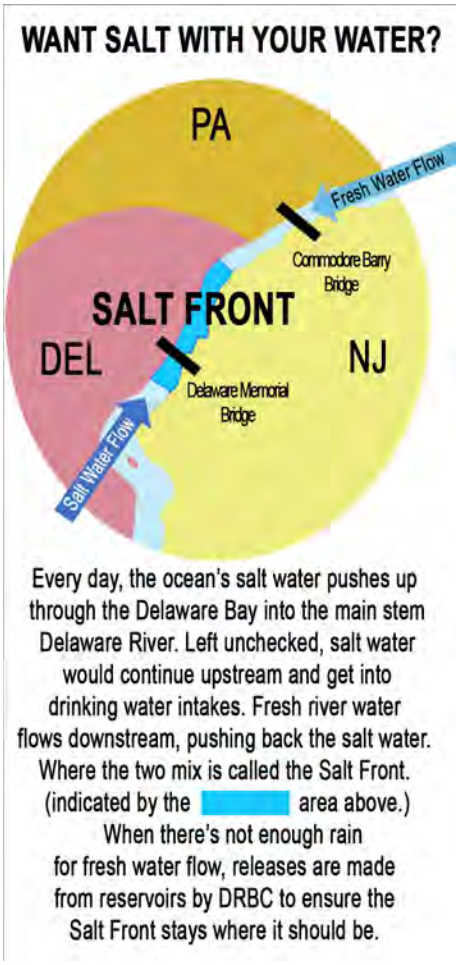
DID YOU KNOW?

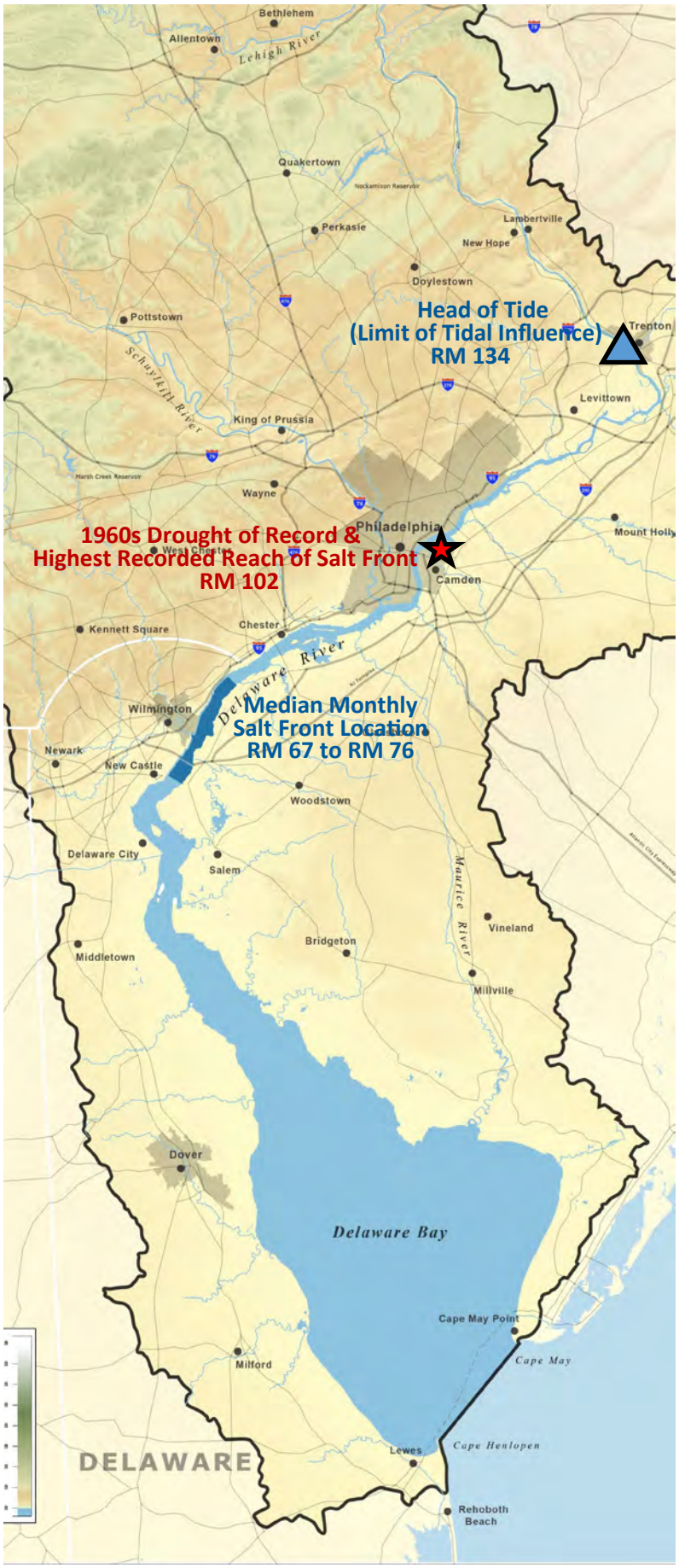
The location of the salt front fluctuates along the main stem Delaware River as streamflow increases or decreases.

During higher streamflow, chloride concentrations are diluted by freshwater flowing downstream.

During low flows, chlorides become concentrated in the river as the result of saltwater pushing upstream from the ocean.

As shown on the map on the right, the long-term median mid-month location of the salt front ranges from river mile 67 in April (two miles downstream of the Delaware Memorial Bridge) to river mile 76 in September (two miles downstream of the Pennsylvania-Delaware State line).





F.E. WALTER DAM RE-EVALUATION STUDY

The Francis E. Dam and Reservoir on the Lehigh River was constructed in 1961. The dam was built for flood risk management, but recreation became an authorized purpose in 1988. Photo Courtesy of the U.S. Army Corps of Engineers, Philadelphia District.

The Francis E. Walter (F.E. Walter) Dam Re-Evaluation Study is being led by the U.S. Army Corps of Engineers (USACE). The DRBC, as well as the NYC Dept. of Environmental Protection (NYCDEP), are non-federal co-sponsors of this study.

The DRBC is funding the scoping study for the project, as authorized by a Resolution for the Minutes approved in 2019. In January 2020, the project team, including representatives from the USACE, NYCDEP and DRBC, held a public meeting in White Haven, Pa. to discuss the study goals and timeline with the public.

A audience estimated at about 600 people packed a public meeting to hear representatives from the U.S. Army Corps of Engineers, New York City Department of Environmental Protection and the DRBC about the F.E. Walter Dam Re-Evaluation Study.

The primary missions of the F.E. Walter Dam are to reduce flooding risk and support recreation. The F.E. Walter Dam is also part of the DRBC's drought management plan for the Basin, providing storage in times of drought emergency.

The intent of this study is to determine if modifications to the F.E. Walter Dam structure, infrastructure, or reservoir operations can be implemented to improve water supply, fisheries, recreation, and other objectives without adversely impacting the congressionally authorized purposes of the reservoir, which are flood risk management and recreation.

