



# Delaware River Basin Commission

## 2008 ANNUAL REPORT

40th Anniversary of the National Wild and Scenic Rivers Act

30th Anniversary of the Upper and Middle Delaware Wild and Scenic Rivers Designation

Lower Delaware Special Protection Waters Permanent Designation

The Delaware River Basin Commission (DRBC) is an interstate/federal agency created in 1961 by compact legislation signed into law by President John F. Kennedy and the governors of the four basin states with land draining to the Delaware River. The passage of this compact marked the first time in our nation's history that the federal government and a group of states joined together as equal partners in a river basin planning, development, and regulatory agency.

The Delaware is the longest un-dammed river east of the Mississippi, extending 330 miles from the confluence of its East and West branches at Hancock, N.Y. to the mouth of the Delaware Bay where it meets the Atlantic Ocean. The river is fed by 216 tributaries, the largest being the Schuylkill and Lehigh rivers in Pennsylvania. In all, the basin contains 13,539 square miles, draining parts of Pennsylvania (6,422 square miles; 50.3% of the basin's total land area); New Jersey (2,969 square miles; 23.3%); New York (2,362 square miles; 18.5%); and Delaware (1,004 square miles; 7.9%). Included in the total area number is the 782 square-mile Delaware Bay, which lies roughly half in New Jersey and half in Delaware. Nearly 15 million people (approximately five percent of the nation's population) rely on the waters of the Delaware River Basin for a multitude of uses, but the watershed drains only four-tenths of one percent of the total continental U.S. land area. The 15 million figure includes about seven million people in New York City and northern New Jersey who live outside the basin. New York City gets roughly half its water from three large reservoirs located on tributaries to the Delaware.

This publication, which covers calendar year 2008, was compiled and edited by DRBC Communications Manager Clarke Rupert and designed by Susan Owens, the commission's graphic designer. Numerous commission staff provided valuable assistance. It is available on the commission's web site at [www.drbc.net](http://www.drbc.net). Copies are available upon request by contacting the DRBC (P.O. Box 7360, West Trenton, NJ 08628; 609-883-9500; [clarke.rupert@drbc.state.nj.us](mailto:clarke.rupert@drbc.state.nj.us)).

*Front cover photo credits:*

*Top - (from left to right) Clarke Rupert, David B. Soete, and Phil Levy*

*Bottom - Maggie Allio*





A View of the Delaware River from Prallsville Mills, Stockton, N.J. (Photo by Katharine O'Hara, October 2008)

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## Executive Director's Message

I was looking back at my Executive Director's Message from the last annual report, in which I listed a number of evolving issues in the basin that must be tackled. The fifth issue listed was "evaluating and mitigating the potential impacts of ongoing land development and loss of forest cover in the basin's headwaters." Since that time, new concerns and potential opportunities have developed in the upper portion of the Delaware River Basin.

Notably, natural gas well drilling has come to the basin, and with it, the potential for large economic and energy gains in our region. Of course, we also need to recognize the potential impacts of natural gas extraction on water resources. In order to stimulate the release of natural gas from shale formations underlying much of the basin, large quantities of water combined with sand and chemicals are required to be injected at high pressure into the ground. Returned "frac" wastewater must be treated to remove added chemicals, along with dissolved solids, heavy metals, and radiation leached from the rock. Land disturbance, stormwater runoff, and forest fragmentation all accompany the development of natural gas well sites. (The article on page 12 provides more details.)

Natural gas extraction can be an asset to our region. But because of the unique values of the Delaware River system, it is important that the best management practices available be used in undertaking each of the activities involved. The basin provides potable water to 15 million people. The water quality of the upper basin is superb—better than existing standards require. Because of the river's high water quality, free flowing condition (there are no dams on the main stem), and historic river towns nestled in forested riparian lands, the Delaware is a draw for tourism and recreation.

Great care is required in developing any project in the upper basin because it is the headwaters of the river system. Emperor Yu of China said in 1600 BC, "To protect your rivers, protect your mountains." The health of the larger downstream waterway is dependent on the health of the small headwater streams. The Philadelphia Water Department has stated that development and loss of forest cover in the upper basin 200 miles upstream are the city's greatest source water concerns. The Stroud Water Research Center has issued two publications on the importance of headwaters that I strongly recommend: "Where Rivers Are Born: The Scientific Imperative for Defending Small Streams and Wetlands" and "Protecting Headwaters: The Scientific Basis for Safeguarding Stream and River Ecosystems."

Today we have an opportunity. Many people are taking an interest in the upper Delaware River Basin. For example, the Pinchot Institute for Conservation, teaming with the National Park Service, DRBC, and others, has initiated a Common Waters Partnership bringing together interested organizations, agencies, and individuals from the tri-state upper basin region to work toward a sustainable future.

In the short term, the DRBC will need to provide directional signals to natural gas extraction project sponsors on an interim basis until new regulations can be adopted under our public rulemaking process. If we work with representatives of the natural gas industry, land owners, environmental organizations, and government agencies, we can craft a sustainable future that allows for natural gas extraction while protecting the important, yet fragile, headwater environment of the Delaware River Basin. It must be done right and it must be now.

*Carl R. Collier*





## Signatory Members



New Jersey Governor  
Jon S. Corzine



New York Governor  
Eliot Spitzer



New York Governor  
David A. Paterson



Delaware Governor  
Ruth Ann Minner



Pennsylvania Governor  
Edward G. Rendell



Brigadier General  
Todd T. Semonite

The members of the Delaware River Basin Commission include the four basin state governors and a federal representative. A 2007 federal law stipulated that the ex officio United States member shall be the Division Engineer (commonly referred to as the Commander) of the U.S. Army Corps of Engineers North Atlantic Division.

The five members appoint alternate commissioners, with the governors 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.

### New Jersey

Department of Environmental Protection (DEP) Commissioner **Lisa P. Jackson** (alternate), Assistant Commissioner for Land Use Regulation **Mark N. Mauriello** (second alternate), and Water Supply Division Director **Michele Putnam** (third alternate) continued to represent **Governor Jon S. Corzine** on the DRBC. In 2008, the governor named DEP Assistant Director

of Water Supply Permitting **Fred Sickels** as his new fourth alternate and Research Scientist **Joseph A. Miri** became his fifth alternate. Ms. Jackson became Governor Corzine's chief of staff effective December 1 and Mr. Mauriello was named as the new DEP commissioner. **President-Elect Barack Obama** announced in December that Ms. Jackson was his choice to head the U.S. Environmental Protection Agency in his new administration.

### New York

In March 2008, **Lieutenant Governor David A. Paterson** replaced **Governor Eliot Spitzer**, who resigned. Governor Paterson appointed Department of Environmental Conservation (DEC) Commissioner **Alexander B. "Pete" Grannis** (alternate), Division of Water Director **James DeZolt** (second alternate), Bureau of Water Resource Management Director **Mark Klotz** (third alternate), and Chesapeake and Delaware Program Director **Peter Freehafer** (fourth alternate).

New York City DEP Commissioner **Emily Lloyd** continued to be the designee of **Mayor Michael**

**R. Bloomberg** to serve as advisor to the New York State DRBC commissioner. Ms. Lloyd announced her intention to resign her DEP position in October 2008.

### Delaware

**Governor Ruth Ann Minner** named Department of Natural Resources and Environmental Control (DNREC) Water Resources Division Director **Katherine Bunting-Howarth** as her new second alternate, replacing **Kevin C. Donnelly** who left the department at the end of 2007. DNREC Secretary **John A. Hughes** and Senior Science Advisor **Harry W. Otto** continued to serve as Governor Minner's alternate and third alternate, respectively.

### Pennsylvania

DEP Deputy Secretary for Water Management **Cathy Curran Myers** (alternate) was joined in 2008 by two new representatives of **Governor Edward G. Rendell** on the commission: Bureau of Watershed Management Acting Director **John T. Hines** (second alternate) and Water Use Planning Division Chief **Susan K. Weaver** (third alternate).



