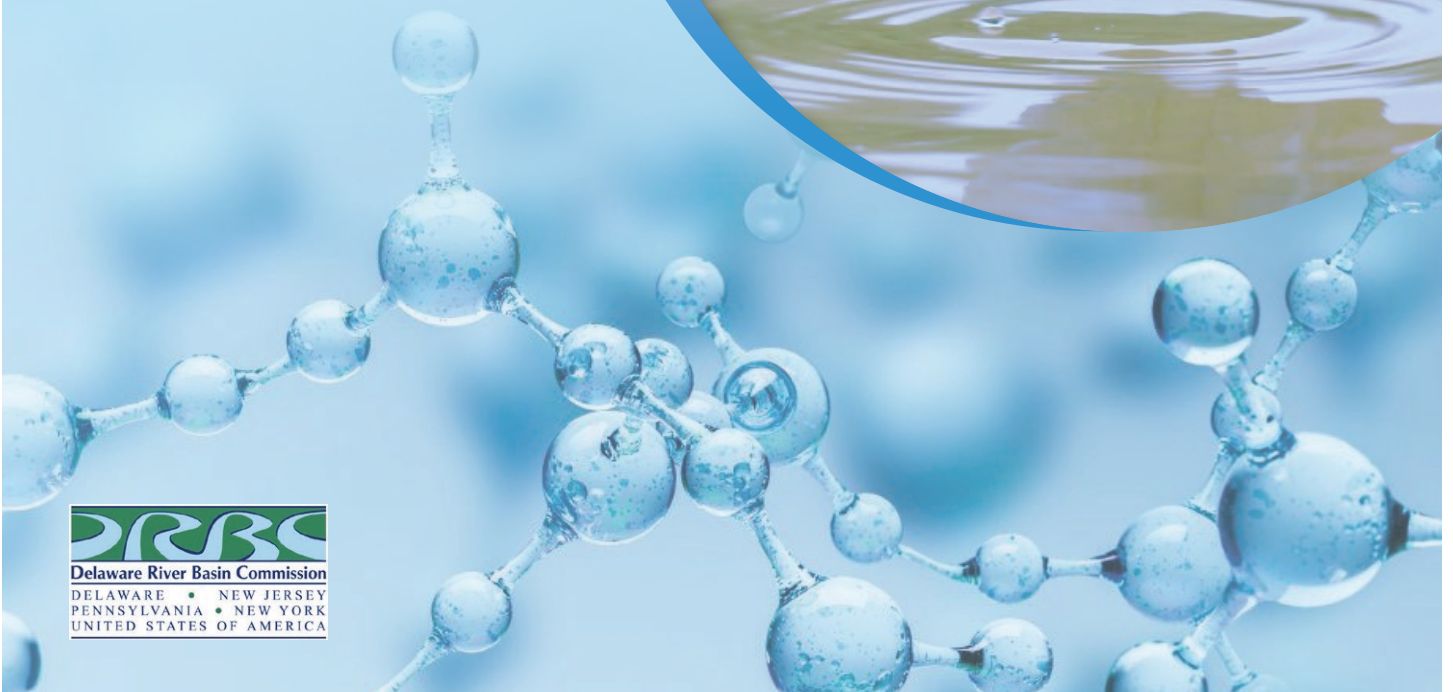


DELAWARE RIVER BASIN COMMISSION
2022 ANNUAL REPORT

Sound
Science
for Shared
Management





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 60 years and counting. 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.

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

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Executive Director's Message

For over 60 years, the driving principle of *sound science for shared management* has anchored our work at the Delaware River Basin Commission. The Delaware River Basin Compact calls on the Commission to “develop and effectuate plans, policies and projects related to the water resources of the Basin.” Sound science is the key to fulfilling this mandate to translate plans and policies for water management into real-world, measurable outcomes that protect and improve our shared water resources for the benefit of over 14 million people in four states.

When the Compact was adopted in 1961, it recognized the need for science-based management, as the water cycle does not follow political boundaries. As such, the Compact created the Commission with regulatory authority over a watershed rather than a political district.

The value of investing in sound science, and translating that science into policy, shows in remarkable water quality improvements made in urban reaches of our Delaware River Estuary—the tidally influenced part of our Basin. Before the DRBC took on the responsibility of managing the Basin’s shared water resources, the estuary near Philadelphia and Camden was so choked by severe pollution it was effectively dead: devoid of enough dissolved oxygen to support aquatic life. Without the benefit of today’s computer technology, DRBC scientists in the 1960s used sound science to model the complex tidal estuary. That science was translated into a regulatory plan for the DRBC’s water quality standards that would support the year-round maintenance of aquatic life. These standards, along with additional regulatory and funding support from the Clean Water Act, turned scientific study into improved conditions. Pollution was reduced, dissolved oxygen improved, and the Delaware River Estuary’s fish, along with its commercial and recreational fisheries, began to thrive once again.

Sound Science for Shared Management was a natural choice for this year’s Annual Report theme. Advances in science shine a light on opportunities to advance our mission. Five years ago, the DRBC recognized current dissolved standards were not fully supporting the “fishable waters” goals of the Clean Water Act. In 2022, the DRBC completed critical multi-year studies applying sound science to inform the Commission of the dissolved oxygen needed to support the propagation of fish species—including the endangered Atlantic Sturgeon, a dissolved oxygen-sensitive species. Through this focused and intensive effort, the DRBC has advanced scientific understanding



Steve Tambini, P.E.
Executive Director



to determine dissolved oxygen needs of sensitive fish species and identified pollution sources that continue to decrease oxygen in the river; determined the monitoring data needed to develop a complex estuary model; and applied a state-of-the-art computer model to evaluate if and how future pollution reductions could support fish propagation. Our 2022 science provides a sound basis to develop new water quality standards for the Delaware River Estuary, an effort that is now underway with our federal and state partners.

The nature of science is to change, steadily advancing our understanding of the possible. Because of this, water management looks different in 2022 than when the Commission was formed in 1961. I am proud to highlight our agency's advancements and achievements in this year's annual report. Amid changing conditions and information, the DRBC remains constant in its mission to manage, protect and improve the Basin's shared water resources by applying sound science to its plans, policies, and projects.

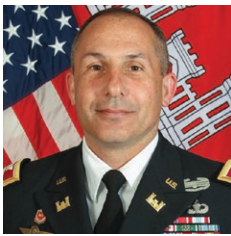
Steve Tambini, P.E.
Executive Director



DRBC Commissioners and staff meet in Wilmington, Del. Pictured L-R: Ken Kosinski (N.Y.), Jeff Hoffman (N.J.), Steve Tambini (DRBC), Delaware Governor John Carney, LTC Ramon Brigantti (U.S.), Lisa Daniels (Pa.) , Shawn Garvin (Del.).

Delaware River Basin Commission

Commissioners



Chair
Federal Representative
 Col. John P. Lloyd



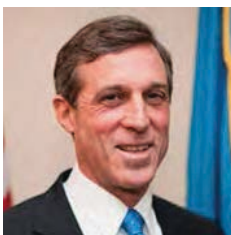
Vice Chair
Pennsylvania Governor
 Tom Wolf



New York Governor
 Kathy Hochul



New Jersey Governor
 Philip D. Murphy



Delaware Governor
 John Carney

The *ex officio* members of the Delaware River Basin Commission are the four Basin state governors and the Division Engineer of the U.S. Army Corps of Engineers, North Atlantic Division, who serves as the federal representative. The five members appoint alternate commissioners, with the governors typically selecting high-ranking officials from their state environmental agencies.

Each commissioner has one vote of equal power, with a majority vote needed to decide most issues. Exceptions are votes on the Commission’s annual budget and drought declarations, which require unanimity.

There was one notable Commission change in 2022. Federal Representative Brigadier General Thomas J. Tickner was succeeded by Colonel John P. Lloyd, North Atlantic Division Commander and Division Engineer of the U.S. Army Corps of Engineers. Alternate Commissioner, Lieutenant Colonel Ramon Brigantti, remained in his current role, serving as the Chair of the Commission for FY 2022.



Commission Alternates and Advisors for 2022

Pennsylvania (Commission Chair)

1st Alternate: Patrick McDonnell

PADEP Secretary

2nd Alternate: Lisa Daniels

Acting Deputy Secretary the Office
of Water Programs

3rd Alternate: Joseph Adams

Deputy Secretary for Field Operations

New Jersey (Commission Vice Chair)

1st Alternate: Shawn LaTourette

NJDEP Commissioner

2nd Alternate: Pat Gardner

Director of Water Supply and Geoscience

3rd Alternate: Jeffrey L. Hoffman

State Geologist

New York (Commission Second Vice Chair)

1st Alternate: Basil Seggos

NYSDEC Commissioner

2nd Alternate: Carol Lamb-Lafay, P.E.

Asst. Director, DEC Division of Water

3rd Alternate: Kenneth Kosinski

Chief DEC Watershed Implementation Section

Delaware

1st Alternate: Shawn M. Garvin

DNREC Secretary

2nd Alternate: Lisa Borin Ogden

Deputy Secretary

3rd Alternate: Steve Smailer

Director DNREC Division of Water Management Section

Federal Government

1st Alternate: Lieutenant Colonel Ramon Brigantti

Commander USACE Philadelphia District

2nd Alternate: Valerie Cappola

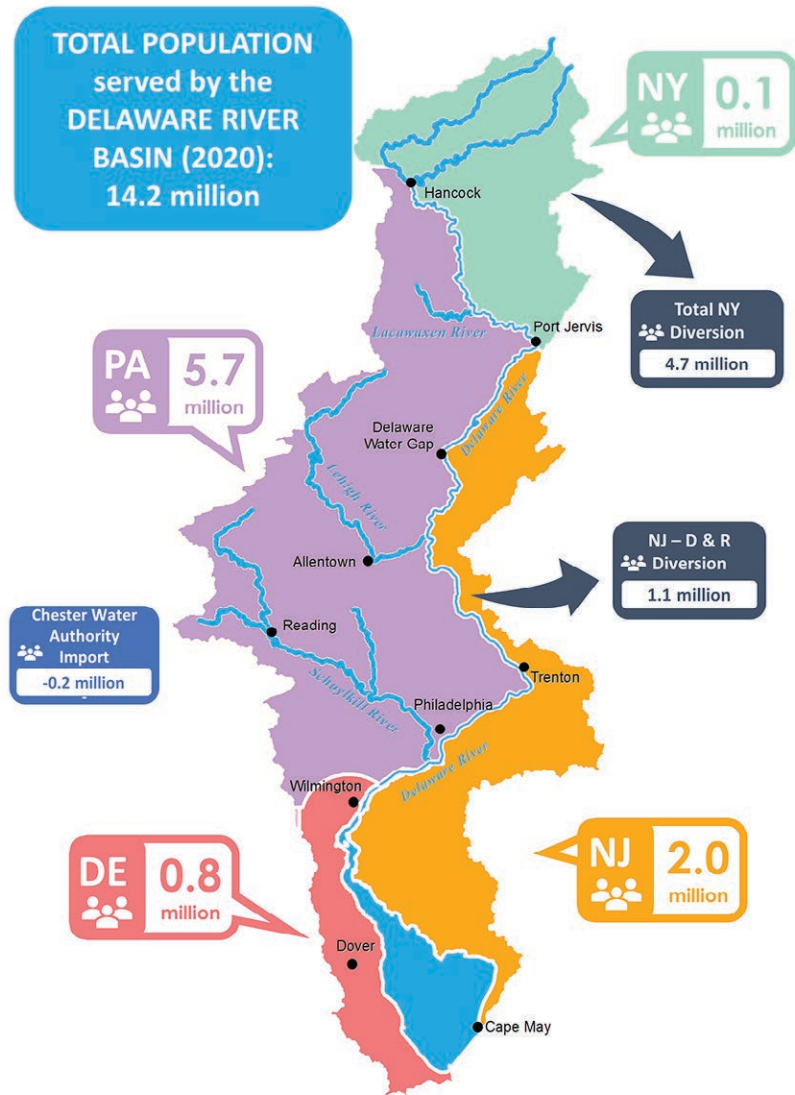
3rd Alternate: Henry Gruber

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 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.

	POPULATION (2020)
State	
Delaware	0.774
New Jersey	1.989
New York	0.117
Pennsylvania	5.749
Total DRB Population	8.629
Import/Export	
NJ – D & R Diversion	1.087
Total NY Diversion	4.664
CWA Import	-0.187
Total Import/Export	5.564
TOTAL ESTIMATED POPULATION SERVED	14.193

Total NY diversion includes NYC diversion and upstate NY communities. All values are in million people.





Introduction

The Delaware River Basin Commission (DRBC) is pleased to present its annual report for 2022. This report highlights the significant accomplishments and ongoing initiatives of the DRBC in managing and protecting the water resources of the Delaware River Basin. The following are some of the major accomplishments and ongoing initiatives of the DRBC in managing and protecting the water resources of the Delaware River Basin, including the following highlights:

- Continued support for the protection of aquatic life: The DRBC continued leading efforts to protect aquatic life in the Delaware River Basin. This included the development of new studies to inform regulatory updates to protect fish and aquatic life.
- Improved water quality monitoring: The DRBC continued to expand its water quality monitoring efforts. This included the deployment of new monitoring equipment and the expansion of the DRBC's monitoring network.
- New Regulations to protect water resources finalized: On December 7, 2022, the DRBC approved new and revised regulations prohibiting discharges to waters or land within the basin of wastewater from high-volume hydraulic fracturing and related activities and concerning importations of water into and exportations of water from the Delaware River Basin.