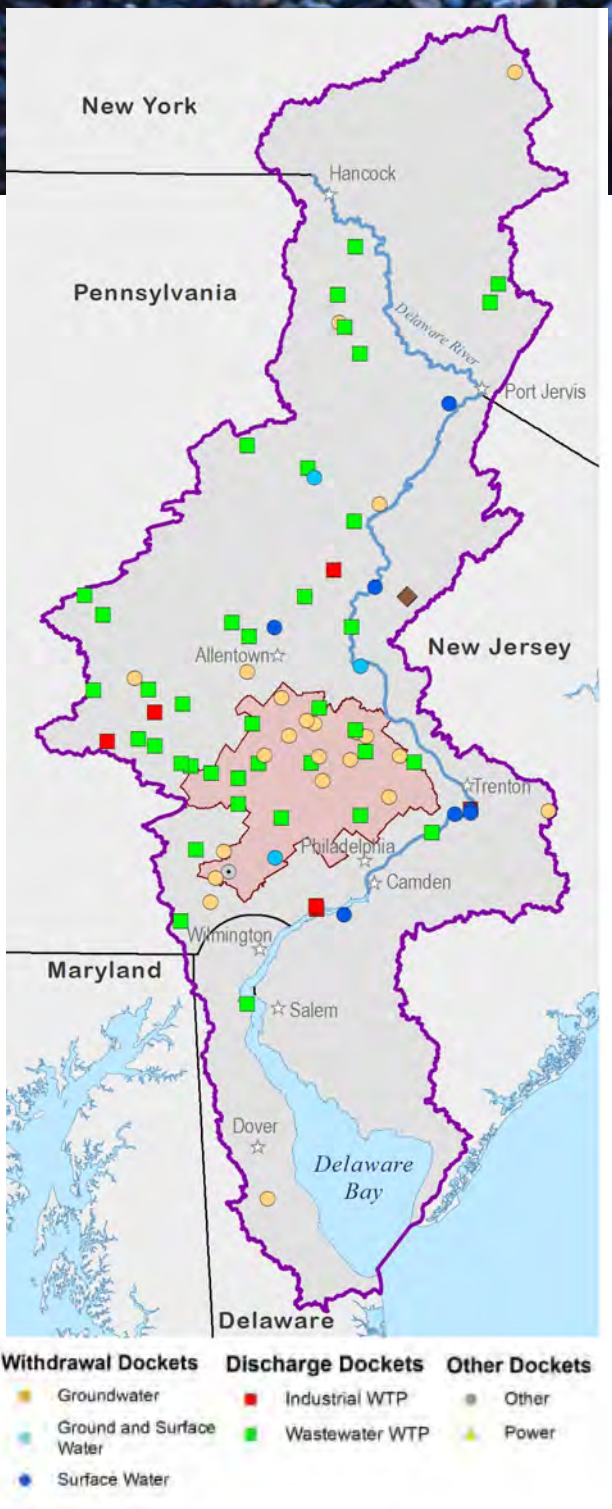
In particular, the study will examine reservoir management options that could release additional water under drought conditions to help repel salinity downstream.

DRBC's position is that the F.E. Walter Dam's existing, congressionally authorized purposes of flood risk management and recreation should be protected.

The study is expected to take three years. The only funding currently available is for the study; no funds are yet allotted or appropriated for anything else.

The public can comment on the study throughout the process. Learn more at https://www.nj.gov/drbc/programs/flow/FEWalter_reeval-study.html.

OUR REGULATED COMMUNITY



Section 3.8 of the Delaware River Basin Compact provides that no project having a substantial effect on the water resources of the Basin shall be undertaken unless it shall have been first submitted to and approved by the Commission.

These projects generally fall into one of two categories: water withdrawals (ground and/or surface water) or discharges (wastewater treatment).

Generally, the following projects are deemed to have a substantial effect on the water resources of the Basin and require DRBC approval:

- Water withdrawals - be it from ground or surface water or diversion or transfer in or out of the Basin - more than 100,000 gallons per day (gpd) during any consecutive 30-day period.
- Discharges over 50,000 gpd during any consecutive 30-day period, be it from wastewater treatment facilities or the importation or exportation of wastewater.

A list of docket applications approved by the Commissioners at the quarterly business meetings in 2020 are found on the following pages.

DOCKETS APPROVED MARCH 11, 2020

Upper Southampton Authority (PA) - Groundwater Withdrawal, D-1965-023 CP-3.

Brodhead Creek Regional Authority (PA) - Wastewater Treatment Plant, D-1986-011 CP-5.

Easton Area Joint Sewer Authority (PA) - Wastewater Treatment Plant, D-1987-010 CP-3.

The flow metering and pre-aeration part of the Joint Municipal Authority of Wyomissing Valley's waste water treatment plant.

Fleetwood Borough Authority (PA) - Wastewater Treatment Plant, D-1987-054 CP-6.

Spring Township (PA) - Wastewater Treatment Plant, D-1988-077 CP-4.

Wyomissing Valley Joint Municipal Authority (PA) - Wastewater Treatment Plant, D-1991-009 CP-6.

Exelon (PA) - Eddystone Generating Station, D-1992-066 CP-3.

Borough of Bally (PA) - Wastewater Treatment Plant, D-1994-044 CP-4.

Aqua Pennsylvania, Inc. (PA) - Groundwater Withdrawal, D-1995-057 CP-3.

Lehigh County Authority (PA) - Wastewater Treatment Plant, D-1999-011 CP-3.

Bucks County Water and Sewer Authority (PA) - Wastewater Treatment Plant, D-1999-013 CP-4.

Dan Schantz Farm & Greenhouses (PA) - Groundwater Withdrawal, D-1999-014 -3.

Lehigh County Authority (PA) - Groundwater Withdrawal, D-2001-020 CP-6.

Exelon (PA) - Fairless Hills Generating Station Discharge, D-2010-036 CP-3.

Upper Makefield Township (PA) - Wastewater Treatment Plant, D-2016-006 CP-2.

Bristol Township (PA) - Groundwater Withdrawal, D-1990-098 CP-2.

Plumstead Township (PA) - Groundwater Withdrawal, D-1997-033 CP-4.

Artesian Water Company (DE) - Groundwater Withdrawal, D-2001-034 CP-2.

Joe Jurgielewicz & Son, Ltd. (PA) - Groundwater Withdrawal, D-2017-003 -2.

NP New Castle, LLC (DE) - Wastewater Treatment Plant, D-2019-004 -1.

Pocono Mountains Industries. Inc. (PA) - Waste Water Treatment Plant, D-2019-008 -1.

DOCKETS APPROVED JUNE 10, 2020

New Castle County Department of Special Services (DE) - Wastewater Treatment Plant, D-1972-210 CP-3.

U. S. Steel Real Estate (PA) - Wastewater Treatment Plant, D-1978-068 -5.

Amity Township (PA) - Wastewater Treatment Plant, D-1990-078 CP-5.

Waste Management Disposal Services of Pennsylvania, Inc. (PA) - Surface Water Withdrawal, D-1991-090 -3.

Leidys Inc. (PA) - Groundwater Withdrawal, D-1993-021 -3.
Shoemakersville Municipal Authority (PA) - Wastewater Treatment Plant, D-1993-074 CP-5.

Lower Perkiomen Valley Regional Sewer Authority (PA) - Wastewater Treatment Plant, D-2001-042 CP-6.

East Vincent Township (PA) - Wastewater Treatment Plant, D-2005-007 CP-3.

White Manor Country Club (PA) - Groundwater and Surface Water Withdrawal, D-2009-022 -2.

Tuscan Lehigh Dairies (PA) - Groundwater Withdrawal, Montgomery Co, D-2009-043 -2.

Schuylkill Valley Sewer Authority (PA) - Wastewater Treatment Plant, D-2012-029 CP-3.

Indian Head Camp (PA) - Wastewater Treatment Plant, D-2015-008 CP-2

Aqua Pennsylvania Wastewater, Inc. (PA) - Wastewater Treatment Plant, D-2016-011 -2.

The Boeing Company (DE) - Wastewater Treatment Plant, D-1994-030 3.

DOCKETS APPROVED SEPTEMBER 10, 2020

Martins Creek, LLC / Talen Energy (PA) - Surface Water Withdrawal, discharge and consumptive use at the Martin's Creek Generating Station, D-1970-025 CP-2.

Birdsboro Municipal Authority (PA) Wastewater Treatment Plant, D-1974-126 CP-4.

West Grove Borough Authority (PA) Wastewater Treatment Plant, D-1987-024 CP-4.

Mount Airy #1 (PA) - Groundwater Withdrawal, LCC, D-1989-037 -4.

Manwalamink Water Co. (PA) - Groundwater Withdrawal, D-1989-050 CP-6.

Aqua Pennsylvania, Inc. (PA) - Groundwater Withdrawal, D-1993-083 CP-3.

Sunnybrook Golf Club (PA) - Groundwater Withdrawal, D-1997-007 -3.

Northampton Generating Company (PA) - Surface Water Withdrawal for Cogeneration Facility, D-1998-040 -2

New Hanover Township Authority (PA) - Wastewater Treatment Plant, D-1999-040 CP-5.

Fairless Energy, LLC, (PA) - Surface Water Withdrawal for Fairless Hills Electric Generating Station , D-2001-028 CP-3.

Bedminster Municipal Authority (PA) - Wastewater Treatment Plant, D-2006-010 CP-4.
East Brandywine Township Municipal Authority (PA) - Wastewater Treatment Plant— D-2007-002 CP-4.

Franconia Sewer Authority (PA) - Wastewater Treatment Plant, D-2007-041 CP-3.