DRBC commissioners and many of the federal agency representatives who attended the 2008 federal summit at the Independence Seaport Museum in Philadelphia. Seated in the front row (from left to right): Commissioner Mark Klotz, Executive Director Carol Collier, Assistant Secretary of the Army (Civil Works) John Paul Woodley, Jr., Commissioner Brig. Gen. Todd Semonite, Commissioner Cathy Curran Myers, Commissioner Mark Mauriello, and Commissioner Katherine Bunting-Howarth. Standing (from left to right): Commissioner Lt. Col. Gwen Baker, Richard Coombe (USDA-Natural Resources Conservation Service), Wendi Weber (U.S. Fish & Wildlife Service), Paul Rush (NYCDEP), Jon Capacasa (EPA), David Russ (USGS), Reggina Cabrera (NOAA-NWS), Richard Birdsey (USDA-Forest Service), Barbara Finazzo (EPA), Jonathan Sarubbi (FEMA), Deputy Executive Director Bob Tudor, Vidal Martinez (NPS), Joseph DiBello (NPS), William Douglass (Upper Delaware Council), Commissioner Lt. Col. Thomas Tickner, and Commissioner Harry Otto. An article about the summit appears on page 24. (Photo by Katharine O'Hara)

## Federal Government

**Brigadier General Todd T. Semonite**, Commander of the U.S. Army Corps of Engineers North Atlantic Division, was originally appointed by **President George W. Bush** in May 2007 and continued to serve as the DRBC's federal member during 2008. **Lieutenant Colonel Gwen E. Baker** (Philadelphia District Engineer for the Army Corps of Engineers) was Brig. Gen. Semonite's second alternate until her mid-year reassignment to a post in Fayetteville, N.C. Her replacement as second alternate was **Lieutenant Colonel Thomas J. Tickner**, who succeeded Lt. Col. Baker as Philadelphia District Engineer. Basin Planning Section Chief **Henry W. "Hank" Gruber** with the Corps' Philadelphia District also was named during 2008 as the new third alternate. **Colonel Christopher Larsen**

(North Atlantic Division Deputy Commander) continued to serve as alternate to Brig. Gen. Semonite throughout the year.

## Commission Officers

The Delaware River Basin Compact requires the annual election of a chair and vice chairs, which historically has been based upon rotation of the compact's five signatory parties. The following members served as commission officers during calendar year 2008:

*January 1, 2008 through June 30, 2008  
(one-year term began July 1, 2007)*

**Chair:** Governor Rendell (Pennsylvania)

**Vice Chair:** Governor Corzine (New Jersey)

**Second Vice Chair:** Governor Spitzer/Paterson (New York)

*July 1, 2008 through December 31, 2008  
(one-year term to end June 30, 2009)*

**Chair:** Governor Corzine (New Jersey)

**Vice Chair:** Governor Paterson (New York)

**Second Vice Chair:** Governor Minner (Delaware)

The current list of commission members and their alternates can be viewed at [www.nj.gov/drbc/commiss.htm](http://www.nj.gov/drbc/commiss.htm).

# Commission Staff

## New DRBC Additions

- **Amy Shallcross**, Supervisor, Operations Section, Water Resources Management Branch (WRM).
- **Stephen Walsh**, Water Resources/Civil Engineer, WRM.
- **Erin McCracken**, Water Resources Planner, Planning and Information Technology Branch (PIT).
- **David Kovach**, Geologist/Hydrologist, WRM.
- **Robert Conway**, Geologist/Hydrologist, WRM.
- **Shane McAleer**, Water Resources/Civil Engineer, WRM
- **Thais Gardy**, Information Resources Coordinator, Directorate.
- **Valerie Zigon-Richardson**, Secretary, Operations Section, WRM.
- **Feng Shi**, Water Resources Engineer/Modeler, Modeling, Monitoring and Assessment Branch (MMA).

## Promotions Resulting From 2007 Technical Branch Reorganization

- **David Sayers**, Supervisor, Information Technology and Water Use Section, PIT.

## Staff Goodbyes

- **Daniel Liao**, Water Resources Engineer/Modeler, MMA, retired.
- **Alysa Suero**, Geologist/Hydrologist, WRM.
- **Paul Britt**, Geologist/Hydrologist, WRM.
- **Sherry Garrahan**, Secretary, Operations Section, WRM.

- **Kim Wobick**, Information Resources Coordinator, Directorate.
- **Maggie Allio**, Water Resources Assistant, PIT.

## Other Noteworthy People News

- The commission was saddened by the passing of two former public information officers whose combined service spanned portions of five decades. **Dawes Thompson**, who died in September 2008 at the age of 84, was the commission's first PIO. He joined the DRBC staff in 1962 after a distinguished newspaper career and served until 1986. **Christopher M. Roberts**, who succeeded Dawes and retired in 2004 after serving more than 18 years as the commission's PIO, died in January 2008 at the age of 65. Like Dawes, Chris was an accomplished journalist before joining the DRBC staff and also previously served as director of communications for the Pennsylvania Crime Commission.
- Executive Director **Carol R. Collier** was elected in 2008 to serve a three-year term as a director on the board of the

American Water Resources Association (AWRA). The AWRA, founded in 1964, is a non-profit professional association dedicated to the advancement of multidisciplinary water resources education, management, and research. Additional information can be found on its web site at [www.awra.org](http://www.awra.org).

- Environmental Toxicologist **Ronald MacGillivray** was elected president of the Hudson-Delaware Regional Chapter of the Society of Environmental Toxicology and Chemistry (SETAC). Information about this professional organization can be found at [www.hdcsetac.org](http://www.hdcsetac.org).

The current list of DRBC staff members, including their phone number extensions and e-mail addresses, can be viewed at [www.nj.gov/drbc/staff.htm](http://www.nj.gov/drbc/staff.htm).



# Hydrologic Highlights of 2008

## Drought Watch

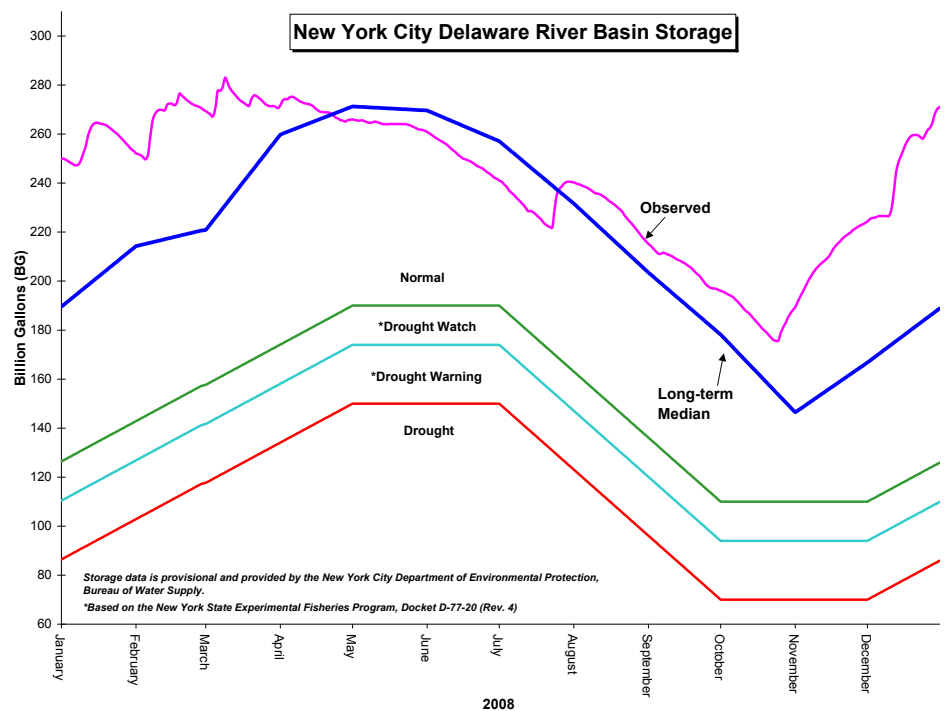
The entire state of Delaware as well as 14 counties in Pennsylvania remained under state-declared drought watches as of January 1, 2008, a lingering reminder of the dry summer and early autumn that was experienced the previous year.

Surface and groundwater conditions had been improving during the last quarter of 2007 and this trend continued during the first weeks of 2008. In response, Pennsylvania lifted drought watch declarations in 11 of its Delaware River Basin counties on January 11, 2008, and the watch ended in the three remaining basin counties on February 15. Improving conditions allowed Delaware to lift its statewide drought

watch on April 25, signaling the first time all basin counties were under normal conditions since early August 2007. Although the basin experienced a brief dry period during late-summer 2008, no new drought declarations were issued by any of the basin states or by the DRBC during the year.

## Tropical Storm Hanna

Tropical Storm (TS) Hanna arrived in the basin on Saturday, September 6 after making landfall earlier in the day along the border between South Carolina and North Carolina. Except for a heavy band of rainfall in the three-inch to four-inch range that occurred from Southeastern Pennsylvania through Northeast-



This graph shows the observed combined water storage in the NYC-Delaware Basin reservoirs (Cannonsville, Pepacton, and Neversink) during 2008, as well as the long-term median and drought rating curves. The period of record represented by the long-term median values is June 1967 to November 1998.

ern New Jersey, most of the basin received one inch to three inches. Although no significant flooding resulted from this event, TS Hanna did produce some wild weather around the basin, including a confirmed tornado in Allentown, Pa.