- Groundwater Planning Completed: The DRBC finalized an assessment of current and projected groundwater availability for the Delaware River Basin, concluding that groundwater resources are, and will continue to be, used at sustainable rates throughout the Basin.
- Collaboration with all Basin stakeholders: The DRBC continued to collaborate with stakeholders to ensure that the needs of all water users were considered in the commission's decision-making processes and to advance its Diversity, Equity, Inclusion, Justice and Belonging efforts.

Strategic Planning

In 2020, the DRBC made a commitment to listening, learning and finding more ways to meet our mission by supporting and embracing diversity, equity, inclusion, justice and belonging (DEIJB). The DRBC has made important strides on its DEIJB journey since that day, including updating its [Vision, Mission and Values](#). A milestone will be the completion of a DEIJB strategic plan, on track for 2023. Throughout this report, updates are provided on the Commission's DEIJB efforts.

Financial Statement

As expressed in the federal statute that formed the DRBC, the Delaware River Basin Compact, P.L. 87-328, 75 Stat. 688 (1961), Art. 13.3(c), the Commission’s five members are responsible, in part, for financially supporting the DRBC’s operations.

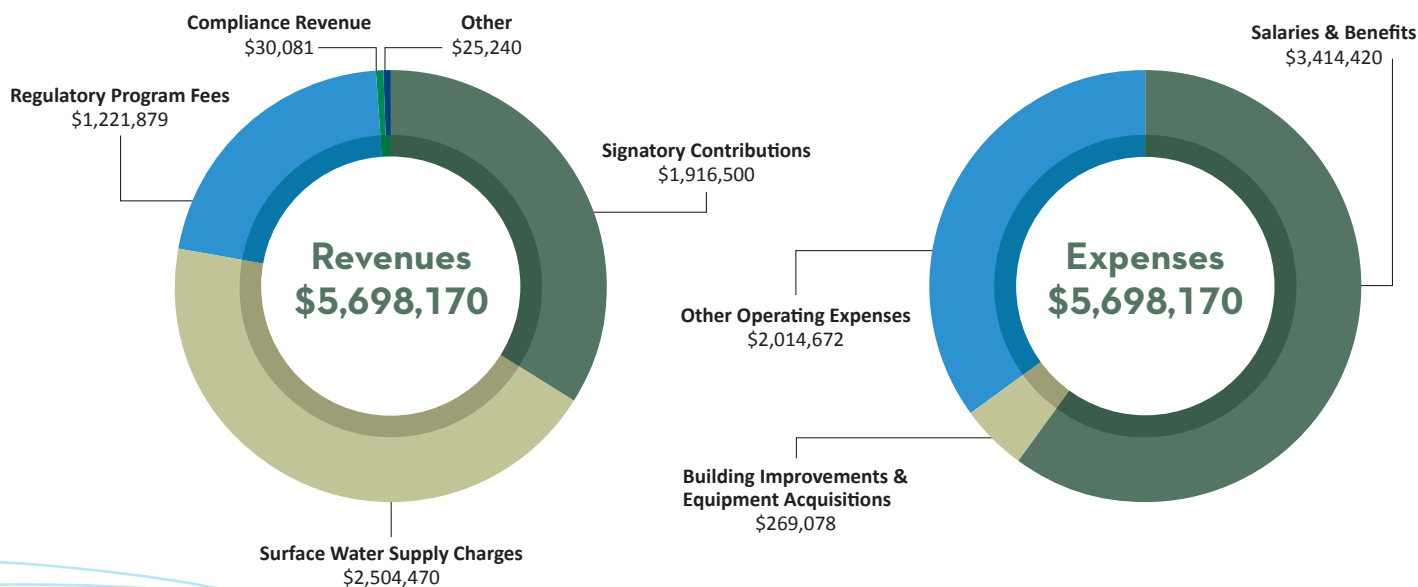
Under an equitable agreement among the Commission’s four member states and the United States in 1988 to apportion signatory party contributions, the annual contributions since 2008 are as follows: Delaware \$447,000 (12.5%), New York \$626,000 (17.5%), New Jersey \$893,000 (25%), Pennsylvania \$893,000 (25%) and the United States \$715,000 (20%).

The DRBC operates and maintains two funds for budgeting purposes: a General Operating Fund and a Water Supply Storage Facilities 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 come from signatory party contributions, regulatory program fees, competitive grants, compliance revenue, transfers from the WSSF and other sources. The balance of the General Fund at the end of FY 2022 was \$5.42 million.

The Water Supply Storage Facilities Fund was created to support reliable water supply in the Basin and is used to repay the obligations the DRBC assumed to purchase storage capacity at two federal reservoirs, Beltzville and Blue Marsh. The Water Supply Storage Facilities Fund 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 General Fund) and any future required storage in the Basin. Revenues are generated from charges for applicable surface water withdrawals in the Basin. The balance of the Water Supply Storage Facilities Fund at the end of FY 2022 was \$24.92 million.

Note that DRBC’s Adopted Budgets use “Fair Share Signatory Party Apportionment” as informed by any adopted member budgets at the time of DRBC Budget Adoption. State and federal members are at different points in their annual budgeting processes as of the DRBC Budget Adoption.





Our Water Resources

- Water Resource Planning
- Water Quality
- Water Management
- Climate Change





Interns Bailey Adams and Colman Closser perform shore-based sampling in Camden, New Jersey.

Water Resource Planning

Groundwater Use in the Basin

The DRBC staff finalized an assessment of current and projected groundwater availability for the Delaware River Basin. The results are summarized in a new report, [*Estimated Groundwater Availability in the Delaware River Basin 2020 – 2060*](#).

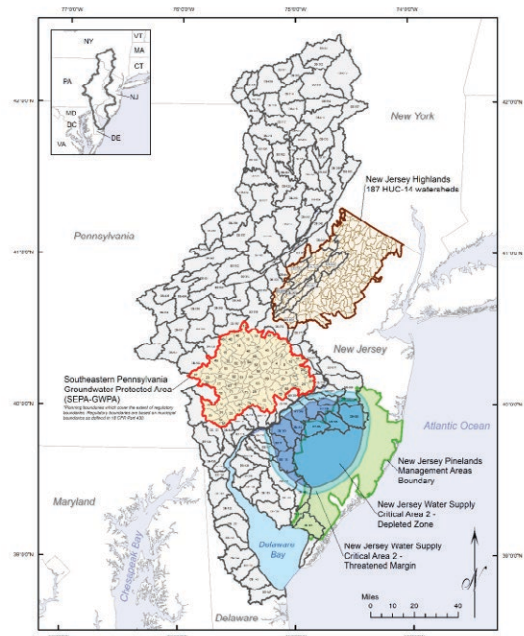
Groundwater only accounts for about 5% of the total water withdrawals from the Delaware River Basin; it is a critical water source in need of sustainable use and planning. In 2020, groundwater withdrawals were about 450 million gallons per day, of which nearly 75% was used to meet drinking water needs.

Results from this report indicate that groundwater resources are, and will continue to be, used at sustainable rates throughout the Delaware River Basin. Even at the upper end of projected net withdrawals during a very dry year, groundwater use remains sustainable overall. Only one subbasin (the Little Lehigh Creek, Pa.) is projected to use more than 75% (and less than 100%) of estimated available groundwater in a very dry year.

The report gives special focus to the Southeastern Pennsylvania Groundwater Protected Area (SEPA-GWPA), which the Commission created at the request of the Commonwealth in 1980

to address unsustainable groundwater depletion in this 1,200 square mile, high-growth region. Groundwater use has stabilized under DRBC’s management of SEPA-GWPA.

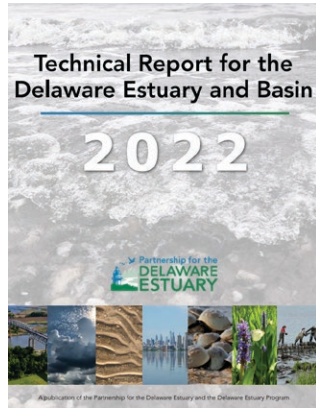
Considerations of seasonality, natural resources, and climate change are also discussed, and the report provides insight into areas of future study that may advance future groundwater planning efforts.



Groundwater management and special planning areas in the Delaware River Basin, overlying 147 subbasins.

Contributing to TREB

In 2022, the Partnership for the Delaware Estuary published the [*Technical Report for the Delaware Estuary and Basin*](#), for which DRBC staff authored two chapters on water quantity and water quality. This report is published every five years, and DRBC staff provides substantial in-kind contributions of time and resources.



Ten years of water audits

2022 marked the tenth anniversary of the DRBC's Water Audit Program. Beginning in Calendar year 2012, public water suppliers were required by DRBC to conduct an annual water audit of their systems to help identify water losses, particularly water lost due to leaky infrastructure. That requirement followed regulatory changes to the DRBC's Comprehensive Plan and Water Code in 2009 to implement an updated water audit approach to identify and control water loss in the Basin.

The DRBC's water audit program results in a clearer understanding of the causes of water loss and allows system operators, utility managers and regulators to better target their efforts to improve water supply efficiency, saving water and money. The DRBC is one of a handful of regulatory agencies in the United States implementing this improved approach to water loss accounting.

The DRBC has compiled 10 years of water audit data (CY2012 – CY2021) and is currently assessing the effectiveness of the water audit program to help guide the DRBC's Water Management Advisory Committee with next steps in the program and identify reduction potentials. Publication of this work is anticipated in 2023.

Population served

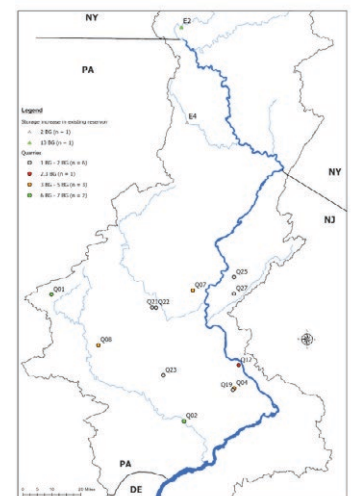
The FY2023–2025 Water Resources Program included a task to update the Population Served estimate for the Basin. The DRBC most recently provided a Population Served estimate in July 2018 based on CY 2016 information, which estimated the total population served by Basin water at 13.3 million. In 2022, DRBC staff worked with its Water Management Advisory Committee to identify a methodology to update the estimate and with NYCDEP, NJDEP, PADEP, and Chester Water Authority to update data. A revised estimate of 14.2 million was completed in fall 2022 and will be approved in the FY2024–2026 Water Resources Program.

Storage Study progress

In April 2021, the DRBC began a study to explore the feasibility of additional freshwater storage to meet future water availability, climate adaptation, drought management and flow management needs in the Delaware River Basin. This is likely to be the most comprehensive, Basin-wide evaluation of potential storage options in the Basin in over 40 years.

The Study Objectives are to identify, inventory, and evaluate the feasibility of options that could provide additional usable storage on the order of 1, 5, 10 or 20 billion gallons (BG) (minimum).

The Delaware River Basin supports the water needs of over 14 million people and is an important water source for public water supply and power generation. Having this planning inventory at the ready in case more freshwater storage is needed helps the DRBC meet its mission of managing and protecting water resources. The findings will be published in 2023.



The Storage Study identified several feasible storage projects.

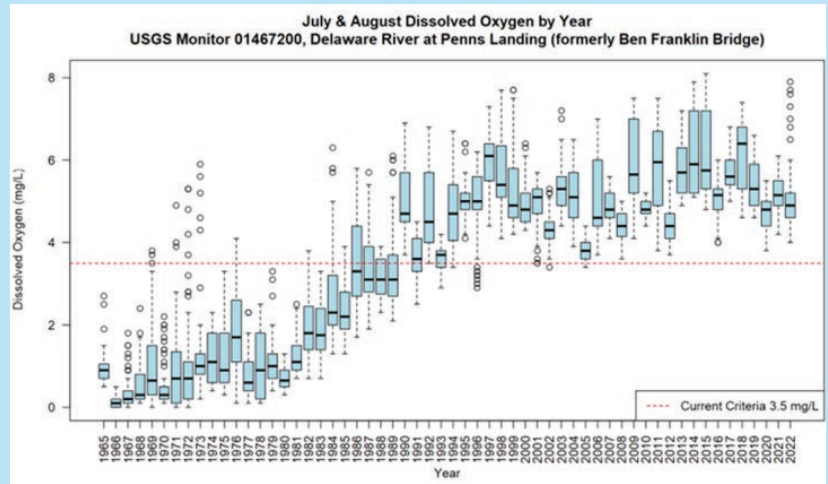
Water Quality

Aquatic Life Designated Use Study Reaches Key Milestone

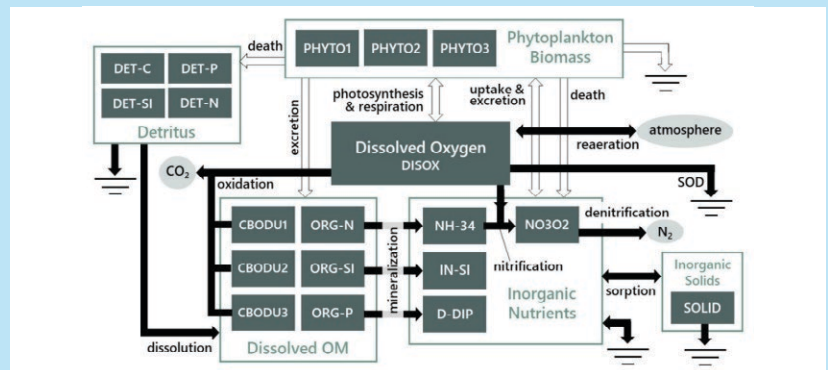
In 2022, the DRBC reached a key milestone with the completion of its draft Analysis of Attainability (AA), representing five years of work across multiple branches of the DRBC, as well as coordination with state and federal partners, national experts, and the DRBC’s Water Quality Advisory Committee.