US Steel Real Estate (PA) - Surface Water Withdrawal for Industrial Processes, Cooling, fire Suppression and Potable Water Supply at Industrial Park, D-2009-006 -2.

Pineville Facility Company (PA) - Groundwater Withdrawal for Irrigation, LLC, D-2009-031 -2.

Beaver Lake Estates (NY) - Wastewater Treatment Plant, D-2009-038 CP-3.

Reading Area Water Authority (PA) - Water Filtration Plant, D-2010-009 CP-3.

RALHAL Corp. and Concord Estates Condominiums LLC, (NY) - Wastewater Treatment Plant, D-2012-019 CP-2.

MHC Lil Wolf, LP (PA) - Wastewater Treatment Plant, D-2015-005 CP-2.

Pechiney Plastic Packaging, Inc. (PA) - Groundwater Remediation Industrial Wastewater Treatment Plant, D-2015-013 -2.

Pottstown Borough Water Authority (PA) - Wastewater Treatment Plant, D-1989-055 CP-4.

Municipal Authority of the Borough of Milford (PA) - Surface Water Withdrawal for Public Water Supply, D-1965-168 CP-2.

Aqua Pennsylvania, Inc. (PA) - Discharge from Ingram's Mill Water Filtration Plant, D-2019-007 CP-1.

Artesian Water's Hyetts Corner Water Treatment Plant in Southern New Castle County, Del. Courtesy of Artesian Water.

DOCKETS APPROVED DECEMBER 9, 2020

Abington Township (PA) - Wastewater Treatment Plant, D-1973-191 CP-6.

Hawley Area Authority (PA) – Wastewater Treatment Plant, D-1981-029 CP-3.

Pennsylvania American Water Company (PA) - Exeter Township Wastewater Treatment Plant Upgrade, D-1992-003 CP-3.

Gilbert Power, LLC, Gilbert Generating Station (NJ) – Surface Water Withdrawal and Electric Generating Facility Consumptive Use, D-1993-071-2.

Broad Run Golfers Club (PA) – Groundwater Withdrawal, D-1999-036-3.

Upper Tulpehocken Township (PA) – Wastewater Treatment Plant, D-2005-006 CP-4.

West Deptford Energy, LLC, West Deptford Energy Station (NJ) – Surface Water Withdrawal and Electric Generating Consumptive Use, D-2008-027 CP-4.

Camp Hachshara-Moshava of NY, Inc. (PA) – Wastewater Treatment Plant, D-2015-014-2.

Hickory Hills Mobile Home Community, LLC (PA) – Wastewater Treatment Plant, D-1973-079-2.

Reading Alloys, Inc. (Ametek) (PA) – Non-contact Cooling Water Discharge, D-1979-044-4.

Quakertown Borough (PA) - Wastewater Treatment Plant, D-1984-026 CP-2.

Aqua Pennsylvania, Inc. (PA) – Upper Uwchlan System Groundwater Withdrawal, D-1990-050 CP-4.

Aqua Pennsylvania, Inc. (PA) – West Chester System Groundwater Withdrawal, D-1990-079 CP-2.

Jackson Township Municipal Utilities Authority (NJ) – Importation and Exportation of Wastewater, D-1994-018 CP-4.

Town of Roxbury (NY) Groundwater Withdrawal and Water Exportation, D-2002-014 CP-3.

Camp Lake Bryn Mawr (PA) – Wastewater Treatment Plant, D-2017-011-2.

DRBC Project Review Manager David Kovach, P.G. (standing) presents the pending dockets at the Commission's first quarterly pubic hearing, which was held on Feb. 10 at the Commission's headquarters building in West Trenton, N.J.

Major Regulatory Actions

GIBBSTOWN LOGISTICS CENTER

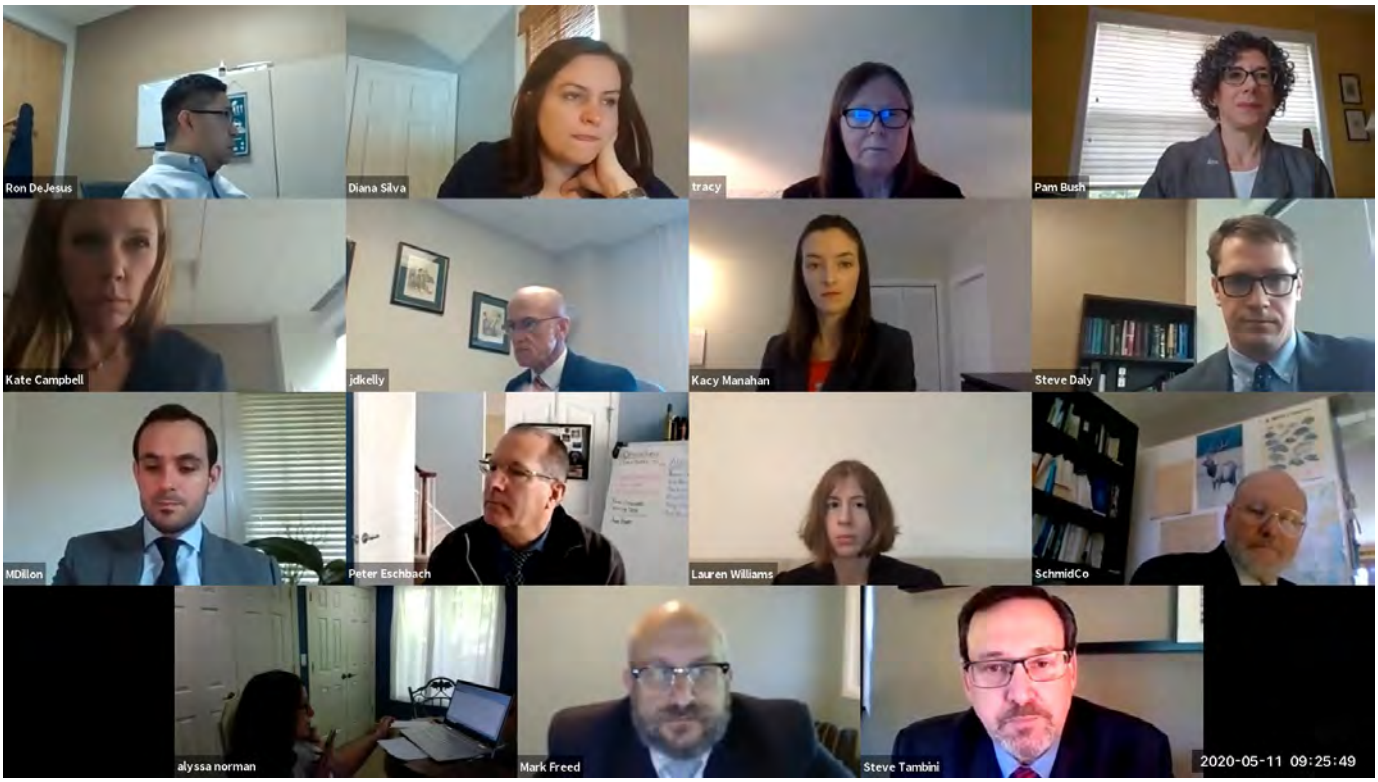
On June 12, 2019, the Commission approved a dredging and deep-water berth construction project (“Dock 2”) at the Gibbstown Logistics Center (“GLC”). In 2017, the Commission approved upland marine terminal facilities and the construction of a one-ship deep-water berth known as “Dock 1” at this site.

To the varieties of freight, including automobiles (roll-on/roll-off), non-containerized break bulk cargoes, bulk products and liquids, that could be handled at Dock 1, the new dock would add capacity for the transloading of bulk liquid products including liquefied petroleum gas (“LPG”), liquefied natural gas (“LNG”) and ethane from either trucks or rail cars.

In accordance with the Commission’s Rules of Practice and Procedure, The Delaware Riverkeeper and The Delaware Riverkeeper Network (collectively, "DRN") requested an adjudicatory hearing (a trial-like proceeding) on the DRBC approval, which the Commission granted in September 2019 at its 3Q Business Meeting.

The Adjudicatory Hearing

The hearing took place from May 11 to May 20, 2020, with John D. Kelly, retired Pennsylvania Department of State, presiding as hearing officer. Testimony was heard from 16 witnesses on behalf of project sponsor Delaware River Partners, LLC, DRN and the DRBC. More than 300 exhibits were entered into evidence. In light of COVID-19 restrictions on in-person gatherings, the hearing was conducted virtually.