### Precipitation

Annual precipitation was below normal for the majority of basin counties with only 14 counties reporting surpluses for the year. Annual departures-from-normal ranged from 8.70 inches (22%) below normal in Kent County, Del. to 4.40 inches (12%) above normal in Delaware County, N.Y. Year-end precipitation totals ranged from 31.50 inches (Kent County) to 45.10 inches (Lehigh County, Pa.).

The observed precipitation at selected stations above Montague, N.J. during 2008 was 48.34 inches (5.08 inches above normal) and 50.68 inches (5.79 inches above normal) above Trenton, N.J. However, observed precipitation at Wilmington, Del. was 40.44 inches, or 2.37 inches below normal.

### Streamflow

Average monthly streamflow was normal to above normal during January 2008. Spring-like temperatures in early January melted nearly the entire snowpack above the New York City reservoirs, contributing to the high flows. The average monthly streamflow above Montague for January was 10,788 cubic feet per second (cfs) or 217% of normal flow for the month. Similarly, the

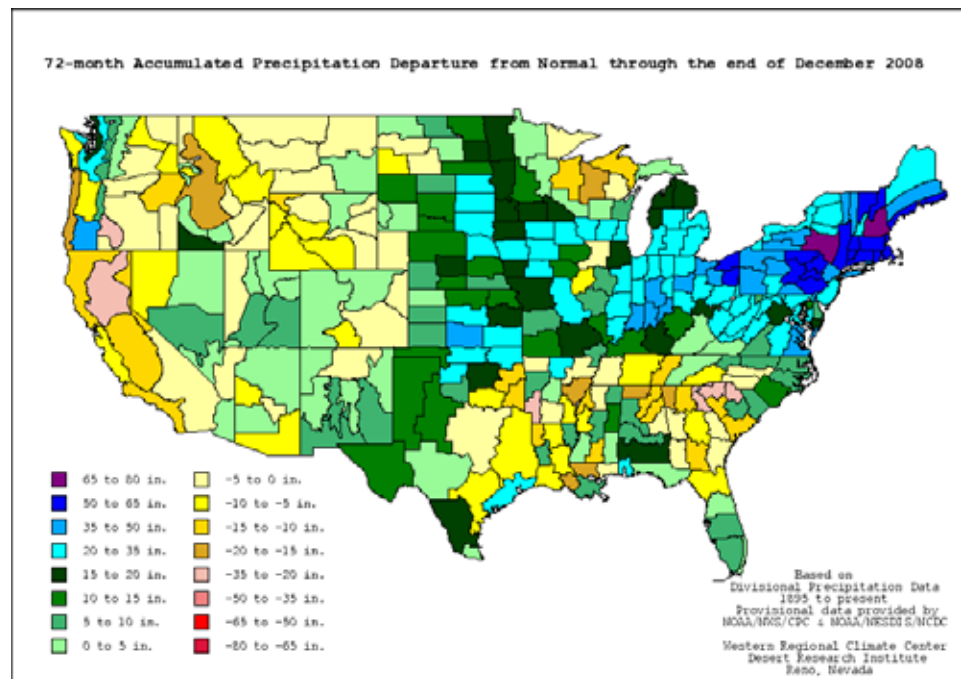
average monthly streamflow above Trenton was 19,255 cfs or 150% of the normal flow for January. Above-normal streamflow and precipitation continued during February and March.

On average, streamflows remained below normal to normal throughout the rest of the spring, summer, and autumn. Much above-normal precipitation in December boosted streamflows at many locations to more than double their normal flow. December's average streamflow above Montague was 12,532 cfs or 255% of normal monthly flow.

Similarly, the flow at Trenton during December was 26,705 cfs or 236% of normal flow.

### Lower Basin Reservoir Storage

Both Beltzville Reservoir (located on the Pohopoco Creek, a tributary of the Lehigh River) and Blue Marsh Reservoir (located on the Tulpehocken Creek, a tributary of the Schuylkill River) maintained storage in the normal range during 2008. After a dry August, DRBC-directed releases from lower basin reservoirs were required to meet the Delaware River flow objective of 3,000 cfs at



This map shows accumulated precipitation departure from normal for the six-year period from January 2003 through December 2008. The Pennsylvania portion of the Delaware River Basin received 50 to 65 inches of accumulated precipitation above normal over this period while New Jersey received 20 to 50 inches above normal. Most of the state of Delaware received 10 to 20 inches of accumulated precipitation above normal, with the northern area of the state receiving 35 to 50 inches above normal. The New York portion of the basin, indicated by the purple shading, received 65 to 80 inches of accumulated precipitation above normal over this stretch of time, which included the three main stem floods. For comparison with the other extreme, the accumulated precipitation deficit during the "drought of record" that extended over a six-year period during the 1960s was around 40 inches. Normal annual precipitation in the basin is 42 to 45 inches. (Courtesy of the National Oceanic and Atmospheric Administration [NOAA]/Western Regional Climate Center)

Trenton. During the period August 28 through September 25, DRBC directed a total of 485 million gallons (mg) from Blue Marsh Reservoir and 1.067 billion gallons (bg) from Beltzville Reservoir

No replacement releases were required during 2008 from Merrill Creek Reservoir, located near Phillipsburg, N.J., to make up for evaporative water losses caused by power generation when the basin is under DRBC drought operations.

### **Upper Basin Reservoir Storage**

The year began with above-normal storage in the New York City (NYC)-Delaware Basin reservoir system (249.832 bg, which was more than 60 bg above the long-term median usable storage for January 1). Heavy precipitation in February caused the reservoirs to fill and spill by mid-February, well ahead of the normal May 1 refill date.

Reservoir levels remained at or above usable capacity until April. Extra releases from the Temporary Wet Spring Releases Schedule Adjustment (please see the Flexible Flow Management Program article on page 16 for more information) caused storage to decline and total usable storage in the three reservoirs dropped to below the long-term median by the end of April. Storage continued to decline throughout the spring and summer, remaining below the long-term median until late July when several inches of rain boosted water supply levels. Storage remained above the median for the remainder of the year. On Decem-

ber 31, 2008, combined storage was 271.006 bg, or more than 82 bg above normal for that date.

The Office of the Delaware River Master directed releases totaling approximately 47 bg from the NYC reservoirs to meet the normal minimum flow target at Montague as required by the 1954 U.S. Supreme Court Decree. These 2008 directed releases, which began in June and continued as-needed through October, were lower than the 54 bg released during 2007 and 101 bg released during the drought year 2001.

### **Groundwater**

The average observed groundwater level at eight reported U.S. Geological Survey observation wells in the Pennsylvania portion of the basin remained above the long-term average through May 2008. However, average water levels in these wells declined below the long-term average beginning in June and continued to decline until autumn. Although water levels began a seasonal upward trend in October, they remained below the long-term average for the remainder of the year.

Monthly groundwater measurements at the New Castle County, Del. coastal plain well recorded levels within the normal range for all of 2008. The Cumberland County, N.J. coastal plain well recorded levels above the normal range through June; water levels there began to decline in July, but remained within the normal range through the end of the year.

### **Salt Front**

The salt front or salt line is the 250 milligram per liter chloride concentration. Its seven-day average location is used by DRBC as an indicator of salinity intrusion in the Delaware Estuary. The salt front's location fluctuates along the tidal Delaware River as streamflows increase or decrease in response to changing inflows, diluting or concentrating chlorides in the river. Long-term average mid-month locations of the salt front range from river mile 61 in mid-April (0.5 miles below Pea Patch Island, Del.) to river mile 81 in mid-October (Marcus Hook, Pa.). The farthest recorded upstream location of the salt front—river mile 102—was measured during the 1960's drought of record.

The salt front location during 2008 varied from below river mile 54 at Reedy Island, Delaware (which is about four miles downstream of the Chesapeake and Delaware Canal) in March to river mile 86 (eight miles upstream of the Delaware-Pennsylvania state line) in October.

More detailed information about the basin's hydrologic conditions can be found on the DRBC web site at [www.nj.gov/drbc/hydro.htm](http://www.nj.gov/drbc/hydro.htm).

## DRBC Votes to Protect Lower Delaware Water Quality

The commissioners on July 16, 2008 permanently designated the Lower Delaware as Significant Resource Waters under DRBC's Special Protection Waters (SPW) program.

The unanimous action taken at the commission's public business meeting establishes numeric values for existing water quality in the 76-mile-long stretch of river extending from the Delaware Water Gap National Recreation Area downstream to the head of tide at Trenton, N.J. It also expands coverage of the DRBC's SPW anti-degradation regulations to include the entire 197-mile non-tidal Delaware River from Hancock, N.Y. south to Trenton.

"This permanent designation clearly demonstrates the DRBC's long-term objective of keeping our clean water clean by ensuring that future discharges to the Lower Delaware will have no measurable change on existing high water quality," Executive Director Carol R. Collier said. "We believe this action, along with the previous SPW designations, establishes the longest stretch of anti-degradation policy on any river in the nation."