This represented the culmination of several key studies and tasks, initiated in 2017 by resolution of the Commission. DRBC staff completed calibration for intended use of a water quality computer model, to the satisfaction of an independent expert panel engaged by the DRBC. Agency staff performed an Analysis of Attainability in close coordination with its Water Quality Advisory Committee. Staff published five draft reports related to the Aquatic Life Use Study.

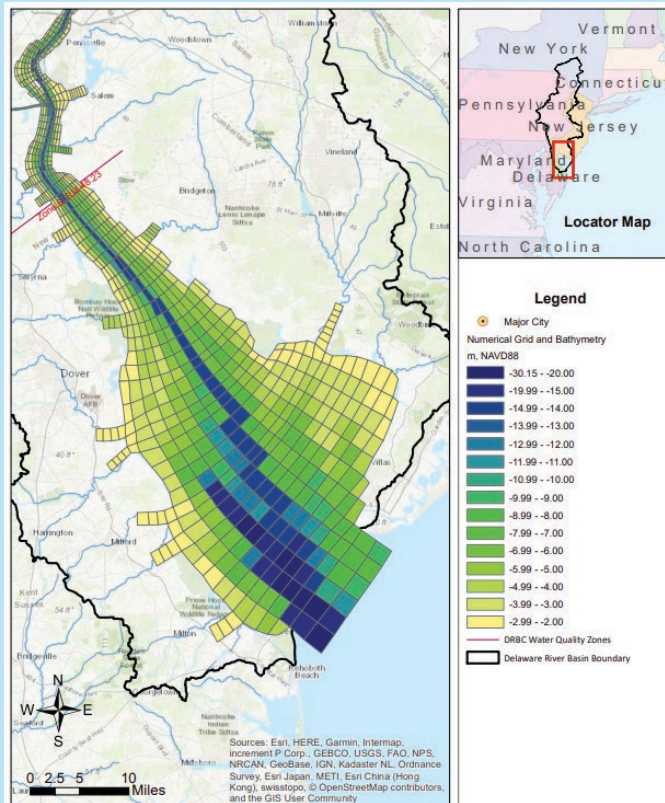
The Draft AA report, [Analysis of Attainability: Improving Dissolved Oxygen and Aquatic Life Uses in the Delaware River Estuary](#), describes the results of studies performed with a state-of-the-art hydrodynamic and water quality model, showing the DO improvements to be achieved when ammonia effluent limits are reduced, and identifies the highest attainable dissolved oxygen condition, or HADO.



Dissolved oxygen at Ben Franklin Bridge 1965–2022.



Water Quality Model Kinetics, representing the major physical, chemical, and biological processes for nutrient cycling and dissolved oxygen in the Delaware Estuary Water Quality Model.



Delaware Estuary bathymetry may vary rapidly from a deep navigational channel to a shallower flank, an element to address in calibrating the DRBC’s hydrodynamics model.

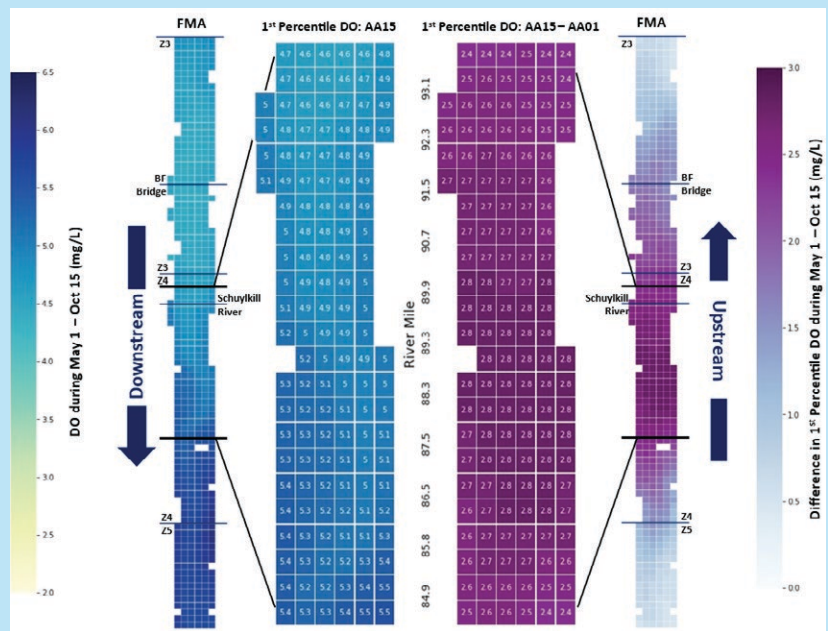
The reports determine that DO levels are most impacted by summer ammonia loads from nine point sources: Philadelphia Water Department’s Southwest, Southeast and Northeast wastewater treatment plants and the plants operated by Camden County Municipal Utilities Authority, City of Wilmington, Gloucester County Utilities Authority, Hamilton Township, DELCORA and Lower Bucks County Joint Municipal Authority.

The reports recommend steps for achieving the HADO and recommends that the Commission initiate a rulemaking process, as outlined in Resolution No. 2017-4, to revise the designated aquatic life uses and develop water quality criteria to support those uses. The associated cost report summarizes the results of cost and affordability evaluations for reducing ammonia discharges to the Delaware River Estuary.

The supporting reports include:

- [Modeling Eutrophication Processes in the Delaware Estuary: Three-Dimensional Water Quality Model.](#)
- [Modeling Eutrophication Processes in the Delaware River Estuary: Three-Dimensional Hydrodynamics Model.](#)
- [Social and Economic Factors Affecting the Attainment of Aquatic Life Uses in the Delaware River Estuary.](#)
- [Linking Aquatic Life Uses with Dissolved Oxygen Conditions in the Delaware River Estuary.](#)
- [Nitrogen Reduction Cost Estimation Study: Final Summary Report.](#)

As 2022 drew to a close, the draft AA and its supporting reports continued to be discussed at Water Quality Advisory



Analysis of Attainability Modeling Results, Tabular.

Spring (April 1 - June 30)								
Zone	Shortnose Sturgeon	Atlantic Sturgeon	American Shad	White Perch	Striped Bass	Channel Catfish	Largemouth Bass	Yellow Perch
2	All life stages present							
3	All life stages present							
4	All life stages present							
5	All life stages present							
6	Juveniles and adults present				Absent			

Summer (July 1 - September 30)								
Zone	Shortnose Sturgeon	Atlantic Sturgeon	American Shad	White Perch	Striped Bass	Channel Catfish	Largemouth Bass	Yellow Perch
2	All life stages present							
3	All life stages present							
4	All life stages present							
5	All life stages present							
6	Juveniles and adults present				Absent			

Fall (October 1 - November 30)								
Zone	Shortnose Sturgeon	Atlantic Sturgeon	White Perch	Striped Bass	Channel Catfish	Largemouth Bass	Yellow Perch	American Shad
2	Juveniles and adults present							Juveniles present
3	Juveniles and adults present							
4	Juveniles and adults present							
5	Juveniles and adults present							
6	Absent							

Winter (December 1 - March 31)								
Zone	Shortnose Sturgeon	Atlantic Sturgeon	White Perch	Striped Bass	Channel Catfish	Largemouth Bass	Yellow Perch	American Shad
2	Juveniles and adults present							Juveniles present
3	Juveniles and adults present							
4	Juveniles and adults present							
5	Juveniles and adults present							
6	Absent							

Summary of occurrence by zone and by season of sensitive species in the Delaware River Estuary and Bay.

Committee meetings and the DRBC began the process to revise water quality designated uses and associated standards in coordination with the U.S. Environmental Protection Agency and the estuary states of New Jersey, Delaware and Pennsylvania.



American eel in Buck Creek watershed, as photographed by Michael Thompson.

On December 1, 2022, EPA issued a determination that revising water quality standards for a portion of the Delaware River Estuary is necessary to satisfy the requirements of the Clean Water Act, in response to a Petition filed by a group of non-governmental organizations. In doing so, EPA recognized the value of foundational science performed by the DRBC, and the commitment and ongoing work by DRBC and the Estuary states to update the standards. Additional study information can be found at: www.nj.gov/drbc/programs/quality/designated-use.html.

Additional Science and Water Quality Monitoring Highlights

Preparation of the 2022 Delaware River and Bay Water Quality Assessment

This document reports the extent to which waters of the Delaware River and Bay are attaining designated uses in accordance with Delaware River Basin Commission’s Water Quality Regulations (18 C.F.R. Sec. 410) for the period October 1, 2016, through September 30, 2021. The assessment involves comparison of several key water quality parameters with applicable DRBC water quality criteria. DRBC regulations designate public water supply, agricultural, and industrial uses for the Delaware River. Since the public water supply use is assessed and protective of the other uses, agricultural and industrial uses are not assessed separately for this report. For each designated use in each assessment unit, several water quality parameters, relevant to the use, are compared to the existing, applicable water quality criteria. Where the DRBC’s applicable water quality criteria are not available, Basin states and/or EPA’s criteria were used in this assessment.

Chloride Monitoring

For the second year, staff undertook chloride monitoring in the Special Protection Waters

(SPW) of the Delaware River Basin. The DRBC initiated a chloride monitoring effort within the Lower Delaware reach of the SPW area as results of the 2016 DRBC Lower Delaware Assessment of Measurable Changes indicate weak to moderate evidence of degradation at 83% of the sites for chloride and specific conductance. In 2022, staff once again deployed and maintained continuous conductivity HOBOTM loggers in tributaries and monitored throughout the year for an expanded list of: chloride, total dissolved solids (TDS), conductivity, alkalinity and the common



DRBC intern Bailey Adams conducts chloride monitoring.

ions that comprise the TDS and electrical conductivity in water: sodium, potassium, bicarbonate, silica, nitrate, sulfate, calcium, and magnesium. This expanded monitoring will enable the DRBC to characterize ionic compositions for each site and to aid in potential source tracking. The entire data collection effort will support a site-specific assessment of modeled expected vs. observed chloride and specific conductance to identify sites as “degrading,” “improving,” or “no change.” This project is funded by the EPA 106 grant, and more information about this initiative may be found on the DRBC’s website.

PFAS Monitoring

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a diverse group of compounds that have varying degrees of persistence, toxicity, and bioaccumulation in the environment. They are found in a variety of industrial and household products such as stain-repellent textiles, fire-fighting foams, and paper coatings. They have unique properties to repel both water and oil. While there is still much to be learned about the effects of PFAS on human and ecological health, exposure from drinking water and fish consumption is a concern. These substances have been detected in drinking water wells in Basin states. Health advisories and standards have been developed by federal and Basin state agencies for some PFAS. New Jersey, New York, Pennsylvania and Delaware also have initiatives to manage PFAS exposure. PFAS levels observed in fish indicate that further evaluation of risk to human health and wildlife is warranted in the Delaware River. PFAS has also been detected in fish tissue in the Basin at levels causing fish consumption advisories in some locations. The DRBC continued to advance its understanding of the nature and extent of PFAS in our Basin during 2022, part of a three-year study. In April 2022, Ron MacGillivray was interviewed by RTBF, Belgian national television, about the DRBC’s monitoring.



DRBC staff conduct macroinvertebrate sampling in the Delaware Water Gap.

Biomonitoring

In 2022, the DRBC completed biological monitoring of the non-tidal Delaware River, which is protected by the DRBC’s SPW regulations. This monitoring was planned for 2021 but was delayed due to weather and high flows. The remaining 17 sites in the Delaware Water Gap and Upper Delaware River were sampled during August or September 2022. In addition to water chemistry data collected at each site, sampling included macroinvertebrates, periphyton and habitat analyses.

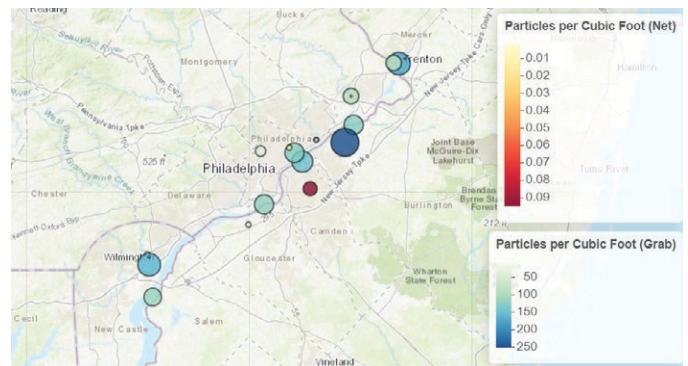


The DRBC's Director of External Affairs and Communications, Beth Brown, at the microplastics report release.

Microplastics

A highlight of 2022 research was published in [Reducing Microplastics in the Delaware River Estuary](#)—a report summarizing two years of study into microplastics, a contaminant of emerging concern. The DRBC's study focused on water quality in the Delaware River near some of the Basin's most dense population centers to better understand the distribution and concentration of microplastics within this part of our Basin. The Commission's research sought to characterize the distribution of microplastics in the upper portion of the Delaware River estuary, or tidal reach, through monitoring and modeling, and to increase public awareness of the issues associated with microplastics. The study focused on the Delaware River Basin between Trenton, N.J., and the Chesapeake & Delaware Canal. Samples were collected at 15 sites in Pennsylvania, New Jersey and Delaware. The DRBC developed an interactive map of the results, available directly at [this link](#).