The adjudicatory hearing gets started on May 11 under the management of Hearing Officer John D. Kelly Esq. (second row from the top, second from left).

The Hearing Officer's Ruling

On July 21, the hearing officer issued his report of findings and recommendations to the DRBC. He found that DRN "had a full and fair opportunity to demonstrate that Dock 2 would substantially impair or conflict with the Comprehensive Plan …, [and that] DRN took full advantage of that opportunity, thoroughly and ably presenting its arguments and evidence. However, the effort and evidence were insufficient to carry the burden. Accordingly, it is recommended that the Dock 2 Docket should remain as previously approved by the Commission." The hearing officer's recommendation, along with briefs from DRN, DRP and DRBC staff was sent to the Commissioners for their consideration.

A Stay on the Docket

At DRBC's third quarter Business Meeting on September 10, the Commission's General Counsel Kenneth J. Warren, Esq., summarized the hearing process and the Hearing Officer's Final Report, explaining that the Commissioners' task was to review that Report and the complete hearing record and make a final determination. Given the size of the record, the technical nature of much of the evidence, and the submission of final briefs as recently as the week prior to the business meeting, a thorough review of the record by all of the Commissioners could not be completed prior to this meeting, and it was agreed additional time for review and deliberation was required.

Accordingly, by a 3-1-1 motion, with New York, New Jersey and Delaware voting yes, the United States voting no and Pennsylvania abstaining, the Commission stayed DRBC's approval for the Dock 2 project pending the Commissioners' final determination resolving the administrative appeal.

The Commissioners' Vote is Upheld at Dec. 9 Business Meeting

At the Commission's 4Q Business Meeting on December 9, the Commissioners affirmed by a vote of four to zero with one abstention (by the State of New York) their original June 2019 determination that dredging and construction of the Dock 2 project would not substantially impair or conflict with the Commission's Comprehensive Plan. The approved Resolution for the Minutes adopted the findings and recommendation of the Hearing Officer, which affirmed the June 12, 2019, docket approval.

Two bulk liquid carriers moored at Dock 2 in this concept drawing that was part of Delaware River Partners LLC's waterfront development permit application. Source: Moffat & Nichol

ADVISORY COMMITTEES

DRBC's advisory committees provide a forum for the exchange of information and viewpoints on a variety of issues, enhancing communication and coordination. The Commissioners recognize the importance of engaging qualified representatives from state/federal government agencies, industry, municipalities, academia, public health and environmental/watershed organizations to inform their policy decisions. Advisory committee and subcommittee meetings are open to the public. Please note that the Flood Advisory Committee still is one of DRBC's advisory committees, but it is currently inactive, so its members are not included in this section.

Advisory Committee on Climate Change

Delaware Department of Natural Resources and Environmental Control
Robert Scarborough, Ph.D.

New Jersey Department of Environmental Protection
Nicholas A. Procopio, Ph.D., GISP

New York Department of Environmental Conservation
Mark Lowery

Pennsylvania Department of Environmental Protection
Scott R. Perry

National Park Service Interior Region 1, North Atlantic - Appalachian
Amanda L. Babson, Ph.D.

NOAA Northeast Regional Climate Center
Arthur DeGaetano, Ph.D.

New York City Department of Environmental Protection
Alan Cohn

Philadelphia Water Department
Julia Rockwell

Partnership for the Delaware Estuary
Danielle Kreeger, Ph.D.

Exelon Corporation
William Brady III, P.E.

Audubon Mid-Atlantic
Elizabeth Koniers Brown

University of Delaware
John Callahan

American Water, Inc.
James J. Chelius, P.E.

Rutgers University
Marjorie B. Kaplan, Dr.P.H. (Vice Chair)

Columbia University
Upmanu Lall, Ph.D.

Delaware Valley Regional Planning Commission
Christopher Linn, AICP

The Water Center at Penn
Howard Neukrug, P.E. (Chair)

Academy of Natural Sciences of Drexel University
David Velinsky, Ph.D.

Monitoring Advisory and Coordination Committee

Delaware
David Wolanski (Committee Chair)
Delaware Department of Natural Resources and Environmental Control

Delaware River Basin Fish and Wildlife Cooperative
Sheila Eyler

Education
Marc Peipoch

Environmental Organization
Eileen Murphy
Elizabeth Brown
Emily Baumbach

New Jersey
Chris Kunz
New Jersey Dept. of Environmental Protection
Bureau of Freshwater & Biological Monitoring

New York
Division of Water
New York State Department of Environmental Conservation

Pennsylvania
Michael (Josh) Lookenbill
Pennsylvania Dept. of Environmental Protection

Regulated Community
Matthew Fritch
Philadelphia Water Department

Environmental Protection Agency Region III
Kristin Regan

U.S. Geological Survey
Heather Heckathorn

Watershed Organization
Preston Luitweiler

Regulated Flow Advisory Committee

Delaware Department of Natural Resources and Environmental Control
William Cocke, P.G.

Delaware Geological Survey
Stefanie Baxter, P.G.

New Jersey Department of Environmental Protection
Joseph A. Miri, Ph.D.
Steve Domber (vice-chair)

New York City Department of Environmental Protection
Jen Garigliano

New York State Department of Environmental Conservation
Brenan Tarrier (Chair)

Office of the Delaware River Master
Kendra Russell

Pennsylvania Department of Environmental Protection
Hoss Liaghat, PE

Philadelphia Water Department
Kelly Anderson

U.S. Army Corps of Engineers
Laura Bittner

Subcommittee on Ecological Flows

New Jersey
Ross Shramko

Pennsylvania
Daryl Pierce

New York
Chris VanMaaren

Delaware
Ian Park

United States Government
Peter Sharpe, Ph.D., PWS

Philadelphia
Molly Hesson, Ph.D.

New York City
Lori Emery

Non-Reserved Members
Sheila Eyler, Ph.D.
Erik Silldorff, Ph.D.
Jeff Skelding
Jim Serio
Peter Kolesar, Ph.D.
Garth Pettinger
Bab Bachman, Ph.D.

Toxics Advisory Committee

Academic
David Velinsky, Ph.D., Academy of Natural Sciences of Drexel University

Delaware
John Cargill, Division of Waste and Hazardous Substances/Site Investigation and Restoration Section

Environmental/Watershed
Tracy Carluccio, Delaware Riverkeeper Network

Diana Oviedo-Vargas, Ph.D., Stroud Water Research Center

Environmental Protection Agency Region II
Brent Gaylord

Environmental Protection Agency Region III
Kuo-Liang Lai, P.E.

Federal Fish & Wildlife
Clay Stern, U.S. Fish and Wildlife Service

Industry
J. Bart Ruiter, The Chemours Company, FC, LCC

Municipal
Jason Cruz, Philadelphia Water Department

New Jersey
Biswarup (Roop) Guha, New Jersey Department of Environmental Protection

New York
Jason R. Fagel, New York State Department of Environmental Conservation

Pennsylvania
Maria Schumack, Pennsylvania Department of Environmental Protection

Public Health
Eric Bind, M.P.P., New Jersey Department of Public Health

Water Management Advisory Committee

Delaware
Steven Smailer, P.G., Department of Natural Resources and Environmental Control

New Jersey
James MacDonald, Department of Environmental Protection

New York
Erik Schmitt, P.E., New Jersey Department of Environmental Protection

Pennsylvania
Hoss Liaghat, P.E., Pennsylvania Department of Environmental Protection

U.S. Army Corps of Engineers
Laura Bittner

U.S. Environmental Protection Agency
Katie Lynch

U.S. Geological Survey
Daniel J. Goode, Ph.D.

City of New York
Dana Olivio, New York City Department of Environmental Protection

City of Philadelphia
Kelly Anderson, Philadelphia Water Department

County Water Agency
Janet L. Bowers, Chester County Water Resource Authority

Water Resources Association
Preston Luitweiler, Water Resources Association of the Delaware River Basin

Water Utility
Kathleen Thaeder (Chair), Artesian Water Company, Inc.

Agriculture
Sandra Howland, New Jersey Department of Agriculture

League of Women Voters or other Civic Organization

Jill Green, League of Woman Voters of Pa.