The SPW program is designed to prevent degradation in the non-tidal main stem Delaware considered to have exceptionally high scenic, recreational, ecological, and/or water supply values through stricter control of wastewater discharges, non-point source pollution control, and evaluation requirements. The initial SPW regulations adopted in 1992 focused on controlling point

(or end-of-pipe) sources of pollution to maintain existing high water quality. In 1994, the regulations were amended to add language dealing with the complex issue of non-point source pollutants that are found in runoff, especially after heavy rains.

The July 16 rulemaking decision was years in the making, beginning with the efforts leading up to President Bill Clinton signing legislation into law adding key segments of the Lower Delaware and selected tributaries to the National Wild and Scenic Rivers System in November 2000. This federal designation was followed in April 2001 with a petition from the Delaware Riverkeeper Network to classify the Lower Delaware as Special Protection Waters. Extensive data were collected from 2000 through 2004, which confirmed that existing water quality in this stretch of river exceeded most state and federal standards, and an eligibility report was issued by DRBC in August 2004.

The Lower Delaware had been temporarily classified as Significant Resource Waters by DRBC since January 2005, making it subject to all SPW regulations except those that stipulate the use of numeric values for existing water quality. The temporary designation was made pending a determination of the numeric values, evaluation of options for implementing the rule, consideration of rule clarifications needed to ensure the program's uniform application in all areas of the basin that drain to SPW, and rule-making to adopt the amendments to

DRBC's Water Quality Regulations that are needed to fully implement the program.

The notice of proposed rulemaking leading up to the July 16, 2008 action was published September 28, 2007 on the commission's web site, and appeared in federal and state registers in early October 2007. Two informational meetings took place in Stockton, N.J. and Easton, Pa. in the fall of 2007, a public hearing followed on December 4, 2007 at the DRBC's headquarters in West Trenton, N.J., and written public comments were accepted through December 6, 2007.

As adopted, the rule requires new or expanding facilities to demonstrate that their discharges will not cause measurable change to existing water quality. In response to concerns raised during the public comment period, the adopted rulemaking clarified language, in particular relating to the circumstances under which wastewater facilities must employ nondischarge alternatives or natural treatment technologies and how they must demonstrate that they will cause no measurable change. It was noted at the July 16 meeting that the clarifications were consistent with the overall goal of "no measurable change except to natural conditions" and with provisions applicable to already designated SPW areas upstream of the Delaware Water Gap National Recreation Area.

Additional SPW information is available on the commission's web site at [www.nj.gov/drbc/spw.htm](http://www.nj.gov/drbc/spw.htm).





This map shows the DRBC Special Protection Waters Drainage Area.

# Natural Gas Drilling

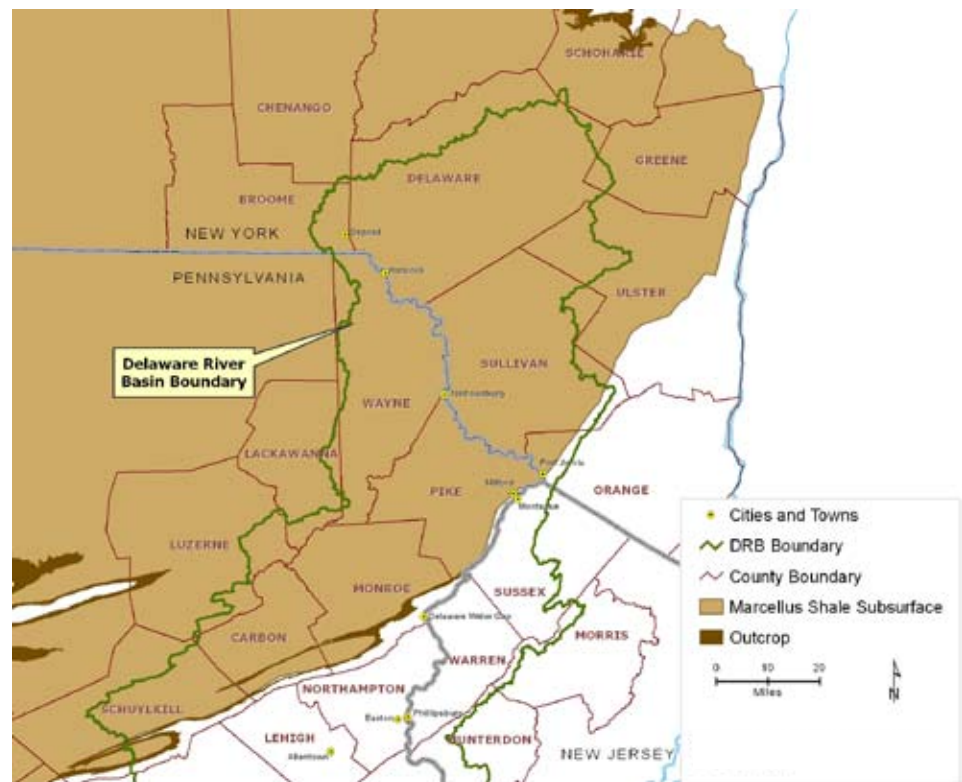
## *An Emerging Issue Facing the Basin and DRBC*

Gas drilling is certainly not new to states like Pennsylvania and New York. In fact, Pennsylvania reports that more than 350,000 oil and gas wells have been drilled in the Commonwealth since the first commercial oil well was developed in 1859.

Technological advances in horizontal drilling and hydraulic fracturing, and the profitable use of these techniques to extract gas from shale formations throughout the United States, have led to a recent surge of interest in the Marcellus Shale formation, which underlies 36 percent of the Delaware River Basin or nearly 5,000 square miles in northeastern Pennsylvania and south central New York. Unlike traditional

natural gas exploration, these new extraction methods require large amounts of water to fracture the shale formation to stimulate the release of trapped natural gas. A significant amount of water used in the extraction process is recovered, but this “frac water” includes natural gas and chemicals added to facilitate the extraction process, as well as brine and other contaminants released from the formation.

Historically, gas exploration and drilling have been regulated by the states, not the DRBC. However, given the new extraction techniques and the commission’s legal authority over both water quality and water quantity-related issues throughout



This map shows the extent of the Marcellus Shale formation in the Delaware River Basin (DRB). “Outcrop” refers to shale formations found at surface level. (Source: USGS National Assessment of Oil and Gas)

the basin, a DRBC regulatory role over natural gas drilling projects emerged during 2008. The intent of the commission is not to prevent natural gas drilling, but rather to ensure that proper environmental controls are provided to safeguard the basin's water resources. In connection with natural gas drilling, the DRBC has identified three major areas of concern:

1. Gas drilling projects in the Marcellus Shale or other shale formations may have a substantial impact on the water resources of the basin by reducing the flow in streams and/or aquifers used to supply the significant amounts of water needed in the natural gas extraction process.
2. On-site drilling operations may potentially add, discharge or cause the release of pollutants into the groundwater or surface water.
3. The recovered "frac water" must be stored, treated, and disposed of properly.

Throughout the second half of 2008, DRBC staff members met with concerned citizens and industry representatives, as well as held pre-application meetings with several natural gas drilling companies or their consultants to answer questions and explain the commission's regulatory review process.

By the end of the year, commission staff was aware of only one natural gas well that had been drilled

in the Marcellus Shale formation in the basin. DRBC issued the company, Stone Energy Corporation, a compliance letter in June 2008 to address its failure to obtain DRBC approval before drilling this well in Wayne County, Pa. No fracking materials were injected into the well. In response to this letter, the company ceased further activities at the site and capped the well. DRBC and Stone Energy reached a settlement in December where the company agreed to pay a \$70,000 penalty and submit an application for commission approval of future gas extraction activities at the site.

The only natural gas-related application received by the DRBC in 2008 was submitted by Chesapeake Appalachia, LLC in October. The company is seeking approval to withdraw 30 million gallons per 30 days from the East Branch of the Delaware River at Peas Eddy in Delaware County, N.Y. The water would be used for natural gas well drilling operations in both New York and Pennsylvania. This application is for surface withdrawal only and not for actual well production, which also would require DRBC approval.

DRBC is currently working with other regulatory and scientific agencies at the federal and state levels to refine review criteria. Although DRBC's authority is separate from the states' authorities, the commission is working with Pennsylvania and New York to coordinate agency actions and minimize unnecessary duplication of effort in the issuance of DRBC permits or "dockets"

to natural gas drilling companies. Companies must obtain applicable state or federal approvals as well as approval by the DRBC. DRBC dockets are not expected to be issued to individual property owners who merely sell or lease natural resource rights to a natural gas drilling company. However, the commission requires any entity to obtain DRBC approval if the proposed withdrawal exceeds the applicable threshold, which for most of the basin is more than 100,000 gallons per day during any 30 consecutive day period from a ground and/or surface water source.