The report release was announced at a news conference at Philadelphia's Lardner's Point Park. U.S. Representative Brendan F. Boyle (PA-02), Julie Slavet, Executive Director of the Tookany/Tacony-Frankford Watershed Partnership, John Moore, Executive Director of Palmyra Cove Nature Park, and Stephanie Phillips, Executive Director, Riverfront North Partnership joined the DRBC in announcing the research. The research was funded in part



Net and grab samples collected at sites across the urbanized Estuary were evaluated for microplastics.

by the U.S. Fish and Wildlife Service through the National Fish and Wildlife Foundation's Delaware Watershed Conservation Fund.

Continued MST Monitoring and Microbial Source Tracking

In the portion of the Delaware River around Philadelphia and Camden, known as DRBC Water Quality Zone 3 and upper Zone 4, the river's designated use is for 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, the DRBC began a study several years ago with more focused monitoring in Camden and other communities. [View Map of Sampling Locations](#). For this study, data was collected near-shore (where recreation is occurring). This complements our existing [Delaware Estuary Water Quality Monitoring Program](#), which collects bacterial data from the river's center channel. And because bacteria levels in this region can change rapidly, the DRBC is devising ways to reduce the time, cost and effort to better drive decision-making. Stormwater runoff and combined sewer overflows contribute to higher bacteria concentration following rainfall events. Yet there often is a multi-day lag time between sample collection and receipt of results, so daily or hourly fluctuations of bacteria indicator concentrations in the Delaware River are not captured.

To better understand sources of bacterial pollution, the DRBC's shore-based bacteria monitoring program continued in 2022. From May – September, samples were collected once weekly at nine locations in the Delaware River Estuary around Philadelphia and Camden. This bacteria monitoring was in addition to samples collected as part of the Delaware Estuary Water Quality Monitoring Program (aka the boat run), which runs once monthly. The DRBC also performed Microbial Source Tracking at the same nine shore-based bacteria monitoring locations: three wet weather and three dry weather events. The goal is to differentiate bacteria derived from humans, cows, horses, Canada geese, deer and dogs. Samples will be analyzed for E. coli, fecal coliform and enterococcus.

The DRBC also collaborated with the U.S. Geological Survey (USGS) on the deployment of a Fluidion Alert System—one of the first in the nation—to monitor near real-time Delaware River bacteria concentrations in Camden's Pyne Poynt Park. The DRBC spent two seasons evaluating this rapid, remote sampling and analysis method to deliver more time-sensitive data. The deployment at Camden was completed in 2022, and partners at USGS will move it to a different location for the summer of 2023.

While the DRBC is evaluating the results of this manual versus automated comparison, staff continue to monitor by shore and boat, and recognize the challenges of this complex issue are many, and preliminarily too early to say if promising for further investigation. The DRBC plans to develop a story map about the project that can illustrate some of the work and the questions posed and the best next steps. (Funding for the Fluidion instrument came from the U.S. EPA Urban Waters Federal Partnership and from a grant provided by the William Penn Foundation.)

Cyanotoxin Monitoring

In 2022, this pilot study examined harmful algal blooms (HABs) toxins (anatoxin, microcystins and cylindrospermopsin) at 15 sites in the mainstem Delaware River. During August and September, DRBC staff deployed SPATT bags, collecting them after eight days, for a total of three rounds. The Delaware DNREC lab assisted with analysis.



Intern Kyle McAllister retrieves a sample as part of a study to track for cyanotoxins.

DEIJB Update

The DRBC acknowledges there is work ahead to make recreation safe and accessible throughout the urban Estuary. This topic exemplifies where the DRBC is recognizing the role of water equity in its work—that in order to achieve equity, monitoring, modeling and outreach may suggest different tools and approaches for different communities, as we meet the needs of our Basin and incorporate DEIJB principles across our work.



DRBC staff perform water quality monitoring in support of the Special Protection Waters program near Columbia, New Jersey.

Water Management

Hydrologic Conditions

Dry Conditions Were Pervasive in 2022

The second and third quarters of 2022 were marked by persistent dry conditions throughout the Delaware River Basin. The commission fell short of declaring a “water supply emergency” as conditions leveled off in the fall.

These conditions prompted New Jersey, New York, and Pennsylvania to declare drought watches in most of the counties that lie within the Basin. Many areas in the Delaware River Basin experienced significantly below-normal precipitation with resulting effects on streamflows, groundwater levels, and reservoir storage. Beginning in August, low flows in the Delaware River prompted the DRBC to direct releases of stored water from federal reservoirs at Beltzville (Carbon County, Pa.) and Blue Marsh (Berks County, Pa.) to meet the minimum flow target for the river at Trenton, N.J.

The purpose of the Trenton flow target is to control the salt front in the tidal Delaware River. Freshwater is needed to keep salty or brackish water from advancing up from the Delaware Bay during low-flow conditions and reaching drinking water intakes for Philadelphia and New Jersey communities, and industrial intakes along the river.

The salt front was upstream from its normal location for this time of year despite significant freshwater reservoir releases. Had more water been needed to address salt front management, it would have meant additional declines in reservoir storage and additional drought risks.

Had drought been declared in the Basin, initial drought management plans would reduce flow objectives for the Delaware River and out-of-basin diversions to conserve reservoir storage. The drought plans also would have given the DRBC the option of calling for releases from additional reservoirs to bolster flows.

Precipitation

Throughout the Basin, total precipitation for the period January 2022 through December 2022 ranged from approximately 32 inches to 68 inches. Through the first few days of October, the Basin was impacted by the remnants of Hurricane Ian. The system stalled, and many locations experienced several rounds of precipitation from the tropical moisture. The lower Basin south of the Lehigh Valley received the most precipitation over the period, where amounts ranged from 3.5 to eight inches. The upper Basin was least impacted by the tropical system, where precipitation amounts were less than two inches.

Reservoir Conditions and Management

Combined storage in the three New York City (NYC) reservoirs, located in the upper Basin at the start of the year was approximately 228.5 billion gallons (BG), or 85.4%. Reservoir levels were normal in January but began to decrease as precipitation (snow and ice) during the month was stored as snowpack and, thus, did not runoff into the reservoirs until it melted in the spring.

Beginning in February, warmer temperatures began to melt the snow, increasing the storage in the reservoirs. Additional rain events occurred throughout the spring, and the reservoirs were full on March 21 and remained so until the beginning of May. During this time, the reservoirs spilled a combined total of approximately 79.2 BG.

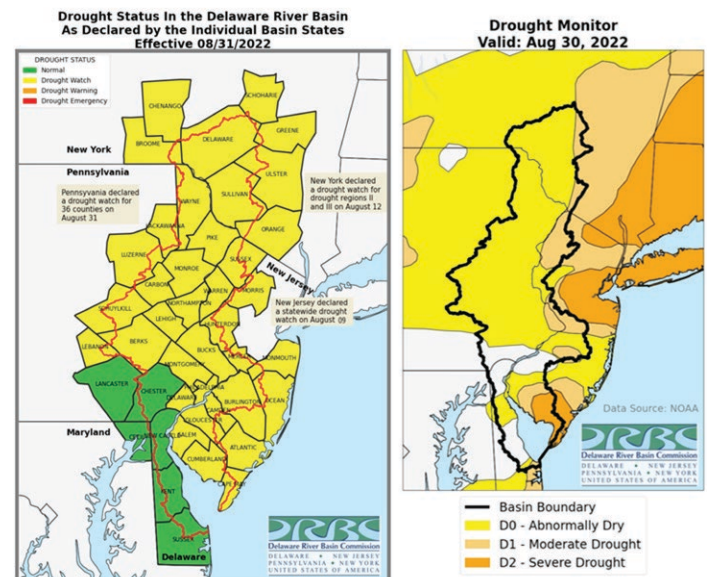
Reservoir levels began decreasing in May due to higher water use in the spring and summer compared to the winter and conservation releases along with lower precipitation. During the summer months, the combined storage decreased steadily until September and remained relatively steady until mid-November. The lowest combined storage of 161.8 BG (60.5%), which is 51.8 BG above the drought watch curve, occurred on November 11. The end-of-year combined storage was approximately 218.3 BG (81.6%).

Releases were made from the three NYC Delaware River Basin reservoirs in accordance with the 2017 Flexible Flow Management Program (FFMP). The Delaware River Master directed releases to meet the Montague flow objective during the summer months. The total volume of water released for Montague was approximately 21.3 BG. Two releases were made at the end of January. Other releases were made between the end of July through the beginning of September and on five days in November. Thermal mitigation releases were made for

26 days in June, July and August when water temperatures were in danger of exceeding 25 degrees Celsius at Lordville, N.Y. The amount of water used for thermal releases was 1.13 BG (1,754 cfs-days).

One rapid flow change mitigation release was made on August 20, using 9 million gallons (14 cfs-days).

Water was also required to support the Trenton Equivalent Flow Objective (TEFO) between August 15 and September 1. The DRBC requested flow augmentation releases from its water supply storage in Beltzville and Blue Marsh Reservoirs and a bank of water reserved in the New York City reservoirs for this purpose (TEFO bank). In total, 2.06 BG of water was released to meet the Trenton Flow Objective: 0.55 BG from Blue Marsh Reservoir, 0.99 BG from Beltzville Reservoir, and 0.52 BG from the TEFO bank. Although not specifically for the Trenton Equivalent Flow Objective, weekend white water releases from FE Walter Reservoir also supported flows in the main stem river.



Left: Map of all counties partly or completely contained within the DRB, colored based on drought status as declared by individual basin states. On this map, the red line represents the boundary of the basin. Right: Drought monitor data retrieved.



DRBC intern Bailey Adams performs water quality monitoring on the Delaware River.

Climate Change

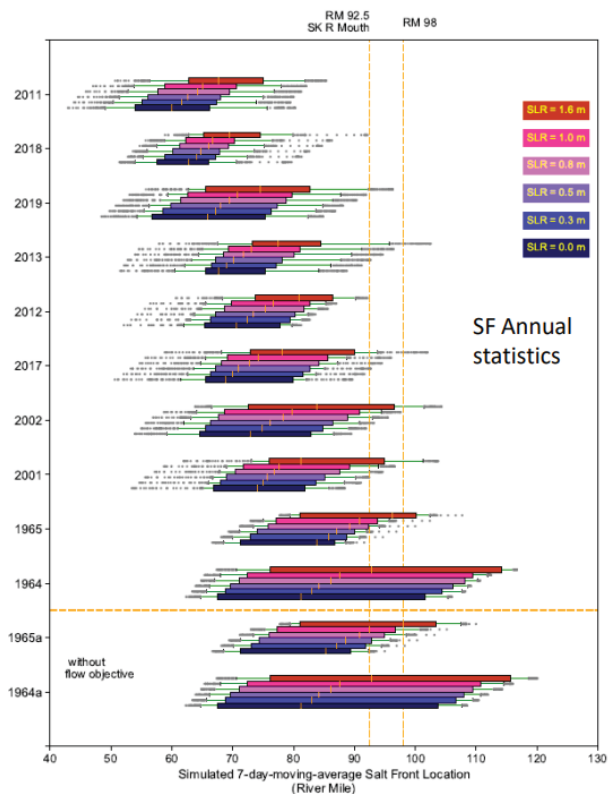
Sea Level Rise and Associated Effects in the Delaware Estuary Coastal Zone

The Delaware Estuary is experiencing a relative sea level rise rate of 3.48 mm/year (1.14 feet in 100 years) at Lewes, Del. and 4.63 mm/year (1.52 feet in 100 years) at Cape May, N.J. based on long-term sea level data. It is anticipated that the local sea level rise rate will accelerate in coming decades and by 2100, range from 0.52 to 1.53 m (1.71 to 5.02 feet) based on a technical workgroup established by Delaware DNREC in 2017.

Sea level rise will increase the size and extent of the tidal prism and alter flow circulation patterns and other hydrodynamic processes in the Delaware Estuary. In addition, the effective mixing volume of water in the estuary will increase. More salt water from the ocean will enter the estuary relative to the incoming freshwater flows, resulting in less dilution and higher salinity water.

The Delaware River Estuary is habitat to the Atlantic Sturgeon, an endangered species listed by the National Oceanic and Atmospheric Administration Fisheries Service. Critical spawning habitat was identified near Marcus Hook and Chester Island. Oysters are harvested from the lower estuary and bay areas in New

Jersey and Delaware. Both species are sensitive to the salt content of water (salinity) and sea level rise may have a negative impact on their respective habitats.



Preliminary modeled results of Salt front location with various sea level rise and flow regimes.

In 2018, the Commonwealth of Pennsylvania, Department of Environmental Protection engaged the Delaware River Basin Commission to evaluate the effects of sea level rise on salinity in the Delaware Estuary Coastal Zone (DECZ). The DRBC applied its three-dimensional hydrodynamic model, known as the Salinity Model, to simulate the effects of sea level rise on salinity and determine the potential impacts to Atlantic Sturgeon and oyster habitats.

In 2022, DRBC staff finalized a report, with funding from a Federal Coastal Zone Management Grant, administered by the Pennsylvania Department of Environmental Protection, summarizing the analyses performed with the model and documenting the potential impacts of sea level rise on salinity and habitat.