Environmental Organization

Mary Ellen Noble, Delaware Riverkeeper Network

Watershed Organization

Laurie Ramie Upper Delaware Council

Academia

Daniel J. Van Abs, Ph.D., FAICP/PP Rutgers University

Recreation

Rob Shane, Trout Unlimited

Fisheries

Sheila Eyler, Ph.D., U.S. Fish & Wildlife Service

Academia/Science

Sheila Eyler, Ph.D., U.S> Fish & Wildlife Service

Water Quality Advisory Committee

Academia/Science

John K. Jackson, Ph.D., Stroud Water Research Center

Delaware

David Wolanski (Committee Chair), Delaware Dept. of Natural Resources and Environmental Control

Environmental Professional

Maya K. van Rossum, Delaware Riverkeeper Network

Local Watershed Organization

Gail Farmer, Wissahickon Trails

National Park Service Wild and Scenic Rivers Program

Richard Evans

New Jersey

Frank Klapinski, New Jersey Department of Environmental Protection

New York

Sarah Rickard, New York State Department of Environmental Conservation

Pennsylvania

Thomas Barron, Pennsylvania Department of Environmental Protection

Regulated Community, Industrial

J. Bart Ruiter, The Chemours Company

Regulated Community, Municipal

Bryan P. Lennon, City of Wilmington

U.S. Environmental Protection Agency

Kuo-Liang Lai, P.E. (Region III)

Brent Gaylord (Region II)

DRBC's Advisory Committee on Climate Change Holds Inaugural Meeting

In May, DRBC announced the membership to its Advisory Committee on Climate Change (ACCC), which was established by a Commission resolution in December 2019. Members are listed on page 41. The new committee will advise the Commission on climate science and water resource climate impacts, enhancing planning and policy development efforts.

The ACCC is authorized for 10 years and can be renewed or extended prior to its expiration in 2029.

Graphic used in DRBC presentation "Climate Change, Sea Level Rise and Drought Management in the DRB," given at the ACCC meeting, August 2020.

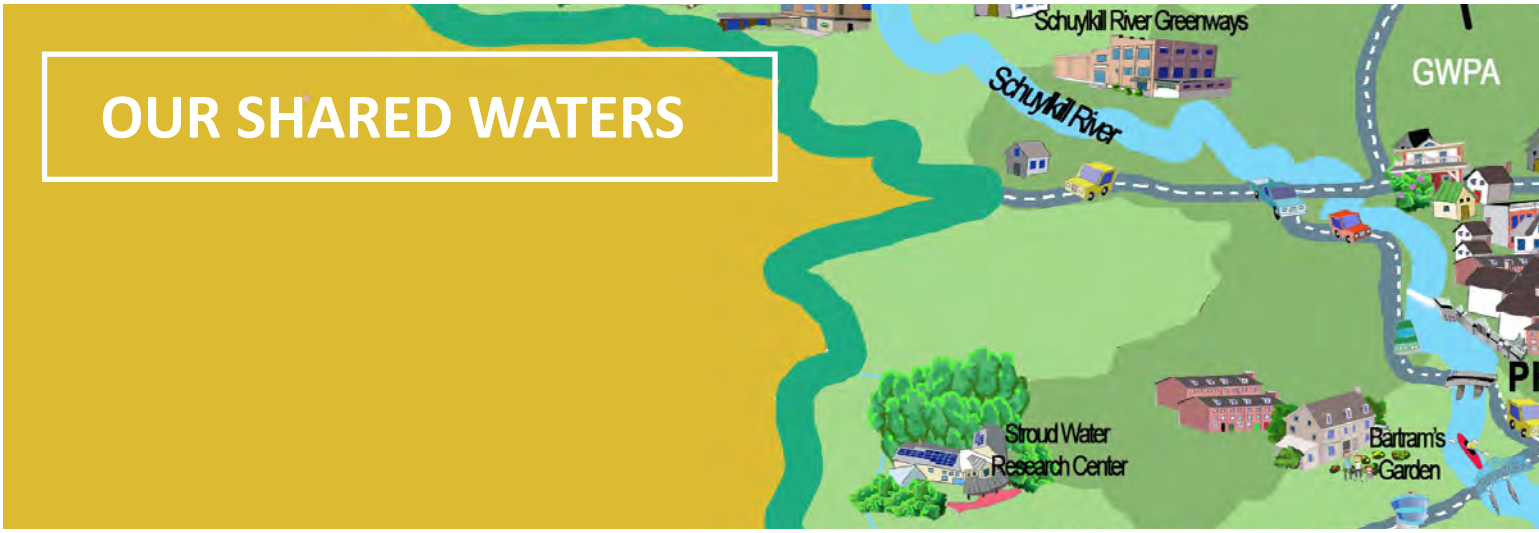
"The DRBC has recognized potentially significant impacts to the water resources of the Delaware River Basin posed by climate change," said Alternate Commissioner for New York Governor Andrew Cuomo Kenneth Kosinski. "We formed the ACCC to provide the Commission and the Basin community with scientifically based information for identifying and prioritizing these threats, which include salinity impacts from sea level rise and changes in the seasonality and volume of streamflows, as well as recommendations for mitigation, adaptation and improved resiliency."

The ACCC is comprised of up to 18 individuals with relevant climate expertise, representing various government, watershed, academic, business and water user perspectives.

The inaugural meeting was held on August 4, the day Tropical Storm Isaias hit the Delaware River Basin. The meeting was held virtually and went on as planned, electing a chair (The Water Center at Penn Director Howard Neukrug, P.E.) and introducing the committee members to DRBC's Water Resource Programs and the work DRBC has accomplished to date regarding studying how climate change will impact the Delaware River Basin.

The committee met again in December, also virtually. At this meeting, a Vice Chair was elected, Rutgers Climate Institute Associate Director Marjorie Kaplan, Dr.P.H. Presentations given at this meeting focused on sea level rise and its impacts in the Delaware River Basin.

The ACCC plans to host a Climate Forum in 2021.



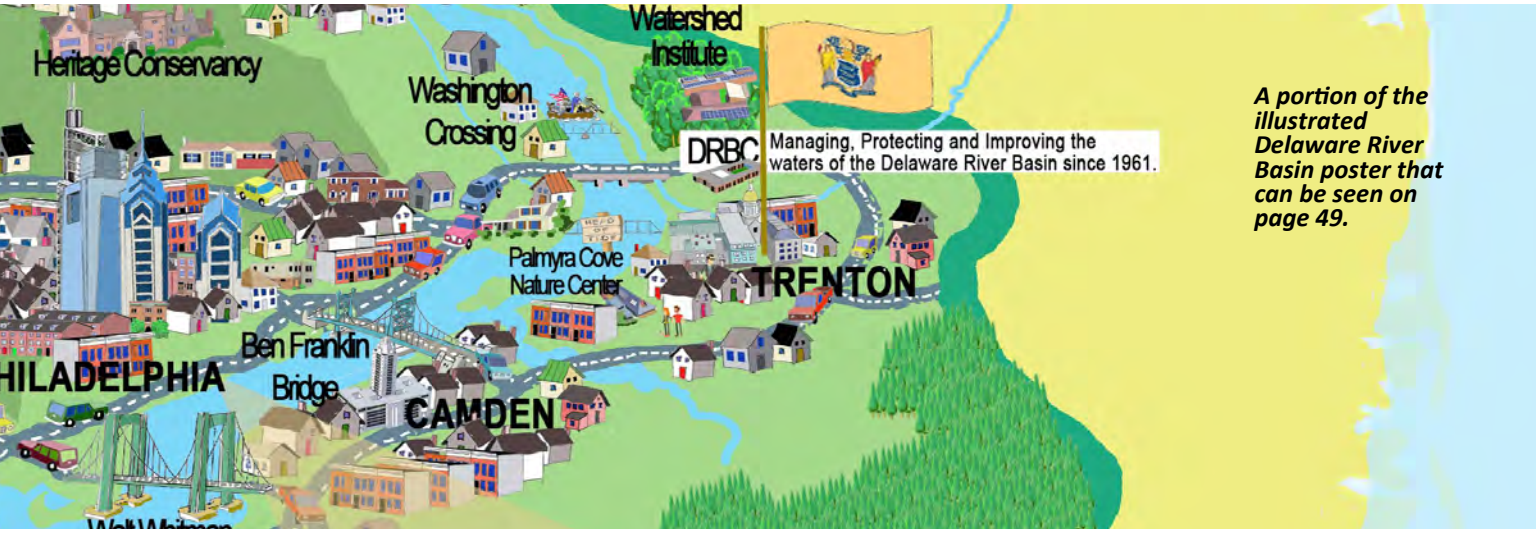
Started in 2019, Outreach Continued in 2020

Our Shared Waters is a William Penn Foundation-funded, DRBC-managed, collective effort of Delaware River Basin stakeholders (water users, businesses, non-profits and government) to educate the public and decisionmakers about the current state of the Basin and the opportunities available to support its continued sustainability now and for future generations. Prior to the pandemic, the program included substantial community outreach and interaction with more than thirty watershed-related organizations.