New York is currently in the process of amending its Generic Environmental Impact Statement (GEIS) for well drilling to consider the differences in the horizontal drilling and fracking operations proposed by many of the natural gas drillers. At New York's request, DRBC has agreed to not process any natural gas drilling applications in that state until the GEIS is completed or until New York has advised the commission that an applicant has a complete state application with all of the necessary supplemental information. DRBC can still process applications that only involve water withdrawals such as the earlier described Chesapeake Appalachia proposal.

The most current information can be found on the DRBC web site at [www.nj.gov/drbc/naturalgas.htm](http://www.nj.gov/drbc/naturalgas.htm).

## DRBC Releases First *State of the Basin Report*

The Delaware River Basin Commission joined with the Partnership for the Delaware Estuary (PDE) at the John Heinz National Wildlife Refuge at Tinicum on December 5, 2008 to officially release the *State of the Basin Report*, as well as reintroduce PDE's *State of the Delaware Estuary Report* which was released earlier in July.

Speakers at the joint press conference included DRBC Deputy Executive Director Robert Tudor and PDE Executive Director Jennifer Adkins. Also speaking was Gerald Kauffman, the director of the University of Delaware Institute for Public Administration's Water Resources Agency (IPA-WRA). Kauffman led a team of the basin's university-based Water Resource Research Institutes which collected and compiled data submitted to both DRBC and PDE that were used as a foundation for their reports.



DRBC Deputy Director Robert Tudor discusses the findings of the *State of the Basin Report* at the December 2008 press conference. (Photo by Shaun Bailey/Partnership for the Delaware Estuary)

Both 2008 reports discuss the current health of the Delaware River Basin by examining the status of certain environmental conditions, as well as trends and actions needed to better monitor and assess these conditions in the future. The two reports provide a baseline analysis to help answer the questions:

- Are things better or worse in the Delaware River Basin?
- Are the goals set forth in DRBC's 2004 *Water Resources Plan for the Delaware River Basin* ("Basin Plan") and the PDE's 1996 *Comprehensive Conservation and Management Plan* (CCMP) viable and being achieved?

"The general assessment is that the answer to these questions is both yes and no," Tudor said. "While there are some conditions in the basin and estuary that have improved over time and are on a positive trend, there are others that have worsened, as well as some that have remained stable. Furthermore, while some goals in the plans have been attained, the reports highlight that more work needs to be done. Such progress will be tracked in subsequent analyses and through additional or enhanced monitoring programs. For water resource



Managers and policy makers, it is important to look at the basin both as a holistic system and as a sum of its inter-related parts in order to effectively improve its overall health and vitality."

DRBC's *State of the Basin Report* serves as a benchmark of current conditions and provides a platform for measuring and reporting future progress. It is meant to be a companion to the 1981 *Level B Study*, which was the last comprehensive assessment of water resource issues in the basin, and a point of reference for gauging implementation status of the water resource management goals listed in the 30-year Basin Plan completed in 2004.

"Our federal and state commissioners directed the preparation of this periodic environmental condition report when they endorsed the Basin Plan," Tudor said. "The desired conditions listed in the *State of the Basin Report* link to specific Basin Plan goals and the collaboration that occurred to produce this report satisfies additional goals in support



of institutional coordination and cooperation.”

The *State of the Basin Report* catalogs specific indicators, or measurements of environmental conditions, on which data were readily available and assembles them into four categories: hydrology, water quality, living resources, and landscape. Each of the 37 indicators—such as water use, dissolved oxygen, horseshoe crabs, and wetlands—is discussed in terms of current status and trend (positive, negative, or stable) toward a desired condition. For example, water supply, river flows, and dissolved oxygen indicators show good, stable conditions, while indicators for flood damage, fish consumption, and certain living resources show poor conditions. The report also describes future actions and needs necessary to achieve desired conditions.

In addition, the report includes features on burgeoning issues such as climate change, emerging contaminants, invasive species, and the valuation of natural landscapes. It concludes with a summary of all conditions and recommendations for future monitoring and reporting. Updating this comprehensive report is planned every five years.

This project marks the first time that the four basin state Water Resource Research Institutes have collaborated. Jerry Kauffman at the University of Delaware worked with his counterparts at Penn State, Rutgers, and Cornell to collect and analyze data on tributary water quality and flows, basin land use, and historic information on water quality

issues and events in the Delaware River Basin.

DRBC contracted with the universities and worked in collaboration with PDE, USGS, and EPA to set the parameters for the reports. The Science and Technical Advisory Committee for the Delaware Estuary Program provided critical reviews of several indicators.

The DRBC report development team was led by Basin Planner Jessica Rittler Sanchez. A portion of the funding for the *State of the Basin Report* came from the William Penn Foundation as part of the original grant for the Basin Plan. Additional monies were provided by DRBC, and substantial in-kind support was provided by university and state and federal agency partners.

The complete *State of the Basin Report* is available on the DRBC web site at [www.nj.gov/drbc/SOTB/index.htm](http://www.nj.gov/drbc/SOTB/index.htm) and the *State of the Delaware Estuary Report* can be found at [www.delawareestuary.org](http://www.delawareestuary.org). To view the universities’ report, *Technical Summary: State of the Delaware Basin Report*, please visit [www.ipa.udel.edu/publications/water.html](http://www.ipa.udel.edu/publications/water.html).

A brochure summarizing the 2008 *State of the Basin Report* can be viewed on the DRBC web site. Copies of the brochure and complete report are available upon request.



# Flexible Flow Management Program (FFMP) Rulemaking Update

## *DRBC Withdraws Water Code Amendments Proposed in 2007*

The five-member DRBC, comprised of Delaware, New Jersey, Pennsylvania, New York State, and the federal government, at its December 10, 2008 public meeting withdrew the proposed amendments to the DRBC Water Code published on December 3, 2007 and directed staff to develop new proposed amendments to the Water Code for public notice and comment by or in the summer of 2009 (or as soon thereafter as practicable).

Commissioner Katherine Bunting-Howarth, who represents the state of Delaware on the DRBC, presented and read a seven-page statement on behalf of her commission colleagues at the December 10 meeting. "After considering the [over 1,900] comments, we believe that the goals of the proposed regulations can be better effectuated through a regulation that establishes standards for reservoir operations rather than details that unduly restrict flexibility and the ability to adjust operations in a timely manner as conditions warrant," Commissioner Bunting-Howarth said. "We also believe that development of the regulations would benefit from consideration of the results of new models that are under development and the completion of studies that are underway." This would include the following:

- Flood analysis model currently being developed for the commission by the combined efforts of the U.S. Geological Survey, U.S. Army Corps of Engineers, and National Weather Service;

- OASIS model (a water resources planning tool) to be updated with data through September 2006;
- Results of ongoing studies scheduled to be concluded by the U.S. Fish and Wildlife Service in 2009 on the habitat needs of the dwarf wedgemussel, a federally protected endangered species found in the upper Delaware Basin;
- Experience gained over the past year of FFMP operation; and,
- Comments received on the proposed Water Code amendments during the public comment period which ended on March 3, 2008.

The regulations were originally proposed in December 2007 to codify the FFMP agreement that was unanimously approved on September 26, 2007 by the parties to the 1954 U.S. Supreme Court Decree (Delaware, New Jersey, Pennsylvania, New York State, and New York City) for operation of the three New York City (NYC) Delaware Basin reservoirs through May 31, 2011. Informational meetings on the proposal were held December 18, 2007 in Matamoras, Pa. and January 8, 2008 in Philadelphia, Pa., and a public hearing to receive comments was held January 16, 2008 in West Trenton, N.J.

The FFMP agreement continues to be implemented on a temporary basis by the five decree parties through May 2011. This agreement was developed by the decree parties to provide a more adaptive means than the previous operating regime

for managing the Cannonsville, Pepacton, and Neversink reservoirs for competing uses, including: water supply; drought management; flood mitigation; protection of the tailwaters fishery; a diverse array of habitat needs in the main stem river, estuary, and bay; recreation; and salinity repulsion. The 1954 Supreme Court Decree, which resolved an interstate water dispute centering on the three NYC reservoirs, made no provision for spill mitigation, conservation or ecological releases.

The conceptual framework of the FFMP agreement largely eliminates the reservoir storage "banks" previously relied on for habitat protection purposes and instead bases releases on storage levels, resulting in larger releases when water is abundant and smaller releases when storage is at or below normal. Its spill mitigation component is intended to reduce the likelihood that the three reservoirs could be full and spilling coincident with a major storm or thaw.