Climate Change Virtual Panel

As part of the Delaware River Basin Commission’s Advisory Committee on Climate Change (ACCC), the DRBC and the Water Center at Penn hosted a panel discussion, “Climate Change Planning and Adaption” moderated by Howard Neukrug, Executive Director at The Water Center and Committee Chair of the DRBC’s ACCC, and featured Amanda Babson of the National Park Service, Beth Brown of the Delaware River Basin Commission, and Julia Rockwell of the Philadelphia Water Department, who discussed climate change planning and adaptation from the federal, regional, and municipal perspectives.

Hazard Mitigation Workshops

In 2022, the DRBC continued its partnership with the Pennsylvania Emergency Management Agency (PEMA) as the designated agent on two Federal Emergency Management Agency (FEMA) Advance Assistance grants in the Upper Delaware Basin. Additional partnership



Virtual Climate Change Panel co-hosted by the DRBC and the Water Center at Penn.

was provided by FEMA, U.S. Army Corps of Engineers, Pennsylvania Department of Environmental Protection and local Emergency Management Coordinators in Wayne, Pike, Monroe and Lackawanna Counties.

Together, the two FEMA grants combined supported a project to 1) increase the capacity of local municipalities in the four counties to apply for grants, 2) provide education and outreach to local EMCs to increase their understanding of the Hazard Mitigation Assistance (HMA) and Hazard Mitigation Grant Program (HMGP) application process and timeline, and 3) advance Hazard Mitigation Plans (HMPs) to mitigation project development and ultimately hazard mitigation actions.

The Project was initiated by PEMA to provide outreach and education to communities in the four targeted counties, encouraging an increase in applications for HMA and HMGP funding in a region of the Commonwealth of Pennsylvania



Water Resource Engineer Michael Thompson presents to students at Lafayette College in Easton, Pa.

that has historically seen a minimal amount of grant applications despite floods being one of the primary natural disasters affecting this area.

With this backdrop in mind, the Commission and the Project team endeavored to increase engagement, capacity, and ultimately successful grant awards by working intensively with federal, county, and municipal leaders.

To address capacity issues in the study area, the DRBC worked with PEMA to develop a project that used a mix of in-person and virtual engagement—balancing ongoing COVID-19 considerations with identified broadband capacity constraints. The Project team identified emergency management as both a trusted community resource and accessible meeting space. Outcomes and resources identified during this project will provide a future roadmap for state-led Plan Implementation Grant Development (PIGD) events, and shared resources will allow others to replicate this program elsewhere in the Commonwealth.

In 2022, the DRBC and PEMA co-produced a webinar series to build on the in-person and virtual work done in 2021 that drew over 100 participants across three sessions with resources from the DRBC, PEMA and national experts.



Water quality sampling in Chester, Pa.

DEIJB Update

The DRBC is actively seeking opportunities to advance equitable outcomes for underserved populations by linking our work in understanding and modeling the risks of climate change with our outreach and engagement efforts. The Commission’s work under the hazard mitigation project is an example of this effort: Experience gained during this project, and the lack of prior hazard mitigation grant applications, suggests that in upper DRB communities, the capacity to engage in flood loss reduction is significantly lower than in other areas of the Commonwealth. Mapping needs, technical assistance and poverty figures are significant factors likely increasing vulnerability and decreasing mitigation capacity that the outreach was designed to address.



Water quality sampling in the Upper Delaware.

A scenic view of a river with a city skyline in the background and a field of tall grasses in the foreground. The sky is blue with some light clouds. The city skyline includes several buildings, including a prominent tall tower. The river is calm, reflecting the sky and the city. The foreground is dominated by a field of tall, dry grasses and some green plants.

Our Regulated Community and Stakeholders

Regulatory Update

2022 Approved Dockets

Engaging Our Basin Stakeholders

Advisory Committees

Regulatory Update

Rulemaking

By Resolution No. 2022-04 on December 7, 2022, the Delaware River Basin Commission approved amendments to its Comprehensive Plan and the Delaware River Basin Water Code concerning importations of water into and exportations of water from the Delaware River Basin; its Special Regulations – High Volume Hydraulic Fracturing, to prohibit discharges to waters or land within the basin of wastewater from high volume hydraulic fracturing (“HVHF”) and HVHF-related activities; and its Water Quality Regulations, to facilitate the implementation of state-issued permits of the prohibition on such discharges.

February 28, 2022, marked the close of the 123-day public comment period on the proposed rulemaking. The DRBC received 2,388 comment submissions through the online comment system, each of which may consist of one or more letters or attachments. No requests for exceptions from using the online system were received. The DRBC also received oral comments from 73 speakers during five public hearings in December 2021 and February 2022, for a total of 2,461 submissions. DRBC staff reviewed the comments and developed a comment and response document. The Commission considered any changes to the draft rules that may be appropriate based upon the comments received.

DEIJB Update

During the rulemaking process, the DRBC expanded public outreach and more inclusive opportunities for public input. The following measures were implemented on a pilot basis for this rulemaking process:

- Enhanced language access was provided during our fifth public hearing, including real-time English-to-Spanish and Spanish-to-English translation by professional translators, on a pilot basis.
- Toll-free phone access to the fifth public hearing was provided to facilitate participation by those without ready internet access.
- An interactive language translation widget was added to the DRBC website. The widget can translate web-based formatted text on any of the site’s pages from English to any of more than 100 other languages.
- Spanish language versions of the notice of proposed rulemaking and draft rule text were posted on the DRBC website, and a process was created for users to request certified translation of rulemaking documents into other languages.

2022 Approved Dockets

Dockets Approved in Quarter 1, 2022	
Docket #	Docket Name
D-1970-072-7	Global Advanced Metals USA, Inc.
D-1976-021-4	Aqua Pennsylvania Wastewater, Inc.
D-1976-097-5	Exide Environmental Response Trust
D-1985-036 CP-4	Hatfield Township Municipal Authority
D-1994-042 CP-3	Washington Township (Berks Co, Pa.)
D-1996-032 CP-3	Middletown Country Club
D-1999-047-3	Gilbertsville Golf Club, Inc.
D-2000-019 CP-3	Warminster Municipal Authority
D-2006-013-4	Skytop Lodge Corporation
D-2007-039 CP-4	East Stroudsburg Borough
D-2012-014 CP-3	Blue Mountain View Estates, LLC
D-2012-016 CP-2	Covanta Plymouth Renewable Energy LP
D-1990-105 CP-5	Town of Fallsburg
D-2000-051 CP-4	Upper Saucon Township
D-2004-004 CP-4	Audubon Water Company
D-2017-006-1	Barton Court MHP
D-2020-003 CP-1	Diamond State Port Corporation

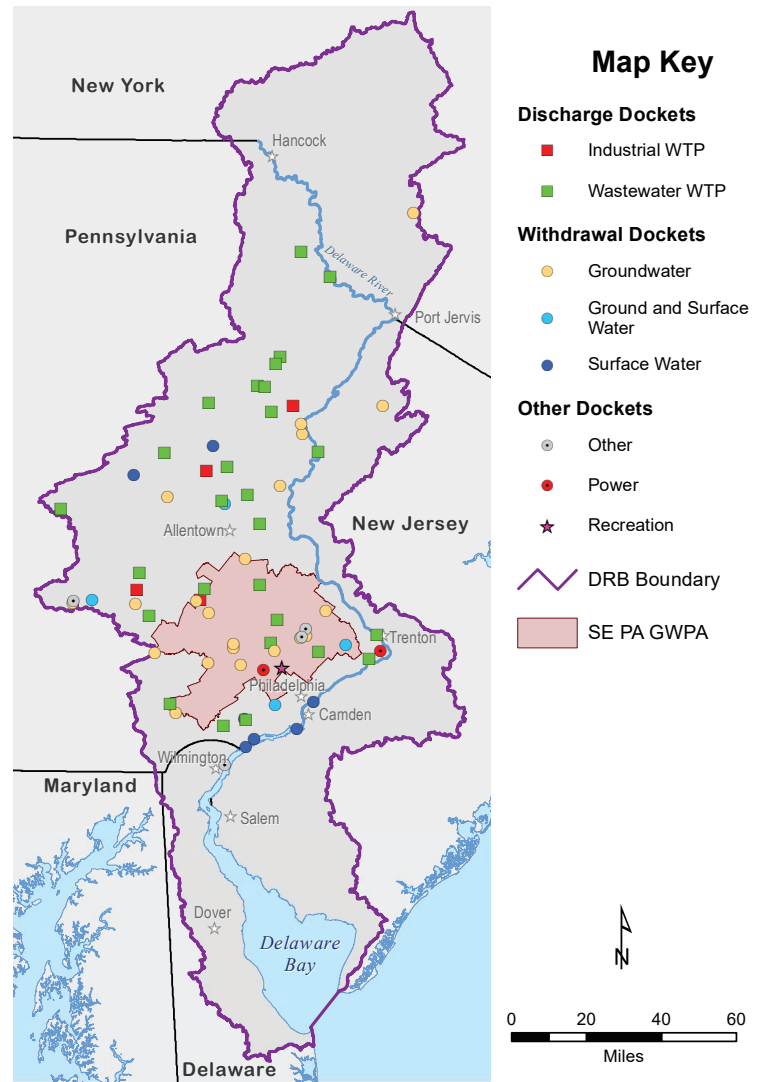
Dockets Approved in Quarter 2, 2022	
Docket #	Docket Name
D-1987-052 CP-5	Lower Moreland Township Authority
D-1997-019 CP-5	Concord Township
D-1997-029 CP-5	Portland Borough Authority
D-1997-032 CP-3	Delaware Water Gap Borough

Dockets Approved in Quarter 2, 2022	
D-1998-019 CP-3	Warwick Township Water & Sewer Authority
D-2001-052 CP-4	Beach Lake Municipal Authority
D-2009-001 CP-4	Buck Hill Falls Water Company
D-2010-002-5	Green Top Management, LLC
D-2010-020 CP-2	Biddle Air National Guard Base
D-2011-023-2	Reading Alloys, Inc. (Kymera International)
D-2012-021 CP-2	Bucks County Water and Sewer Authority
D-2012-017 CP-2	Philadelphia Gas Works

Dockets Approved in Quarter 3, 2022	
Docket #	Docket Name
D-1967-196-4	Befesa Zinc US Inc.
D-1977-058-6	Mount Airy #1, LCC
D-1983-034 CP-5	Robeson Township Municipal Authority
D-1985-025-5	Blue Ridge Real Estate Company
D-1986-059 CP-4	Pennsylvania American Water Company
D-1988-043-7	Giorgio Foods, Inc.
D-1988-051 CP-4	Bath Borough Authority
D-1990-107 CP-4	Nesquehoning Borough
D-1991-088 CP-10	Upper Gwynedd Township
D-1995-019 CP-3	Bethlehem City
D-1998-027-5	BlueTriton Brands, Inc.
D-2000-057 CP-3	Collegeville-Trappe Joint Public Works Department
D-2001-047 CP-2	Schuylkill County Municipal Authority
D-2004-022 CP-4	West Bradford Township
D-2010-028 CP-2	Tamaqua Area Water Authority

Dockets Approved in Quarter 3, 2022	
D-1971-078 CP-5	Bethlehem City
D-1985-029 CP-2	Aqua Pennsylvania, Inc.
D-1992-001 CP-4	Borough of Richland
LP, D-2019-003-1	Wheelabrator Falls Company
D-2021-005-1	Cobbs Creek Restoration and Community Foundation
D-1974-189-3	Holcim (U.S.) Inc.

Dockets Approved in Quarter 4, 2022	
Docket #	Docket Name
D-1985-080-5	Boyertown Foundry Co
D-1986-042 CP-3	Aqua Pennsylvania, Inc.
D-1990-111 CP-3	Newton Town
D-1991-027 CP-3	Mount Pocono Municipal Authority
D-1996-052-3	Monroe Energy, LLC
D-1997-046-5	BlueTriton Brands, Inc.
D-2000-033-3	Crayola, LLC
D-2004-013 CP-3	Northampton Borough Municipal Authority
D-2006-038-4	River Road Utilities, Inc.
D-2008-006 CP-4	Morrisville Municipal Authority
D-2011-024-2	Bluestone Country Club
D-2012-001 CP-3	Lower Bucks County Joint Municipal Authority
D-2012-010 CP-2	Eagle Point Power Generation LLC
D-2012-012 CP-2	Kimberly-Clark Corporation
D-1989-040 CP-3	Aqua Pennsylvania, Inc.
D-1993-040-4	United Corrstack LLC – DBA DS Smith Reading Mill
D-2022-002 CP-1	Montgomery County



2022 Dockets Map.



DRBC Project Review and Water Resource Planning staff toured the New Castle, Del., Municipal Services Commission.

Engaging Our Basin Stakeholders

Community Outreach

Outreach and community engagement are achieved through continued engagement with the DRBC's partner network, direct contact at community events throughout the Basin, and dissemination of information and engagement with local community and environmental groups in the Basin that serve overburdened communities and amplified through DRBC advisory committees, social media, and other communications.

The DRBC's outreach and engagement program aims to develop a two-way flow of information with partners that allows the DRBC to educate partners and policymakers about water quality, water availability, water equity and water resiliency in the Delaware River Basin. We aim to build more capacity to partner with nonprofit as well as business partners to educate and expand understanding of clean and managed water from an economic perspective. And we will maximize points of engagement via existing resources and opportunities, such as building onto in-person Commission meetings. While the DRBC has limited staff capacity and cannot be always present throughout the four Basin states, we can lean on partnerships, events, and other systemic entry points to connect with the communities in each.