However, in 2020, the pandemic curtailed the program's person-to-person outreach as in-person community events and outdoor activities were canceled. As a result, the program's digital efforts took center stage. The Our Shared Waters Facebook page participation grew to 3,556 followers. Videos were developed on Basin-related activities ranging from macroinvertebrates and horseshoe crabs to the 'secret' mud used by Major League Baseball to reduce shine and improve a pitcher's feel of the ball.

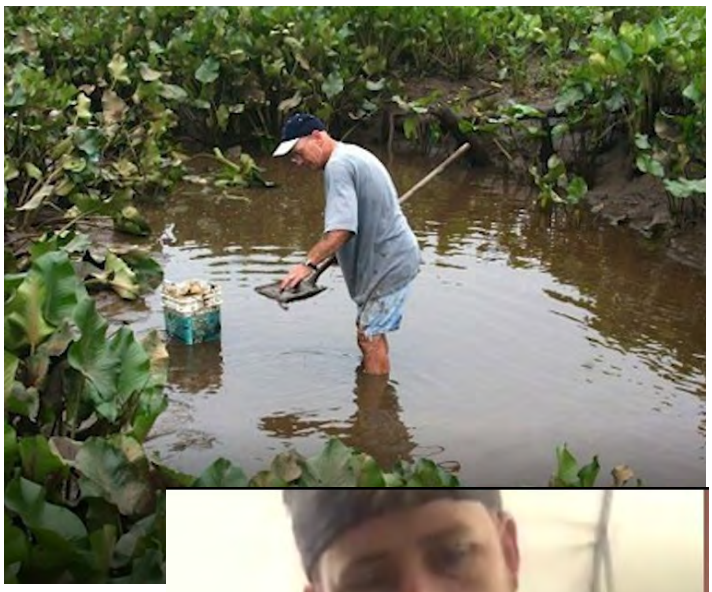
Reaching People with Video

DRBC, through the Our Shared Waters program, created short videos of activities that were normally done when attending community festivals. Left: A video still showing the children of DRBC Water Resource Planning Manager Chad Pindar demonstrating how to make fresh-water mussel hats. Right: A video still of DRBC Deputy Executive Director Kristen Bowman Kavanagh's son as he shows off a horseshoe crab hat he showed how to make.



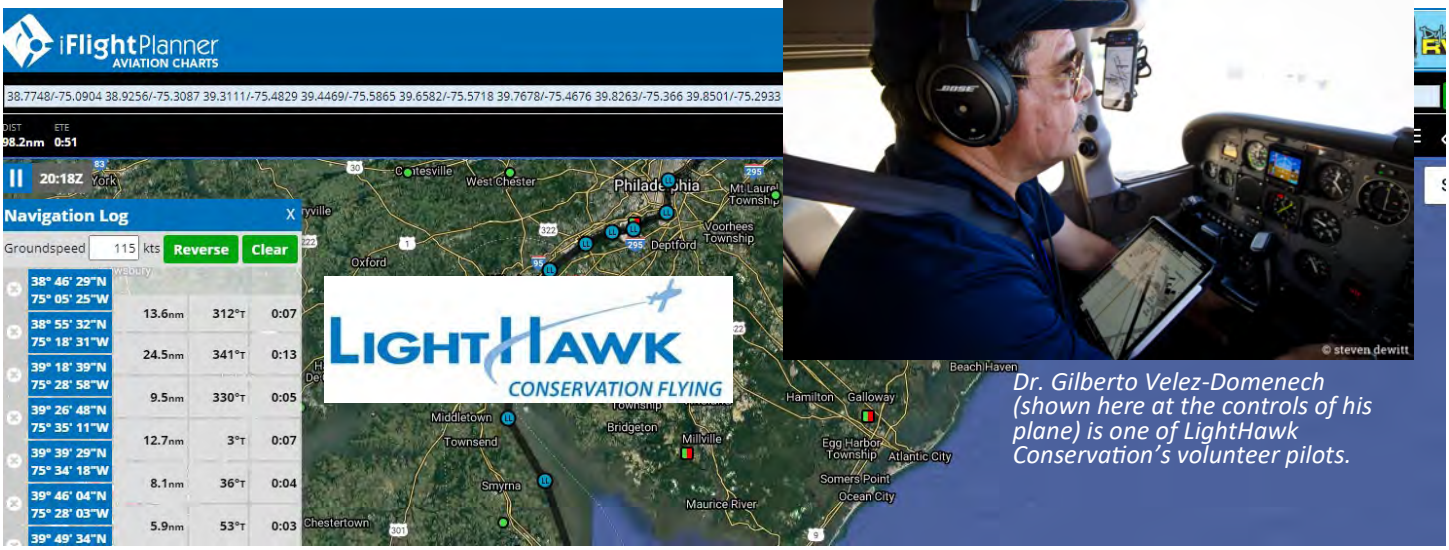
A portion of the illustrated Delaware River Basin poster that can be seen on page 49.

Above: A still shot from a video explaining what macroinvertebrates are and how they can provide an indication of water quality. In the video, DRBC Aquatic Biologist Jacob Bransky showed how he captures and then identifies these important "bugs." At the end of the video, viewers were given a quiz that if passed, earns them the badge below.



Below right: In an Our Shared Waters video, Philadelphia Phillies Baseball Pitcher Cole Irvin demonstrates how to properly "mud" a baseball using Lena Blackburne Baseball Rubbing Mud. The special mud, used throughout Major League Baseball, has been coming from a 'secret' location (above right) in a creek off of the Delaware River since the early 1900s.

The Basin From the Air



Dr. Gilberto Velez-Domenech (shown here at the controls of his plane) is one of LightHawk Conservation's volunteer pilots.

DRBC partnered with LightHawk Conservation Flying in 2020 to begin a project of aerial videoing the 330-mile length of the Delaware River, from Hancock, N.Y. to where the Delaware Bay empties into the Atlantic Ocean.

LightHawk is a national nonprofit network of more than 300 private pilots who volunteer their time, fuel and their aircraft for the purpose of supporting conservation advocacy and education.

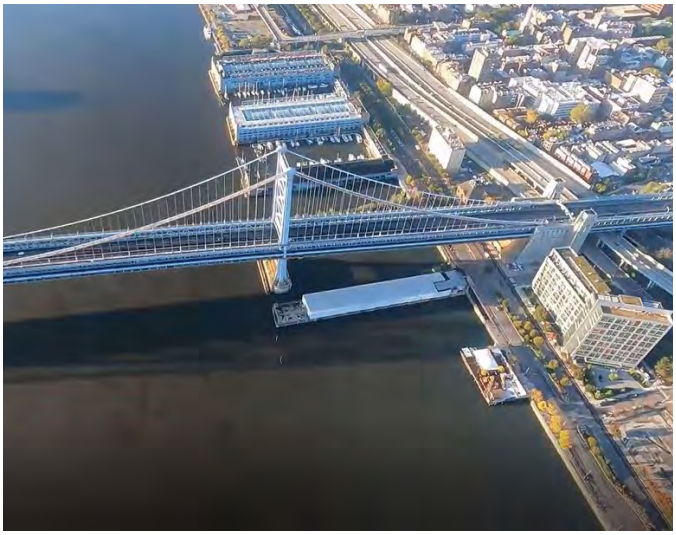
Port Jervis, N.Y. (in foreground), where N.J., N.Y. & Pa. boundaries meet.