The law creating the DRBC gives the commission the power to allocate the waters of the basin, but prohibits it from adversely affecting any condition set forth in the 1954 decree, including the NYC reservoir releases or diversions that the decree established, without the unanimous consent of the five decree parties.

Additional information can be found on the commission's web site at [www.nj.gov/drbc/FFMP/index.htm](http://www.nj.gov/drbc/FFMP/index.htm).

## Summary of FFMP Temporary Adjustments and Changes Agreed to by the Decree Parties in 2008

As the review of the many comments and suggestions received proceeded, the decree parties implemented the following temporary adjustments to reservoir releases and operations under the adaptive management framework of the September 2007 FFMP to respond to various ambient and other conditions in the basin:

- Temporary Increase in the Controlled Releases from NYC's Pepacton, Cannonsville, and Neversink Reservoirs. Purpose: To facilitate the release of excess water from these reservoirs while a corrective maintenance inspection of a portion of the Delaware Aqueduct was conducted. Effective: February to March 2008.
- Temporary Wet Spring Releases Schedule Adjustment for Pepacton, Cannonsville, and Neversink Reservoirs. Purpose: To better protect Delaware River Basin communities by authorizing, subject to certain reservoir-storage criteria, releases of water greater than those specified in FFMP Table 3. Effective: April 15-30, 2008.
- Temporary Thermal Releases Program for Fishery Protection. Purpose: To allow for emergency releases of water from Cannonsville Reservoir, subject to specific air temperature-based triggering criteria, to provide additional thermal protection for the main stem Delaware River downstream to near Hancock, N.Y. Effective: June 9-11, 2008.
- Interim Excess Release Quantity Extraordinary Needs Bank for an Emergency Thermal Releases Program for Fishery Protection. Purpose: To allow for emergency releases of water from Cannonsville Reservoir, subject to specific air temperature-based triggering criteria, to provide additional thermal protection for the main stem Delaware River downstream to near Hancock. This was essentially a continuation of the Temporary Thermal Releases Program for Fishery Protection started in June 2008 (see above). Effective: July 1 to September 15, 2008.
- Temporary Releases Program for 2008 Rondout West Branch Tunnel Shutdown. Purpose: To facilitate the release of excess water from Pepacton, Cannonsville, and Neversink reservoirs while necessary underwater repair work is performed at a dewatering shaft of the Delaware Aqueduct. Effective: October 1, 2008 to May 1, 2009.

Based upon the experience gained during the first year of FFMP operation and comments received during the public comment period on the proposed amendments to the DRBC Water Code, the decree parties unanimously agreed to the following changes to the September 2007 FFMP which became effective on December 10, 2008:

- Revised "Tailwaters Habitat Protection and Discharge Mitigation Program" Releases Tables (Table 3) to allow for increased reservoir releases for fisheries habitat protection needs in late May and early September.
- Revised FFMP Sections 16 and 17 to clarify the meaning of "temporary" releases schedules during periods of maintenance and repair of NYC Delaware Basin reservoirs and appurtenant infrastructure.

The decree party's FFMP agreement can be viewed on the Delaware River Master's web site at [water.usgs.gov/osw/odrm/](http://water.usgs.gov/osw/odrm/).

# Watershed Project Partnerships

The integration of water and land use management frequently takes place at the watershed scale as DRBC works with local, regional, state, and federal partners to improve conditions in specific watersheds. Below is a 2008 progress report on several watershed projects.

## Christina River Watershed

The Christina Basin provides 100 million gallons of drinking water daily to more than a half million people in Chester County, Pa. and New Castle County, Del., including 60 percent of Delaware's state-wide population. The headwaters and upper portion of this basin are in Pennsylvania, accounting for two-thirds of the 565-square-mile drainage area, while the basin's lower third is located in Delaware, where it drains into the Delaware River at Wilmington.

Since the mid-1990s, the Christina Basin Clean Water Partnership (partnership) has worked to develop a coordinated, scientific approach to improve the basin's water quality and meet the water needs of this interstate region. The partnership includes the DRBC, representatives of federal, state and local government, along with private groups and the academic community.

In 2003, DRBC helped secure a \$1 million Targeted Watershed Initiative Grant from the U.S. EPA to support partnership efforts to improve water quality through urban, agricultural, and backyard programs in the Brandywine, Red Clay, White Clay, and Christina

subbasins. The partnership was one of only 20 community-based groups (out of 176 applications) receiving federal funding under the \$15 million national program. Both Delaware Governor Ruth Ann Minner and Pennsylvania Governor Mark Schweiker signed the grant proposal, which was the number one rated application reviewed by EPA in the first year of this watershed grant program.

The Christina Basin restoration budget was \$3,679,778. Of that total amount, \$1 million was provided by the EPA grant, \$339,000 was provided by local matches from Delaware and Pennsylvania stakeholders, and \$2,340,778 was received in leveraged funds from other sources. *The partnership leveraged more than two dollars for every federal dollar invested for water qual-*



Congressman Castle (right) presents an award at the February 2008 Christina Basin ceremony to Susan Donaghy, Assistant Head of the Independence School. Steve Williams with DNREC also is pictured. (Photo by Katharine O'Hara)

*ity improvement projects, allowing the partners to exceed their original goals, some by more than 50 percent.*

These successful efforts were celebrated on February 29, 2008 with an awards ceremony in Kennett Square, Pa., where six property owners who

The following list summarizes the on-the-ground best management practices (BMPs) that were completed with the federal grant as well as matched and leveraged funds:

Pa. Nutrient Management Control Plans	10 (1,067 acres)
Pa. Nutrient Management Control Systems	Seven
Pa. Soil Conservation Practices	728.5 acres on eight farms
Pa. Waterway Diversions	2,250 feet (1.29 acres) on three farms
Pa. Water Control Structures	Eight on six farms
Pa. Stream Fencing	8,025 feet
Pa. Stream Reforestation	9,148 feet
Del. Smartyard Landscaping/Rain Barrels	150 smartyards/204 rain barrels
Del. Stream Bank Restoration/Reforestation	8,920 feet
Pa. Stream Bank Restoration	1,200 linear feet
Pa. Stormwater Outfall Retrofits	One
Pa. Stormwater Basin Retrofits	Three
Del. Stormwater Wetland Retrofits	Five
Del. Stormwater Wetland Retrofits	One rain garden





(From right to left) Congressman Pitts, Lois Laffey and Karen Kauffman from Glenville Farms, and Bill Callahan with CCCD at the February 2008 Christina Basin awards ceremony. (Photo by Katharine O'Hara)

were involved in separate projects throughout the Christina Basin were honored. U.S. Rep. Mike Castle (Del.-At Large), who co-chairs the Delaware River Basin Congressional Task Force, and U.S. Rep. Joe Pitts (Pa.-16) presented the recipients with their awards. U.S. Rep. Jim Gerlach (Pa.-6) was represented by a member of his staff, who also presented an award.

The December 2008 Christina Basin Targeted Watershed Grant Final Report was prepared by DRBC Watershed Planner Pamela V'Combe and edited by Martha Corrozi Narvaez with the University of Delaware's Water Resources Agency. The complete final report as well as additional information about the partnership's ongoing efforts can be found on the DRBC web site at [www.nj.gov/drbc/christinabasin.htm](http://www.nj.gov/drbc/christinabasin.htm).

### Upper Wissahickon Creek Pilot Study

DRBC led the development of a Special Area Management Plan

(SAMP) for the Upper Wissahickon Creek study area in Montgomery County, Pa. to pilot the Critical Area Resource Plan (CARP) process and guidance document prepared under Pennsylvania's Water Resources Planning Act (Act 220). Since a considerable amount of planning and technical work

had already been performed in the Upper Wissahickon Creek study area, it seemed an appropriate location for this pilot study. This plan is expected to be used as a model for future SAMPs and CARPs in Pennsylvania.

One of the key topics required by Act 220 is the identification of critical water planning areas (CWPAs) where existing or projected future demands may exceed the amount of water that will be available for use or where other significant water resource impacts are expected. Act

220 calls for a CARP to be conducted in these watersheds to evaluate future water conflicts and provide a more detailed analysis of water resource issues.

The Wissahickon Creek is a tributary of the Schuylkill River, which is the largest tributary to the Delaware River. The Upper Wissahickon Creek study area occupies 40 square miles of the creek's total drainage area of 64 square miles, constituting the upper two-thirds of the Wissahickon Creek Watershed. Wissahickon Creek supports a diversity of uses, including fishing, swimming, and drinking water, both within its watershed boundaries and beyond.