Expanded efforts in the DEIJB space can make Our Shared Waters a more diverse and inclusive initiative. Identifying where and when Spanish language translation, non-digital outreach, or other culturally competent methods of communication may enhance our reach. Key communities for outreach include Trenton as the host community of the DRBC, as well as Camden, N.J., Philadelphia, Wilmington, Del., Allentown, Pa., Reading, Pa., and the rural Upper Delaware Basin in New York and Pennsylvania.



Adam Ortiz, Regional Administrator, U.S. EPA Mid-Atlantic Region, joins DRBC staff to celebrate World Environment Day.

2022 Public Events

DRBC staff leveraged and forged new partnerships to significantly expand our outreach in 2022, as a foot in the door to several new communities, successfully engaging in at least one event in each Basin state. The DRBC greatly appreciates our partners who welcomed and connected us with community leaders and resources at and after these events. Highlights include:

- [Trenton Youth Fishing Derby](#)
- [Trenton River Days](#)
- [Trenton Juneteenth Festival](#)
- [Delaware River Festival \(Philadelphia\)](#)
- [Governor Murphy's Hispanic Resource Fair \(New Brunswick, N.J.\)](#)
- [World Environment Day \(New Castle, Del.\)](#)
- [Festival of the Founding Fish \(Narrowsburg, N.Y.\)](#)
- [ShadFest \(Lambertville, N.J.\)](#)
- [Temple EarthFest \(Ambler, Pa.\)](#)

Planned engagements at the Delaware River Festival (Chester, Pa.) and Coast Day (Lewes, Del.) were postponed to 2023 due to inclement weather.

Storytelling from Our Shared Waters Partners

The *Our Shared Waters* blog continued to tell stories from partners working throughout the Basin. In 2022, we featured posts from Schuylkill River Greenways, Audubon Mid-Atlantic, Friends of Washington Crossing Park and more. The blog continues to grow and can be viewed at oursharedwaters.org.

Sojourn and Scholars

Several annual "sojourns" occur in the DRB: the Delaware, Schuylkill and Lehigh Rivers all have such multi-day paddling trips. The 2022 Delaware River Sojourn paddled the Delaware River plus one day on Crosswicks Creek, a tidal

tributary in New Jersey. The trip highlighted partner organizations, stewardship efforts throughout the watershed, and ongoing work being done to improve the Delaware River and preserve its environment. The 2022 Schuylkill River Sojourn hosted by Schuylkill River Greenways paddled 112 miles of the river over seven days, from its headwaters in Schuylkill Haven, Pa., to Philadelphia, and celebrated the river's ability to provide a place to relieve stress and realign with the natural world.

The DRBC through its Our Shared Waters program, offered two scholarship programs. One provided scholarships to first-time adult paddlers to participate in either the Delaware or Schuylkill River Sojourn. This program for individuals interested in paddling but perhaps without the equipment, skills or opportunity to go on their own, aims to increase diversity of all types among sojourn participants. The second scholarship supported five youths to paddle the Schuylkill River Sojourn as part of Schuylkill River Greenways' Mentee Program, which pairs young adults with experienced paddlers to provide an opportunity for new paddlers to learn from longtime kayakers. The program has proven successful in Reading, Pa., and, with this support, expanded to Pottstown in 2022.



Delaware Sojourn Scholars celebrate the conclusion of the 2022 Delaware Sojourn with DRBC staff.



A view of Philadelphia and Camden from Camden’s back channel.

Engaging Our Policymakers

Educating Our Delegation

In addition to regular meetings to inform and educate our federal and state legislators about DRBC activities, the government affairs team hosted two special events to go “behind the scenes” and connect with our shared water resources.

In December 2022, the DRBC and partners in Our Shared Waters hosted Pennsylvania legislators whose districts include the Schuylkill River Watershed for Water and Energy in the Delaware River Basin, a tour of the Limerick Nuclear Generating Station located in Pottstown, Pennsylvania, along the Schuylkill River and owned by Constellation Energy.

Before the tour, guests were welcomed by Constellation and DRBC staff and learned more about the Limerick facility and the DRBC’s role in water resource management. Given that thermoelectric power generation is the largest use of water in the Delaware River Basin, this setting was highly relevant. DRBC staff, Schuylkill River Greenways, and Constellation gave presentations highlighting connections between water, recreation and energy.

The Limerick Generating Station has a DRBC docket for its water withdrawals and wastewater discharge. The facility is permitted to withdraw up to 58.2 million gallons/day of water, much



U.S. Rep. Brendan Boyle (PA-2) provides remarks at an event announcing the DRBC’s microplastics report, which was supported by a grant from the Delaware Watershed Conservation Fund.



Asm. Anthony Verrelli (NJ-15) meets with Jim Bintliff, “the mud guy,” at an event for Our Shared Waters partners.

of which is consumptively used. A flow target at Pottstown ensures adequate flows, and a variety of water sources are permitted to be used to ensure water sustainability.

To help improve water quality in the Schuylkill River Basin, the Limerick Generating Station is a founding supporter of the Schuylkill River Restoration Fund, which provides grants to local projects to reduce acid mine drainage, improve stormwater management, implement agricultural best practices, and restore streambanks.

In August 2022, Our Shared Waters and the DRBC hosted an event at the Trenton Thunder Baseball Ballpark to connect policymakers and partners in New Jersey. Attendees included Assemblyman Anthony Verrelli (NJ-15), Mercer County, Friends of the Abbott Marshlands, the African American Cultural Collaborative of Mercer County, Princeton Hydro, Delaware River Greenway Partnership, and New Jersey American Water.

The evening’s speaker was Jim “the mud guy” Bintliff, owner of Lena Blackburne Baseball Rubbing Mud. Mud he collects from a secret location in the Delaware River Basin is used by all major and minor league teams, as well as colleges, high schools and little leagues. Jeff Hurley, President and General Manager of the Trenton Thunder, also provided remarks and showed attendees how to properly mud a ball.

DRBC staff continued to engage with our state and federal legislative delegations throughout the Basin, meeting with members at a variety of public and partnership events.



DRBC staff engages with U.S. Rep. Matt Cartwright (PA-8) at the Upper Delaware Council Awards, Sept. 2022.



The DRBC and Constellation Energy hosted a tour of Limerick Nuclear Generating Station with Pennsylvania legislators and partners to explore the energy-water nexus.

Community Project Funding

In 2022, the opportunity to pursue federal community project funding was once again considered. DRBC staff applied to several offices and U.S. Representative Bonnie Watson Coleman (NJ-12) included the DRBC's application in her list of projects, and supported by Senator Robert P. Casey (Pa.), it was included in appropriations bills as part of the federal appropriations process. At the end of 2022, we learned that the FY23 omnibus had passed, including DRBC funding. Community Project Funding will be used under the General Fund as the federal signatory funding share. (Support for outreach and education of our legislative delegation and community partners has been from the William Penn Foundation and we wish to acknowledge them for their support.)

DEIJB Update

We are working to advance equitable outcomes for our Basin's communities, including its overburdened communities. We aim to link our outreach and engagement efforts with our continuing understanding and modeling of the risks of climate change, water quality and other hazards. The DRBC's goal is to meet communities where they are and acknowledge diverse community characteristics throughout our Basin. We will prioritize our host community of Trenton and several other communities across the urban-rural spectrum.



Delaware Governor John Carney and Lt. Col. Brigantti with DRBC Executive Director Steve Tambini and Elba Deck, Director of Finance.



Deputy Executive Director Kristen Bowman Kavanagh joins Sen. Coons (Del.) and grantees of the Delaware Watershed Conservation Fund at a ceremony in Wilmington, Del.

Advisory Committees

The DRBC's advisory committees provide a forum for exchanging information and viewpoints on various issues, enhancing communication and coordination. The Commissioners recognize the importance of engaging qualified representatives from state and federal government agencies, industry, municipalities, academia, public health, and environmental and watershed organizations to inform their policy decisions. Advisory committee and subcommittee meetings are open to the public and continued to meet virtually during 2022. A complete and up-to-date list of members can be found on our website at: www.nj.gov/drbc/about/advisory/index.html.

Advisory Committee on Climate Change (ACCC)

Reserved Members

Delaware

Robert Scarborough, Ph.D., Environmental Scientist V, Resource Protection Section, Division of Water, Delaware Department of Natural Resources and Environmental Control

New Jersey

Nicholas A. Procopio, Ph.D., GISP, Bureau Chief, Division of Science and Research, New Jersey Department of Environmental Protection

New York

Mark Lowery, Assistant Director, Office of Climate Change, New York State Department of Environmental Conservation

Pennsylvania

James Horton, Section Chief, Water Use and Planning Section, Compacts and Commissions Support at PADEP, Pennsylvania Department of Environmental Protection

United States Government

Amanda L. Babson, Ph.D., Coastal Landscape Adaptation Coordinator, National Park Service, Interior Region 1, North Atlantic – Appalachian

Arthur DeGaetano, Ph.D., Director, NOAA Northeast Regional Climate Center, Cornell University

New York City

Alan Cohn, Managing Director of Integrated Water Management, New York City Department of Environmental Protection

City of Philadelphia

Julia Rockwell, Manager, Climate Change Adaptation Program, Office of Watersheds, Philadelphia Water Department

Partnership for the Delaware Estuary

Danielle Kreeger, Ph.D., Senior Science Director, Partnership for The Delaware Estuary

Non-Reserved Members

William Brady III, P.E., Principal, CCS Strategies LLC

John Callahan, Ph.D., Visiting Assistant Professor, University of Delaware

James J. Chelius, P.E., American Water, Inc. (Retired)

Marjorie B. Kaplan, Dr.P.H., (Committee Vice Chair), Associate Director, Rutgers Climate Institute, Rutgers University

Upmanu Lall, Ph.D., Professor, Columbia University, Director, Columbia Water Center,

Christopher Linn, AICP, Manager, Office of Environmental Planning, Delaware Valley Regional Planning Commission

Howard Neukrug, P.E., (Committee Chair), Professor, University of Pennsylvania, Founding Director, The Water Center at Penn

David Velinsky, Ph.D., Department Head, Department of Biodiversity, Earth and Environmental Science of Drexel University and Senior Scientist, Academy of Natural Sciences of Drexel University

Water Quality Advisory Committee (WQAC)

Academia/Science

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

Delaware

Bhanu Paudel, Ph.D., Delaware Dept. of Natural Resources and Environmental Control (DNREC), Watershed Assessment and Management Section

Stephen Williams (Alternate to Dr. Paudel), Delaware Dept. of Natural Resources and Environmental Control (DNREC), Div of Water Resources – Watershed Assessment Section

Environmental Professional

Maya K. van Rossum, Delaware Riverkeeper, Delaware Riverkeeper Network

Local Watershed Organization

Gail Farmer, Executive Director, Wissahickon Trails

National Park Service Wild and Scenic Rivers Program

Richard Evans, Ecologist, National Park Service, Delaware Water Gap National Recreation Area, Resource Management and Science

Peter Sharpe, Ph.D., PWS (Alternate to Mr. Evans), National Park Service, Natural Resources Stewardship and Science

New Jersey

Frank Klapinski, Environmental Specialist 3, New Jersey Dept. of Environmental Protection, Bureau of Environmental Analysis, Restoration, and Standards, Division of Water Monitoring and Standards

Biswarup (Roop) Guha, (Alternate to Mr. Klapinski), New Jersey Dept. of Environmental Protection, Bureau of Environmental Analysis, Restoration, and Standards, Division of Water Monitoring and Standards

New York

Sarah Rickard, New York State Department of Environmental Conservation, Research Scientist, Division of Water

Pennsylvania

Michael (Josh) Lookenbill, Pennsylvania Dept. of Environmental Protection, Acting Program Manager, Water Quality Division, Biologist, Monitoring Section Chief. Bureau of Clean Water

Kristen Schlauderer, (Alternate to Mr. Lookenbill), Pennsylvania Dept. of Environmental Protection, Environmental Group Manager, Standards Section, Bureau of Clean Water

Regulated Community - Industrial

Scott T. Northey, The Chemours Company, Chambers Works Facility

Lisa Pfeifer, PMP, (Alternate to Mr. Northey), Manager, Environmental Programs and Services, Pepco Holdings, an Exelon Corporation

Regulated Community - Municipal

Bryan P. Lennon, Assistant Water Division Director, City of Wilmington, Department of Public Works

Jason Cruz, (Alternate to Mr. Lennon), Philadelphia Water Department

U.S. EPA

Kuo-Liang Lai, P.E., Office of Standards, Assessment, and TMDLs, Water Protection Division (3WP30), U.S. EPA Region 3

Brent Gaylord, Water Quality Standards Coordinator, Clean Water Regulatory Branch, Clean Water Division, U.S. EPA Region 2

Monitoring Advisory and Coordination Committee (MACC)

Business/Industry

Daniel Penczak, Field Sales Lead, OTT HydroMet

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Christopher Main, Environmental Scientist, Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Water, Environmental Laboratory Section

Education

Marc Peipoch, Stroud Water Research Center

Environmental Organization

Eileen Murphy, New Jersey Audubon

Robin Irizarry, Audubon Mid-Atlantic, The Discovery Center

Kurt Cheng, Partnership for the Delaware Estuary

Fisheries

Sheila Eyster, Delaware River Basin Fish and Wildlife Cooperative, U.S. Fish and Wildlife Service, Mid-Atlantic Fishery Resources Office