Delaware Water Gap, looking upstream

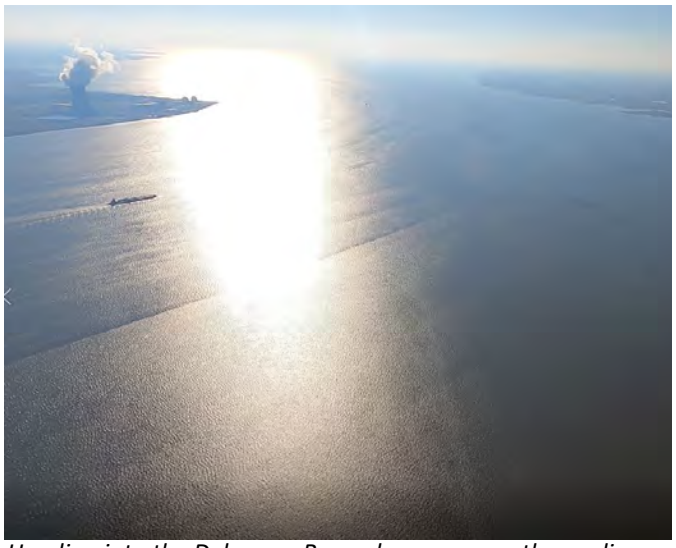
Delaware Water Gap, looking downstream

The confluence of the Lehigh and Delaware Rivers at Easton, Pa. (on the right) and Phillipsburg, N.J. (on the left.)

Lambertville, N.J. (left) and New Hope, Pa.

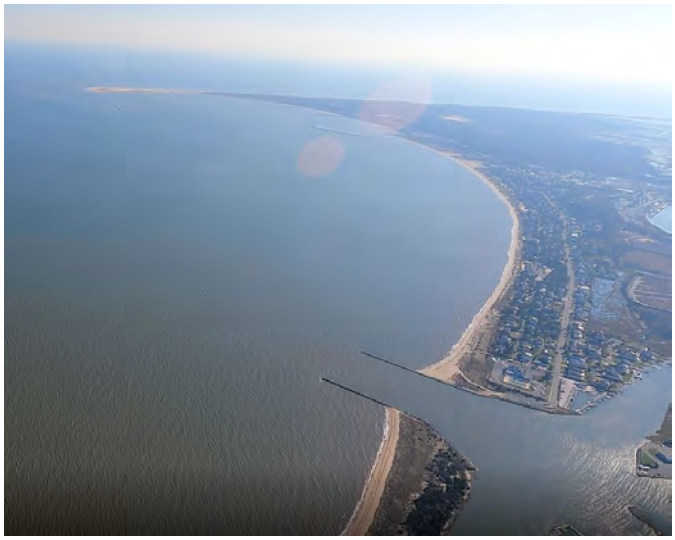


Ben Franklin Bridge going into Philadelphia, Pa.



Heading into the Delaware Bay, a barge passes the cooling towers of the Salem Nuclear Power Plant in Lower Alloways Creek, N.J.

Cape May Point, N.J.



Lewes and Cape Henlopen, Del.

An Illustrated & Informative Look at the Basin

Because of the pandemic, all planned experiential outreach, particularly on the water and community events, was canceled.

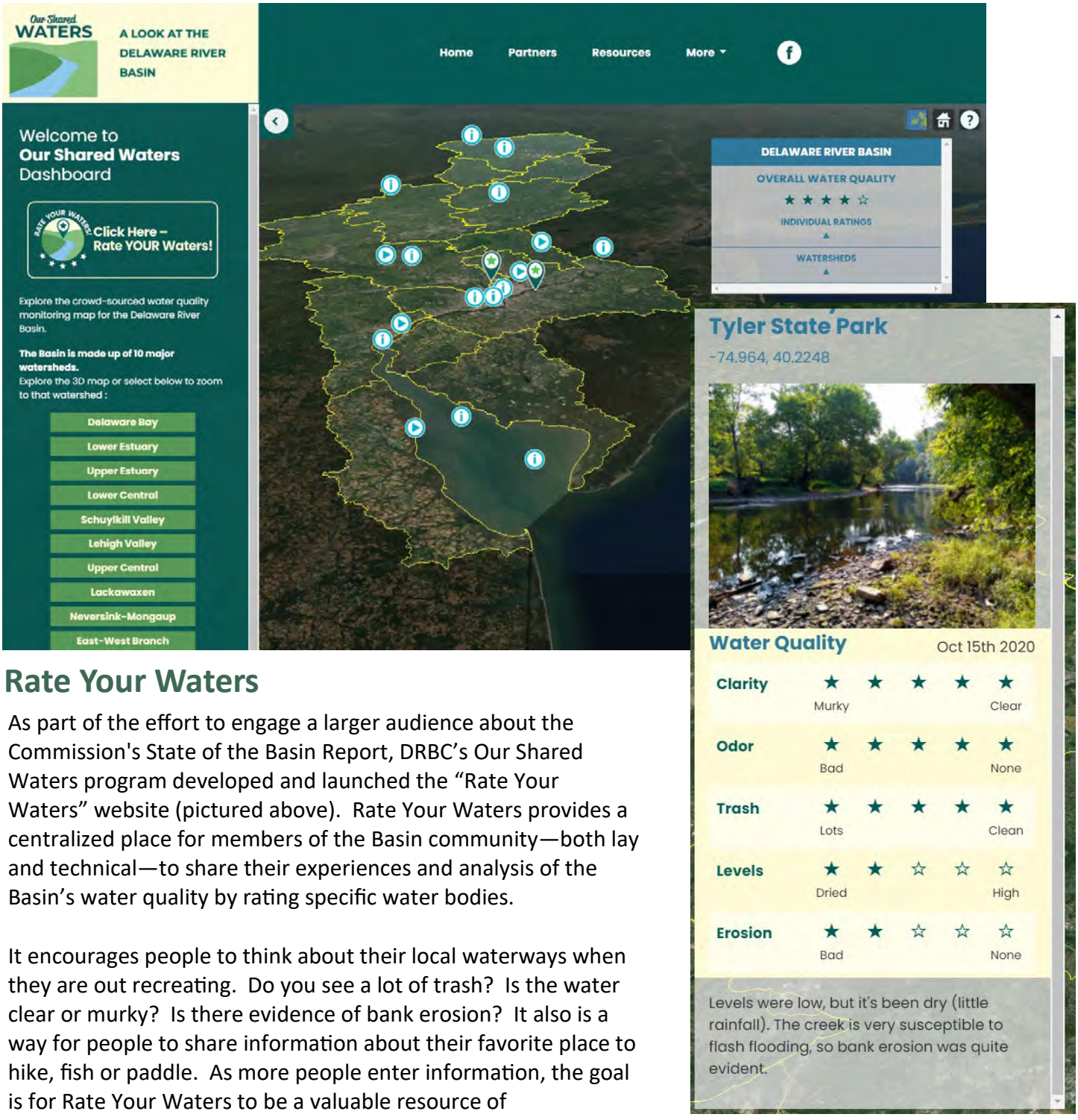
In cooperation with many of its Our Shared Water Partners, DRBC designed and produced a fun and informative look at the Basin in the form of a printed poster.

The illustration features details ranging from an explanation of managing the 'salt front' (more details about this on page 36 of this report) to descriptions of Basin aquatic life, for example the Atlantic Sturgeon and American Shad.

After printing, the posters were sent to more than sixty different Basin organizations for use in their education and outreach efforts.

A digital version of the poster is available for download at https://www.state.nj.us/drbc/library/images/maps/DRB_illustrated_OSW.jpg.