The Upper Wissahickon Creek study area is facing numerous stressors affecting its water quality and flow. Since 1970, over 7,500 acres have been developed, placing an ever increasing demand on the Wissahickon Creek to provide for and support commercial and residential users, within and outside of the study area. Since the Upper Wissahickon study area is projected to continue growing at a steady

DRBC's coordination of the Targeted Watershed Initiative Grant in the Christina Basin included partnerships with Brandywine Watershed Association, Chester County Conservation District (CCCD), Chester County Water Resources Authority, Delaware Department of Natural Resources and Environmental Control (DNREC), Delaware Nature Society, Pennsylvania Department of Environmental Protection (PADEP), University of Delaware's Water Resources Agency, and U.S. Environmental Protection Agency (EPA) Region 3.

pace over the next several decades, it is critical to ensure an adequate supply of suitable quality water by balancing existing and anticipated human uses with ecosystem needs. Some of the challenges facing water managers include:

- Low base flow;
- Channel instability;
- Degraded water quality; and
- Flooding.

The study area's challenges were assessed, corrective alternatives prioritized, and the following six overall strategies were recommended:

- Retrofit stormwater basins;
- Review and update ordinances;
- Protect source water;
- Restore stream channels and riparian corridors;
- Educate homeowners to implement backyard BMPs; and
- Establish a stormwater partnership.

Implementation of the plan will help balance economic vitality and environmental quality in this area. In addition, the recommendations developed to address these issues may be helpful to watersheds throughout Pennsylvania faced with water supply and water quality limitations.

The SAMP was prepared by the DRBC and the Montgomery County Planning Commission, in coordination and cooperation with PADEP. SAMP funding was provided by PADEP through the Pennsylvania Coastal Zone Manage-

ment (CZM) program. The public process used to prepare the SAMP was facilitated by the Pennsylvania Environmental Council (PEC). A major part of PEC's role included coordination of the Critical Area Advisory Committee (CAAC) as well as preparation for and execution of CAAC and public meetings.

The pilot study provided major enhancements to the Act 220 CARP process and guidance including the following:

- *Development of Water Management Areas (WMA):* Subdividing the entire study area into four smaller water management areas allowed CAAC members to develop a geographical focus for detailed discussions on their sub-region within the study area and local decision makers to focus on recommendations relevant to their local issues. This local focus within the watershed allowed for dynamic and integrated collaboration among local governments and other regional agencies active within the entire watershed by creating opportunities for creative partnerships and shared implementation.
- *Reaffirmation of Existing Watershed Goals:* Using a goal matrix and identifying existing goals established through previous related planning efforts and statutory regulations reiterated priorities already established through a prior public planning process. This encouraged immediate "buy-in" from participants and allowed

them to focus on important issues in the watershed.

- *Inclusion of Representation on the CAAC:* As an oversight committee to the Act 220 Regional Water Resources Committee, the CAAC evaluated policies, programs, and management alternatives throughout the CARP's development. Having direct involvement of as many key watershed leaders as possible throughout the process ensured "ownership" of the final plan and facilitated its recommendation to the Regional Committee.
- *Establishment of a Technical Team:* Drawing on the expertise of a group of water resource professionals familiar with the technical issues related to water resource management, including local problems and solutions in the study watershed, was an invaluable resource that was used to assist the CAAC in evaluating alternatives and making recommendations.
- *Facilitation:* CAAC meetings, as well as public meetings and hearings, were organized and directed by a professional, independent facilitator.
- *Ordinance Review:* A simple qualitative and quantitative methodology was developed to compare ordinances in the Upper Wissahickon Creek Study area to the county planning commission's model ordinances. This methodol-

ogy is explained in the SAMP and can be easily replicated in other critical water resource areas.

Additional information, including the June 2008 SAMP, can be found on the Montgomery County Planning Commission's web site at [www.planning.montcopa.org/Wissahickon](http://www.planning.montcopa.org/Wissahickon).

### Schuylkill River Watershed

The Exelon Restoration Fund, initiated as a condition of DRBC docket D-69-210CP, provided nearly \$138,000 for restoration projects in 2008. Three projects were selected to address agricultural BMPs in the Maiden Creek Watershed and stormwater issues in the Scioto Creek and Wissahickon watersheds. Since its inception in 2006, the fund has supplied approximately \$525,000 for nine projects that have helped to restore areas of the Schuylkill degraded by acid mine drainage or poor agricultural and stormwater management practices.

The Schuylkill Action Network signed a memorandum of understanding with the Schuylkill River Heritage Area in 2008 to expand the existing Exelon Fund into a Schuylkill River Restoration Fund and actively seek additional grantors to support restoration projects that will protect this important drinking water source.

### Pocono Creek Watershed

The DRBC sponsored *Trout Trails and Tales*, a community outreach and public education effort in the



This five-foot "Native Brookie" trout, embellished by local artist Jennifer Frantz, helps a student learn about hydrology, land use, and trout in front of the Borough of Mount Pocono municipal building. (Photo by P. V'Combe)

Pocono Creek Watershed during 2008. This innovative art project commissioned fifteen area artists to decorate five-foot fiberglass trout sculptures, which were later placed along a "trout trail" throughout the watershed. Each trout told a part of the "trout tale," the story of how abundant cold waters support the local trout population while raising awareness about the connections between development, streamflows, and living resources. This three-month community art project provided an exciting, imaginative alternative for the Brodhead Watershed Association to actively engage local sponsor support for and spark active public interest in local watershed issues.

This effort was a part of the education and outreach "pillar," which along with the technology and planning components, completed the *Framework for Sustainable Watershed Management* project. The "framework" project is being funded by EPA's Collaborative Science and Technology Network for Sustainabil-

ity (CNS), a grant program offered through the National Center for Environmental Research (NCER) Science to Achieve Results (STAR) that supports collaboration between science and engineering researchers and decision-makers to pursue regional sustainability.

Project partners included Brodhead Watershed Association, DRBC, EPA, Monroe County Conservation District, Monroe County Planning Commission, Pennsylvania Fish and Boat Commission, Pocono Arts Council, and USGS.

Pocono Creek is an 18-mile-long tributary to McMichael Creek in the Brodhead Creek Watershed, and the Brodhead flows into the Delaware River near the Delaware Water Gap.

Additional information is available at [www.trouttrails.org/](http://www.trouttrails.org/).

### Upper and Central Region Watersheds

The large tracts of forest in the upper basin provide excellent protection of the Delaware River's headwaters. DRBC is working with the Pinchot Institute for Conservation, National Park Service, Pa. Department of Conservation and Natural Resources, and other partners in the "Common Waters" Initiative. The goal is to develop strategies to accommodate growth in the central and upper region watersheds of New York, Pennsylvania, and New Jersey while protecting forest and water resources. A grant has been provided from the William Penn Foundation to support the initiative.

# PCB Implementation Plan

In late 2005, the DRBC approved Resolution 2005-19 authorizing the solicitation of public input on an updated water quality criterion for PCBs for the tidal portion of the Delaware River and Delaware Bay, but first requested that the commission's executive director develop a strategy for implementing criteria for bioaccumulative pollutants such as PCBs.

These pollutants are particularly problematic since their association with the sediments of a water body can prevent achieving the updated criteria within a short period (usually five years).

Resolution 2005-19 stated that the recommended approaches should be consistent with the federal Clean Water Act's existing National Pollutant Discharge Elimination System (NPDES) framework while also reflecting principles of adaptive management.

Adaptive management is defined as the application of a variety of techniques, measuring their effects, and further application of the techniques determined to be most effective. While this approach may be utilized for a number of bioaccumulative pollutants, it will first be used with PCBs, a pollutant that is responsible for the fish consumption advisories that have been issued by the states of Delaware, New Jersey, and Pennsylvania for the Delaware Estuary.

The resolution also indicated that participants should include staff of the DRBC, U.S. Environmental Protection Agency (EPA) Regions

2 and 3, and the environmental agencies of the basin states, along with agency staff from outside the basin who are experienced in developing or applying rules designed to implement water quality criteria that cannot be achieved within a single five-year NPDES permit cycle.

Following two meetings in 2006 and 2007, a small workgroup of DRBC staff and staff from the headquarters and regional offices of EPA began work on the details of such a plan. An exhaustive effort culminated during 2008 in the completion of an approach called the Total Maximum Daily Load (TMDL) Implementation Plan for PCBs.

The plan is expected to be included in the public participation phase of the updated water quality criterion which is planned for 2009. This criterion will be used as the basis for the Stage 2 TMDLs that will be developed by DRBC staff and established by EPA in December 2009. The implementation plan will be included as an appendix to the Stage 2 TMDL report.

A TMDL sets the maximum amount of a pollutant that a water body can receive without violating applicable water quality standards and allocates that amount among sources in the watershed – both point (end-of-pipe) and non-point (runoff). Dischargers must reduce loads to the allocated levels in order to achieve and maintain the standards.