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

Brian Henning, (Alternate), New Jersey Dept. of Environmental Protection, Bureau of Freshwater & Biological Monitoring

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Erika Arnold, (Alternate), Monitoring Section Chief, Water Quality Division, Pennsylvania Dept. of Environmental Protection

Regulated Community

Matthew Fritch, City of Philadelphia, Philadelphia Water Department

U.S. Army Corps of Engineers

Vacant

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Watershed Organization

Preston Luitweiler, Water Resources Association of the Delaware River Basin

Regulated Flow Advisory Committee (RFAC)

Delaware Department of Natural Resources and Environmental Control

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Delaware Geological Survey

Stefanie Baxter, P.G., University of Delaware

New Jersey Department of Environmental Protection

Steve Domber, (Committee Vice-Chair), Environmental Specialist

Joseph A. Miri, Ph.D., Research Scientist

New York City Department of Environmental Protection

Jen Garigliano, Chief of Staff, Bureau of Water Supply

New York State Department of Environmental Conservation

Brenan Tarrier, (Committee Chair), Division of Water, Bureau of Water Resource Management

Office of the Delaware River Master

Kendra Russell, U.S. Geological Survey, Delaware River Master

Pennsylvania Department of Environmental Protection

Abdolhossian (Hoss) Liaghat, P.E., Consulting Hydrologist, Compacts and Commissions Office

Philadelphia Water Department

Kelly Anderson, Office of Watersheds

U.S. Army Corps of Engineers

Laura Bittner, Chief of Hydrology, Hydraulics, and Coastal Section

Subcommittee on Ecological Flows (SEF) – RFAC Subcommittee

Reserved Members

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Ross Shramko, New Jersey Division Fish & Wildlife, Bureau of Freshwater Fisheries

Scott Collenburg, (Alternate to Mr. Shramko), New Jersey Division Fish & Wildlife, Bureau of Freshwater Fisheries

Pennsylvania

Daryl Pierce, Pennsylvania Fish and Boat Commission, Division of Fisheries Management – Area 5

New York

Chris VanMaaren, New York State Department of Environmental Conservation

Tim Pokorny, (Alternate to Mr. VanMaaren), New York State Department of Environmental Conservation

Delaware

Ian Park, Delaware Department of Natural Resources and Environmental Control, Division of Fish and Wildlife

United States Government

Peter Sharpe, Ph.D., PWS, National Park Service, Natural Resources Stewardship and Science

Sheila Eyler, Ph.D., (alternate to Dr. Sharpe), United States Fish & Wildlife Service, Mid-Atlantic Fish and Wildlife Conservation Office

Philadelphia

Molly Hesson, Ph.D., (Representing Philadelphia Water Department), Sage Services LLC

New York City

Lori Emery, New York City Department of Environmental Protection

Non-Reserved Members

Sheila Eyler, Ph.D., (Representing Delaware River Fish and Wildlife Management Cooperative), United States Fish & Wildlife Service, Mid-Atlantic Fish and Wildlife Conservation Office

Erik Silldorff, Ph.D., Delaware Riverkeeper Network, The Delaware Riverkeeper

Jeff Skelding, Friends of the Upper Delaware River

Jim Serio

Peter Kolesar, Ph.D.

Garth Pettinger

Bob Bachman, Ph.D., (Alternate to Mr. Pettinger)

Toxics Advisory Committee (TAC)

Academic

David Velinsky, Ph.D., Academy of Natural Sciences of Drexel University, VP for Academy Science and Department Head

Keith Cooper, Ph.D., (Alternate for Dr. Velinsky), Department of Biochemistry & Microbiology, Rutgers, The State University of N.J.

Dibyendu “Dibs” Sarkar, Ph.D., P.G. (2nd Alternate for Dr. Velinsky), Professor of Environmental Engineering, Director, Sustainability Management Program, Department of Civil, Environmental and Ocean Engineering, Stevens Institute of Technology

Agriculture

Vacant

Delaware

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

Environmental/Watershed

Tracy Carluccio, Delaware Riverkeeper Network

Environmental/Watershed

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

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Brent Gaylord, U.S. EPA Region 2, Water Quality Standards Coordinator, Clean Water Regulatory Branch, Clean Water Division

EPA Region III

Kuo-Liang Lai, P.E., U.S. EPA Region III, Office of Standards, Assessment, and TMDLs, Water Protection Division

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Industry

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Lisa Pfeifer, (Alternate for Mr. Northey), Manager Environmental Programs & Services, Pepco Holdings – Environmental Management

Municipal

Jason Cruz, Aquatic Biologist Supervisor, Philadelphia Water Department

Matthew Fritch, (Alternate for Mr. Cruz), Environmental Engineer, Philadelphia Water Department

New Jersey

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Stephen Seeberger, (2nd Alternate for Mr. Guha), Principal Environmental Scientist, New Jersey Department of Environmental Protection, Bureau of Surface Water Permitting, Division of Water Quality

New York

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

Research Scientist, Bureau of Water Assessment and Management – Division of Water

Pennsylvania

Maria Schumack, Bureau of Clean Water – PA Department of Environmental Protection, Project Manager

Public Health

Eric Bind, M.P.P., New Jersey Department of Health, Research Scientist. Environmental and Chemical Laboratory Services

Water Management Advisory Committee (WMAC)

Constituencies per Resolution 98-21

State of Delaware

Patricia Murray, Delaware Department of Natural Resources and Environmental Control, Division of Water Supply, Allocations

Steven Smailer, P.G., (Alternate to Patricia Murray), Delaware Department of Natural Resources and Environmental Control, Division of Water

State of New Jersey

James MacDonald, New Jersey Department of Environmental Protection, Bureau of Water Allocation & Well Permitting

Joseph Miri, Ph.D., (Alternate to James MacDonald), New Jersey Department of Environmental Protection, Water Supply Modeling & Planning Section

State of New York

Brenan Tarrier, New York State Department of Environmental Conservation, Division of Water

Commonwealth of Pennsylvania

Abdolhossian (Hoss) Liaghat, P.E., Pennsylvania Department of Environmental Protection, Compacts and Commissions Office

James Horton, (Alternate to Hoss Liaghat), Pennsylvania Department of Environmental Protection, Compacts and Commissions Support

U.S. Army Corps of Engineers

Laura Bittner, Hydrology and Hydraulics Branch
Gregory Wacik, (Alternate to Laura Bittner)

U.S. Environmental Protection Agency

Katie Lynch, U.S. Environmental Protection Agency – Region II, Drinking Water and Groundwater Protection Section

U.S. Geological Survey

Brandon J. Fleming, USGS Pennsylvania Water Science Center

Curtis Schreffler, USGS Pennsylvania Water Science Center, Operations and Hydrologic Investigations

City of New York

Dana Olivio, New York City Department of Environmental Protection, Bureau of Water Supply, Strategic Services

City of Philadelphia

Kelly Anderson, (Committee Vice-Chair), Philadelphia Water Department, Source Water Protection Program, Division of Planning & Research

County Water Agency

Seung Ah Byun, Ph.D., P.E. (Committee Chair), Chester County Water Resources Authority

Cory Trego, (Alternate for Seung Ah Byun), Chester County Water Resources Authority

Water Resources Association

Preston Luitweiler, Water Resources Association of the Delaware River Basin

Industry

Jordan C. Rajan, Constellation – Limerick Generating Station

Water Utility

Kathleen Thaefer, Artesian Water Company, Inc.

Virginia Eisenbrey, (Alternate for Kathleen Thaefer), Artesian Water Company, Inc.

Agriculture

Sandra Howland, New Jersey Department of Agriculture, Division of Agriculture & Natural Resources

League of Women Voters or other Civic Organization

Kathy Cook, League of Women Voters of Pennsylvania

Environmental Organization

Kelly Knutson, Coalition for the Delaware River Watershed

Eileen Murphy, (Alternate for Kelly Knutson), Coalition for the Delaware River Watershed

Watershed Organization

Laurie Ramie, Upper Delaware Council

Academia

Daniel J. Van Abs, Ph.D., FAICP/PP, Rutgers University, Department of Human Ecology, SEBS

Recreation

Emily Baldauff, Trout Unlimited

Fisheries

Sheila Eyler, Ph.D., U.S. Fish & Wildlife Service, Mid-Atlantic Fish & Wildlife Conservation Office

Flood Advisory Committee (FAC)

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Michael Powell, CFM, Shoreline and Waterway Management, Division of Soil and Water Conservation

New Jersey Department of Environmental Protection

Vincent Mazzei, P.E., Principal Environmental Engineer, Division of Land Use Regulation

John H. Moyle, P.E., Manager, Bureau of Dam Safety and Flood Control

Joseph Ruggeri, P.E., CFM, Supervising Engineer, N.J. State NFIP Coordinator's Office, Bureau of Dam Safety & Flood Control, Office of Engineering & Construction

John Scordato, Flood Plain Management Section

New York Department of Environmental Conservation

Mark Klotz, P.E., Chief, Water Quantity Section

Pennsylvania Department of Environmental Protection

Hoss Liaghat, P.E., Civil Engineering Consultant

New York City Department of Environmental Protection

Tina Johnstone, Bureau of Water Supply

Thomas Murphy Jr., P.E., Chief, Water Systems Operations Division, Bureau of Water Supply

Dana Olivio, Assistant Environmental Engineer, Bureau of Water Supply, Strategic Services

John H. Vickers, P.E., Chief, Western Operations Division, Operations Directorate, BWS, NYCDEP

Delaware Emergency Management Agency

Arthur Paul

Edward Strouse

New Jersey Office of Emergency Management

Sgt. Michael K. Gallagher

Christopher Testa, (Committee Chair), Hazard Mitigation Unit Manager

New York State Division of Homeland Security and Emergency Services

Gary L. Tuthill, Regional Director, Region 2 Catskill Mountain Zone

Pennsylvania Emergency Management Agency

David Williams, PEMA Eastern Area

Thomas S. Hughes, CEM, State Hazard Mitigation Officer

Federal Emergency Management Agency

Dave Bollinger, CFM, FEMA Region III

Scott Duell, FEMA Region II: Flood Insurance & Mitigation Division

Patricia Griggs, FEMA Region II: Flood Insurance & Mitigation Division

J. Andrew Martin, CFM, FEMA Region II: Mitigation Outreach

Alan Springett, FEMA Region II: Risk Analysis Team Lead

U.S. Department of Agriculture - Natural Resources Conservation Service

Hosea Latshaw, State Conservation Engineer

David Lamm, State Conservation Engineer

U.S. Geological Survey

William F. Coon, Surface-Water Specialist,
New York Water Science Center

Heidi L. Hoppe, Chief, Hydrologic Data Assessment
Program, New Jersey Water Science Center

Robert G. Reiser, Supervisory Hydrologist, New
Jersey Water Science Center

Mark Roland, P.E., Hydrologist, Pennsylvania Water
Science Center

Thomas P. Suro, P.H., CFM, Surface-Water
Specialist, Hydrologist & Engineer, New Jersey
Water Science Center

Kirk White, Supervisory Hydrologist, Pennsylvania
Water Science Center

National Weather Service

Peter Ahnert, Hydrologist In Charge, Middle
Atlantic River Forecast Center (MARFC)

Jim Brewster, Senior Service Hydrologist, National
Weather Service Forecast Office (BGM)

Al Cope, Science and Operations Officer, Mount
Holly Weather Forecast Office

Laurie Hogan, NWS Eastern Region

Raymond Kruzdlo, Senior Service Hydrologist

Al Matte, NWS Eastern Region

George McKillop, NWS Eastern Region

Patrick O'Hara, Meteorologist, Mount Holly
Weather Forecast Office

Ted Rodgers, Middle Atlantic River Forecast Center
(MARFC)

Ben Schott, Meteorologist In Charge, National
Weather Service Forecast Office (BGM)

U.S. Army Corps of Engineers

Jason F. Miller, P.E., Chief, Flood Plain Management
Services Branch, Philadelphia District

National Park Service

Kristina Heister, Superintendent, Upper Delaware
Scenic & Recreational River

Vince Pareago, U.S. Park Ranger, Upper Delaware
Scenic & Recreational River

Delaware River Joint Toll Bridge Commission

Sean M. Hill, Deputy Executive Director
of Operations

Electric Generation Industry (Hydropower and Off-Stream Storage)