Sharing the State of Our Basin Online



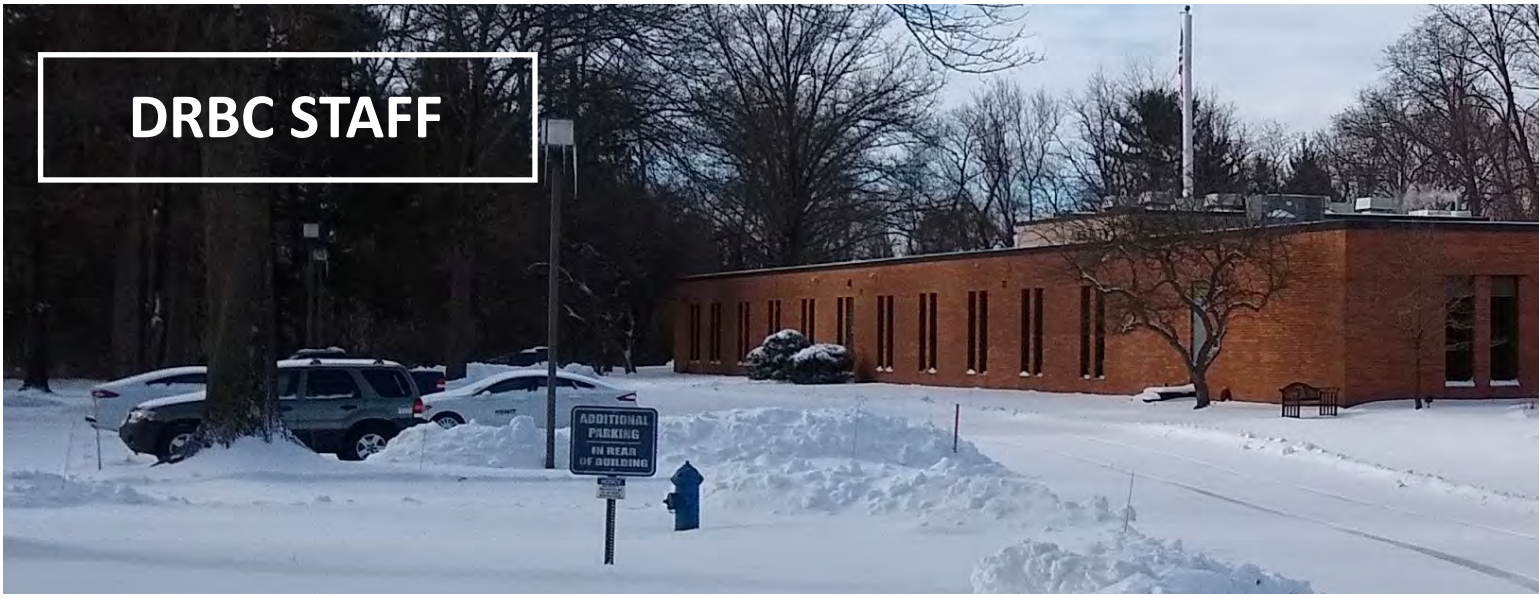
Rate Your Waters

As part of the effort to engage a larger audience about the Commission's State of the Basin Report, DRBC's Our Shared Waters program developed and launched the "Rate Your Waters" website (pictured above). Rate Your Waters provides a centralized place for members of the Basin community—both lay and technical—to share their experiences and analysis of the Basin's water quality by rating specific water bodies.

It encourages people to think about their local waterways when they are out recreating. Do you see a lot of trash? Is the water clear or murky? Is there evidence of bank erosion? It also is a way for people to share information about their favorite place to hike, fish or paddle. As more people enter information, the goal is for Rate Your Waters to be a valuable resource of information, by the people, for the people.

The site has been designed to accommodate evaluations from either individual public citizens or from more technical/science-savvy organizations. Photos, reports or links to other sites may all be attached. All of this may be seen on the site when someone visiting the page mouses over an icon that indicates an evaluation has taken place at that spot.

DRBC STAFF



Staff celebrated the 50th anniversary of Earth Day by organizing a virtual collage message that was shared on DRBC's social media platforms.

Like any organization, the DRBC is only as good as its employees. In this category, the Commission benefits from a staff that is experienced, talented and diligent. Because of its small size (about one employee for every 350 square miles of the area for which DRBC is responsible), most staff members wear multiple 'hats' and often help in areas not part of their normal job descriptions.

For a staff where collaborative teamwork is the norm, 2020 was a challenging year. All but one employee operated from their home offices for most of the year. Staff still found ways to stay connected and continued to work effectively towards the mission of managing, protecting and improving the water resources of the Basin.

Sharing Trusted Technical Expertise

Commission staff are routinely invited to speak on a wide range of matters. Even in a pandemic, staff presented to a variety of groups, albeit virtually. In 2020, these included:

John Yagecic and Amy Shallcross participate in a panel discussion at the 8th Annual Delaware River Watershed Forum (virtual) put on by the Coalition for the Delaware River Watershed.

Thomas Amidon, Manager, Water Resource Modeling

Studies to determine the attainability of aquatic life uses and associated enhanced dissolved oxygen conditions in the urbanized portion of the Delaware River Estuary at the Delaware Watershed Research Conference, Academy of Natural Sciences of Drexel University

Kristen Bowman Kavanaugh, P.E., Deputy Executive Director

The Delaware River Basin Commission at 4 States, 1 Watershed: How Water Impacts Our Economy, Health and Local Environment, hosted by Green Philly

The Delaware River Basin Commission at New York to Philadelphia: Expert Perspectives on Climate Change Impacts in Water Systems in the Delaware River Basin, hosted by The Water Center at Penn, University of Pennsylvania

An Introduction to DRBC at the New Jersey League of Conservation Voters' Meet and Greet

The Delaware River Basin Commission at a Delaware Valley Regional Planning Commission's Public Participation Task Force Meeting

Peter Eschbach, Director, External Affairs and Communications

An Orientation to DRBC and Water Management to Wallenpaupack Area High School, Pa.

Chad Pindar, P.E., Manager, Water Resource Planning

An Introduction to an Interstate Compact at the Smart One Water Workshop and Conference, Virginia Tech

DRBC—Data and Drivers at the Smart One Water Workshop and Conference, Virginia Tech

Ron MacGillivray, Ph.D., Senior Environmental Toxicologist

Temporal trends of PFAS in Delaware River Fish, USA. Published in Integrated Environmental Assessment and Management

Occurrence and aquatic toxicity of contaminants of emerging concern (CECs) in tributaries of an urbanized section of the Delaware River Watershed. Published in AIMS Environ Sci 7:302–319

EPA Aquatic Life Criteria for Toxics Outreach Workshop Presentation - PFAS in Surface Water, Sediment and Fish from the Delaware River at the Water Quality Standards of the Delaware River Basin webinar hosted by The River Network

Anthony Preucil, Water Resource Scientist

Career Vs. Grad School to a Professional Development class at The College of New Jersey

Amy Shallcross, P.E., Manager, Water Resource Operations

A Fishable, Swimmable (and Drinkable) Delaware River Estuary at the 8th Annual Delaware River Watershed Forum

An Orientation to DRBC and Water Management to Wallenpaupack Area High School, Pa.

Namsoo Suk, Ph.D., Director, Science and Water Quality Management

Delaware River Basin Water Quality and Management Implications, part of the Pre-Workshop Webcast "Holistic Approach to Improved Nutrient Management" hosted by the Water Research Foundation

Steve Tambini, P.E., Executive Director

A Fishable, Swimmable (and Drinkable) Delaware River Estuary at the 8th Annual Delaware River Watershed Forum

Delaware River Designated Use: Science, Policy, Process at the Water Resources Association of the Delaware River Basin's General Membership and Board Meeting

John Yagecic, P.E., Manager, Water Quality Assessment

A Fishable, Swimmable (and Drinkable) Delaware River Estuary at the 8th Annual Delaware River Watershed Forum

An Orientation to DRBC and Water Management to Wallenpaupack Area High School, Pa.

COMMUNITY SERVICE

DRBC volunteers gather with the collection of trash picked up in the Tacony Creek Park.

Creek Cleanup

Despite the pandemic, DRBC staff volunteers partnered with the Tacony-Tookany Frankford Creek Partnership to spend a day cleaning up a section of Tacony Creek Park. The park features 300 acres of streamside and woodland habitat in lower Northeast Philadelphia.

Mercer Street Friends

DRBC staff volunteered to work at the Mercer Street Friends (MSF) Food Bank in Hamilton, N.J., packing more than 350 food bags to be given out to families in need. This was DRBC's 6th year volunteering at MSF and staff were pleased to help, knowing the need was greater than ever during the pandemic.

On the Front Cover

Aquatic Biologist Jake Bransky preserves nutrient samples collected from the Schuylkill River at Falls Bridge, Philadelphia, Pa.

DRBC Staff take part in a virtual staff meeting, which during the pandemic became a standard operating procedure for conducting business.

Senior Environmental Toxicologist Ron MacGillivray deploys passive samplers to estimate concentrations of PCBs in the water column at the Lewes, Del. Ferry terminal.

DRBC staff pose with the results of their stream clean up at Tacony Creek Park, Philadelphia. DRBC partnered with Taokany/ Tacony-Frankford Watershed Partnership to remove more than 22 bags of trash.

Delaware River Basin Commission

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