Meredith Strasser, Talen Generation, LLC

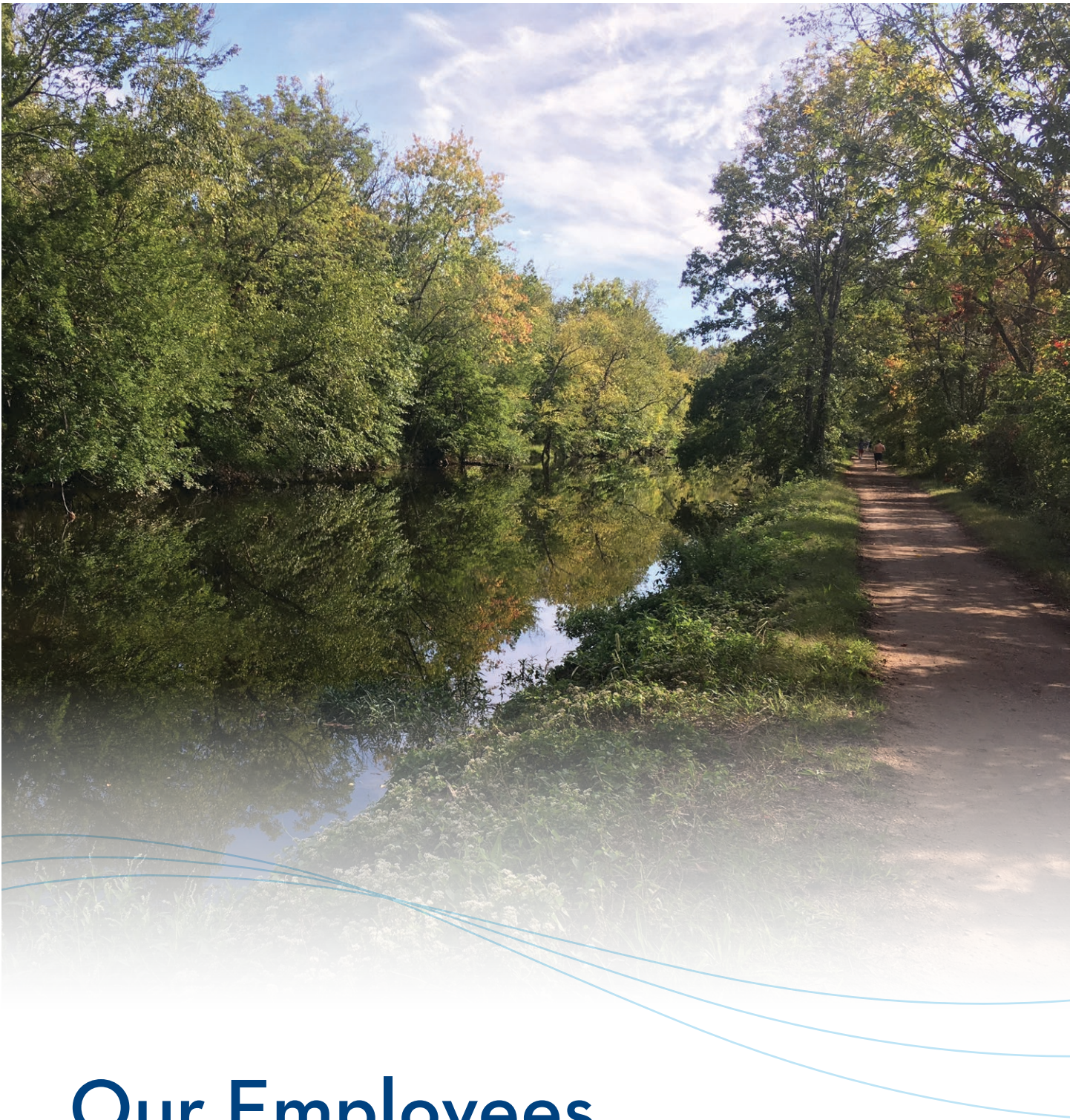
County Water Resources Agencies

Gerald Kauffman, P.E., Water Resources
Coordinator, Water Resource Agency/IPA,
CHEP DGS

Emergency Management Representatives

David K. Burd, Coordinator, Office of Emergency
Management, City of Lambertville

Steve Hood, Director, Delaware County
Department of Emergency Services



Our Employees and Workplace

Our Staff

Community Service

Sharing Trusted, Technical Experience



DRBC current and former staff accept the Water Resources Association of the Delaware River Basin's 2022 Innovation and Collaboration Award.

Our Staff

In 2022, the DRBC said farewell to Dr. Ron MacGillivray and welcomed two new staff, Chris McCann, Government Affairs Lead, and Dr. Jeremy Conkle, Environmental Toxicologist.

Jake Bransky, Aquatic Biologist, celebrated five years with the DRBC.

In September 2022, Pam Bush and the DRBC were honored by the Water Resources Association of the Delaware River Basin with an award for work to reduce PCBs in the Delaware River.

Bush was honored by the group with an individual award for her significant contributions to public policy and commitment to improving connections between people and the environment over her 23 years with the DRBC.

The DRBC received WRA DRB's innovation and collaboration award for its groundbreaking work to improve water quality in the Delaware River Estuary. The DRBC's implementation of pollutant minimization plans, and other practical control measures have resulted in significant and measurable reductions in PCB pollution loads to the Delaware River Estuary. In 2018, fish consumption advisories issued by the states of New Jersey and Delaware for the Delaware River Estuary and Bay were eased due to lower concentrations of PCBs in fish tissue.



Recognizing Ron MacGillivray's retirement.

Community Service

Staff provided supplemental service to the DRBC’s mission by volunteering in a variety of ways. Three highlights from 2022 follow.

Mercer Street Friends Food Bank

As the year drew to a close, DRBC staff volunteered at the Mercer Street Friends Food Bank in Ewing Township, N.J. Mercer Street is the leader of the community’s response to hunger, offering prevention programs and annually distributing 5.5 million pounds of privately- and government-donated food to a network of more than 100 shelters, soup kitchens and food pantries in Mercer County, N.J. In addition to running the food bank, Mercer Street Friends also offers a free preschool and many programs for youth, adults and parents. Learn more about the great work they do at mercerstreetfriends.org/food/. Staff helped make more than 700 food bags, which equaled over 1,400 meals! This was the DRBC’s 8th year volunteering at the Food Bank.

Frankford Riverfront Cleanup

Staff joined other volunteers to clean up the Delaware River shoreline at the Frankford Boat Launch in Philadelphia. Trash negatively impacts water quality and habitat. Litter strewn along roadsides and sidewalks makes its way directly

to our creeks, streams and rivers when it rains or through storm drains. The river is also tidal in this section, and trash regularly comes in with each tidal cycle. The cleanup was hosted by United by Blue, along with the Philadelphia Water Department, Riverfront North and the Academy of Natural Sciences, as part of the Plastic-Free Philly campaign and in support of the Drink Philly Tap program. Both efforts seek to raise awareness about how we can cut down on single-use plastic waste and reduce plastic pollution by drinking tap water instead of buying bottled water. As another way to help cut down on waste, the cleanup hosts provided reusable cleanup supplies, which are industrially cleaned between uses. The Philadelphia Water Department said that nearly 4,000 pounds of litter was collected as part of this cleanup.

Trout Stocking with Pennsylvania Fish & Boat Commission

In April 2022, DRBC staff volunteered to assist the Fish and Boat Commission’s efforts to stock trout in Pennsylvania waters. The group had a great experience and enjoyed spending time understanding the process and meeting with Waterways Conservation Officers and other volunteers at the Delaware Canal in Bucks County, Pa.



Staff volunteering at Mercer Street Friends.



Staff lending a hand at a 2022 Frankford riverfront cleanup.

Sharing Trusted, Technical Experience

2022 Publications

Bransky, J., & Chen, F. (2022). [Reducing Microplastics in the Delaware River Estuary](#). (DRBC Report No. 2022-1.) Delaware River Basin Commission.

Delaware River Basin Commission (2022). [2021 Hydrologic Conditions Report](#). (DRBC Report No. 2022-2.)

Delaware River Basin Commission (2022). [Water Resources Program FY 2023–2025](#). (DRBC Report No. 2022-3.)

Yagecic, J., (2022). [Modernized DSS: A Habitat Model for the Upper Delaware River \(NJ, NY, PA\)](#). (DRBC Report No. 2022-4.) Delaware River Basin Commission.

Thompson, M.Y., Sayed, S.C., Beganskas, S. & Pindar, C.E. (2022). [Estimated Groundwater Availability in the Delaware River Basin 2020–2060](#). (DRBC Report No. 2022-5.) Delaware River Basin Commission.

Bransky, J. (2022). [Growth and Survival of Caged Mussels in the Non-Tidal Delaware River](#). (DRBC Research Brief.) Delaware River Basin Commission.

Delaware River Basin Commission (2022). [Sea Level Rise and Associated Effects in the Delaware Estuary Coastal Zone \(DECZ\)](#). (DRBC Research Brief.)

Thompson, M., Sayed, S., Pindar, C., Shallcross, A. (2022). [Water Quantity. Technical Report for the Delaware Estuary and Basin](#), L. Haaf, L. Morgan, and D. Kreeger (eds). Partnership for the Delaware Estuary. Report #22-05.

Bransky, J. and MacGillivray, R. (2022). [Water Quality. Technical Report for the Delaware Estuary and Basin](#), L. Haaf, L. Morgan, and D. Kreeger (eds). Partnership for the Delaware Estuary. Report #22-05.

2022 Draft Reports Issued for Comment

Delaware River Basin Commission. (2022). [Analysis of Attainability: Improving Dissolved Oxygen and Aquatic Life Uses in the Delaware River Estuary](#). (September 2022 Draft).

Delaware River Basin Commission. (2022). [Modeling Eutrophication Processes in the Delaware Estuary: Three-Dimensional Water Quality Model](#). (September 2022 Draft).

Delaware River Basin Commission. (2022). [Modeling Eutrophication Processes in the Delaware River Estuary: Three-Dimensional Hydrodynamics Model](#). (September 2022 Draft).

Delaware River Basin Commission. (2022). [Social and Economic Factors Affecting the Attainment of Aquatic Life Uses in the Delaware River Estuary](#). (September 2022 Draft).

Delaware River Basin Commission. (2022). [Linking Aquatic Life Uses with Dissolved Oxygen Conditions in the Delaware River Estuary](#). (September 2022 Draft).

Delaware River Basin Commission. (2022). [Nitrogen Reduction Cost Estimation Study: Final Summary Report](#). (September 2022 Draft).

Speaking and Advisory Engagements

The technical staff at the DRBC are frequently called upon to speak at conferences and other gatherings.

The following are selected highlights from 2022:

- Steve Tambini, Executive Director, authored, [Guest Commentary: New Rules Protect Shared Delaware River Waters](#), Bay to Bay News, Dec. 2022.

Tambini also served as an advisor to Pennsylvania's state water plan update.

- Kristen Bowman Kavanagh, Deputy Executive Director, joined Howard Neukrug, Executive Director at The Water Center, to co-moderate a panel discussion, ["Climate Change Planning and Adaption"](#) featuring current and past Advisory Committee on Climate Change members in May 2022.

Kavanagh also presented to the Lehigh County Emergency Management Association at its virtual meeting in September 2022.

- Jake Bransky appeared on WHYY's Radio Times to discuss the [Commission's study on microplastics in the Delaware River Estuary](#), September 2022.
- John Yagecic, Manager, Water Quality Assessment, presented at the Water Resources Association of the Delaware River Basin's Technical Event: *Science, Success Stories & Collaboration in Water Resources* in May 2022.
- Water Resource Scientist Sara Sayed presented, *Is Groundwater Being Used Sustainably in the Delaware River Basin?* November 2022 to the American Water Resources Association National Conference in Seattle, WA.
- Chad Pindar, Manager, Water Resource Planning, contributed expertise to Pennsylvania's 2022 State Water Plan. The PADEP's Water Use and Planning Section developed the Pennsylvania State Water

Plan in collaboration with more than 100 water resources professionals who served on a statewide committee and six regional committees. It follows the announcement of a draft version of the plan in August 2022 and public feedback. According to PADEP, for each region including the Delaware Basin, the plan identifies needs such as climate change resiliency and headwater habitat protection with actions recommended.

- Water Resource Engineer Michael Thompson has been serving as a member of the Project Advisory Committee for a project titled "Developing National Water Use Models and Water Loss Program" which is a joint venture between the USGS and Virginia Tech. The USGS Water Mission Area is developing national water use models that estimate public supply water use for the Nation. Mr. Thompson also gave the following selected technical presentations in 2022:
 - Water Withdrawal and Consumptive Use Estimates for the Delaware River Basin (1990-2017) With Projections Through 2060 (To groups including the Delaware Water Supply Coordinating Council; the Decree Party Workgroup; the Lower Delaware River Wild and Scenic Council Meeting; the Western States Water Council 2022 National Water Use Data Workshop; and the Lehigh Valley Planning Commission's Environment Committee)
 - One Element of the Nexus: Water Management in the Delaware River Basin, September 2022 (To Lafayette College Engineering Students)
 - Water and Energy in the Delaware River Basin, December 2022 (To Constellation Energy, Limerick Nuclear Generating Station, Select Pennsylvania Legislators)
- Amy Shallcross, Manager, Water Resource Operations, advised in 2022 on USGS's NextGen water observation system, namely

its web interface. Ms. Shallcross also gave presentations to:

- The Interstate Council on Water Policy, DC Roundtable.
- HyperFACETS, A Framework for Improving Analysis and Modeling of Earth System and Intersectoral Dynamics at Regional Scales.
- Beth Brown, Director of External Affairs, moderated a discussion on *Water Equity Needs and Status in the Delaware River Basin* at the Coalition for the Delaware River Watershed’s Annual Forum, in Philadelphia, October, 2022.
- Now retired, DRBC’s Dr. Ron MacGillivray presented at the Society of Environmental Toxicology and Chemistry’s regional spring meeting, on PFAS in Surface Water, Sediment & Fish from the Delaware River.

Staff of the DRBC continue to provide expertise and represent the Commission on multi-stakeholder efforts including:

- Schuylkill River Restoration Fund
- Delaware Estuary Program
- Delaware River Greenway Partnership
- Delaware Sojourn
- Upper Delaware Council
- Delaware Water Supply Coordinating Council
- New Jersey Water Monitoring Council
- Delaware Basin Conservation Collaborative

...and many more!



Pam Bush, Assistant General Counsel, accepts an award from the Water Resources Association for her significant contributions to public policy on work to reduce PCBs in the Delaware River.



John Yagecic, Manager of Water Quality Assessment, presents at the Water Resources Association’s 2022 Technical Event.

Photo by Chris Kendig Photography.



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