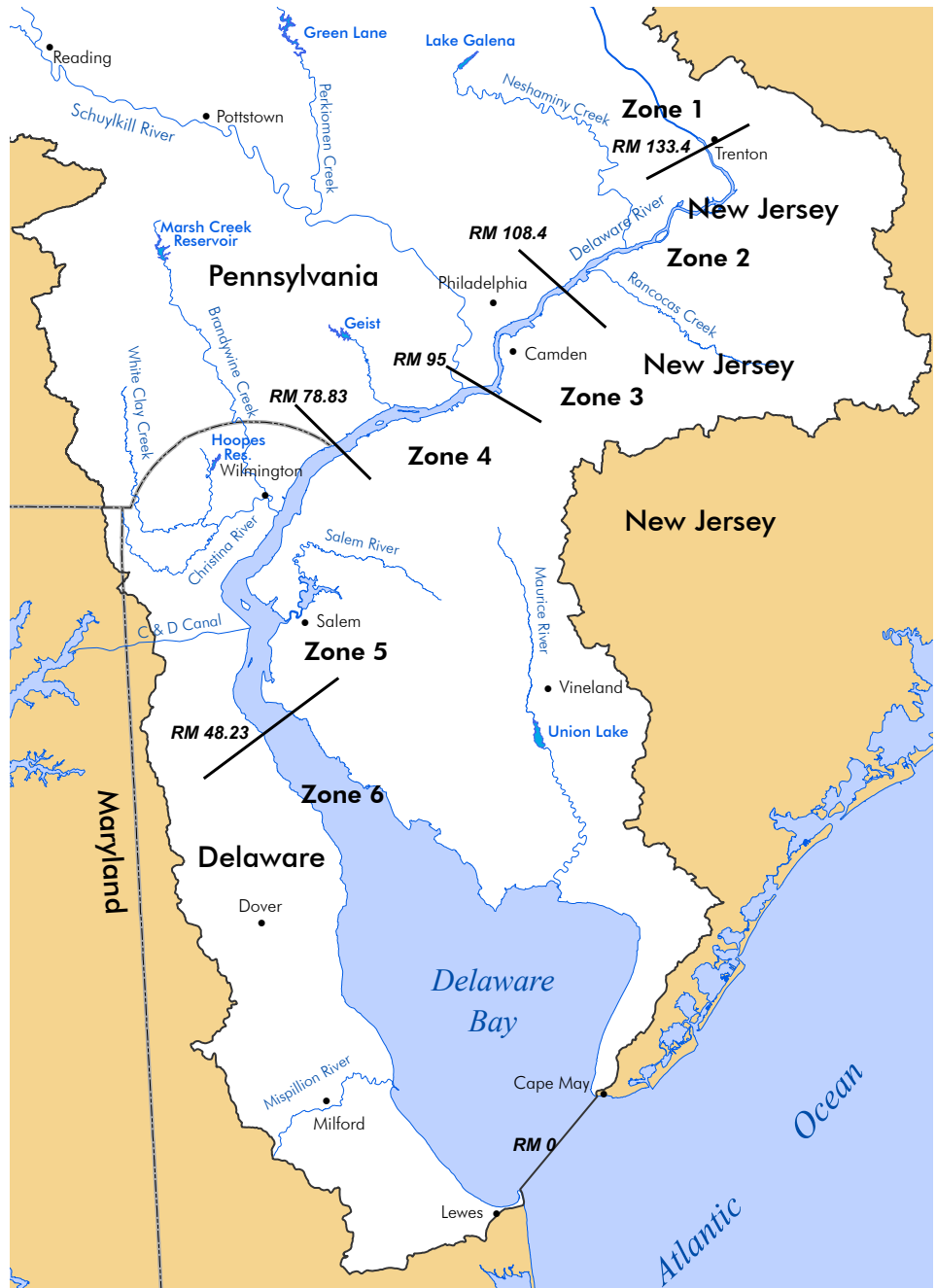
PCBs are a class of chemicals present in the waters of the Delaware Estuary at concentrations



up to 1,000 times higher than the water quality criteria and have been classified by EPA as a probable human carcinogen. The U.S. banned the manufacture and general use (with a few exceptions) of PCBs in the late 1970s, but not before 1.5 billion pounds of the substance was produced. PCBs were used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. Despite the ban, equipment containing PCBs is still in use due to the extended life span of the equipment. The chemical stability of PCBs, which led to their use in hundreds of industrial and commercial applications, also allows them to persist in the environment. PCBs enter fish and other wildlife through absorption or ingestion, and accumulate in their tissues at levels many times higher than in the surrounding water and at levels unsuitable for human consumption.

There are numerous sources of PCBs in the Delaware Estuary. They include contaminated sites, non-point sources, industrial and municipal point source discharges, the main stem Delaware River above Trenton, tributaries to the Delaware both above and below Trenton, the atmosphere, combined sewer overflows (CSOs), and the Atlantic Ocean.

Additional information can be found on the DRBC web site at [www.nj.gov/drbc/toxics\\_info.htm](http://www.nj.gov/drbc/toxics_info.htm).



Map of the DRBC's Water Quality Management Zones. The tidal portion of the Delaware River includes Zones 2-5 and the Delaware Bay is Zone 6. Zones 2-6 encompass the Delaware Estuary. (RM = river mile)

## Second Federal Coordination Summit

DRBC Federal Commissioner Brigadier General Todd Semonite convened the second federal coordination summit on May 15, 2008 at the Philadelphia Seaport Museum, located along the Delaware River at Penns Landing. Governor Edward Rendell, Pennsylvania's member on the DRBC, offered welcoming remarks to the nearly 100 attendees from various federal, state, and city government agencies. Governor Rendell, comparing the DRBC to umpires at a baseball game, noted that the public looks for quick and easy answers to problems like flooding, which are complex and difficult to solve. He went on to say that problem solving requires a balancing act, often with far too little resources, and he thanked everyone for their work. Brig. Gen. Semonite noted that the governor's presence showed a real commitment to the work of the DRBC given his demanding schedule.

Also in attendance was Assistant Secretary of the Army (Civil Works)

John Paul Woodley, Jr., who has overall responsibility for the Corps of Engineers at the Pentagon. Assistant Secretary Woodley attended a significant portion of the day-long event and observed that agencies in other parts of the country often do not get together like this unless there is contentious litigation.

In his opening remarks, Brig. Gen. Semonite complimented the development of the 2004 Basin Plan as a 30-year blueprint for future action. Moreover, he emphasized the summit goals of fostering relationships and networking, strategizing on how to balance competing demands, hoping to leave at the end of the day with better coordination and cooperation as a federal group, creating synergies, trying to be proactive, and a willingness to compromise.

Most of the summit focused on three different discussion areas. The subjects included "Monitoring Coordination" led by Deputy Executive Director Bob Tudor, "Flood Mitiga-



Pennsylvania Governor Ed Rendell (right) and Assistant Secretary of the Army (Civil Works) John Paul Woodley, Jr. at the Federal Summit. (Photo by Khaalid Walls/U.S. Army Corps of Engineers)

tion" led by Federal Alternate Commissioner Hank Gruber, and "Water Supply Management" led by Executive Director Carol Collier.

The first federal coordination summit was convened by Brig. Gen. Semonite's predecessor, Major General William Grisoli, during July 2006.

### The following offices and agencies were represented at the May 15 coordination summit:

- City of New York
- City of Philadelphia
- Commonwealth of Pennsylvania
- Delaware River Basin Commission
- Federal Emergency Management Agency
- Federal Energy Regulatory Commission
- National Park Service
- National Weather Service
- Natural Resources Conservation Service
- Partnership for the Delaware Estuary (National Estuary Program)
- State of Delaware
- State of New Jersey
- State of New York
- Susquehanna River Basin Commission
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey
- U.S. Senate (Offices of Sen. Thomas Carper [Del.], Sen. Frank Lautenberg [N.J.], and Sen. Arlen Specter [Pa.]

# Wild and Scenic River Anniversaries Marked in 2008



Forty years ago, the U.S. Congress approved legislation signed into law by President Lyndon Johnson creating the National Wild and Scenic Rivers System. This law, known as the Wild and Scenic Rivers Act, stated:

“It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.”

According to the National Park Service (NPS), when the Congress and President Johnson created the National Wild and Scenic Rivers System in 1968, they envisioned a cooperative system that would rely on the combined efforts of state, local, and federal governments along with individual citizens and non-governmental organizations. The system was intended to be flexible enough to provide a means for communities to protect their rivers in a way that is sensitive to the needs and concerns of the people who live, work, and recreate along the rivers.

The 1968 law made possible the Upper and Middle Delaware’s Wild and Scenic designations 10 years later. Celebrating their 30th anniversary in 2008, these two stretches

*Three-quarters of the non-tidal Delaware River totaling approximately 153 miles is now included in the national system.*

added by Congress and President Jimmy Carter in 1978 encompass 73 miles of the Delaware River from the confluence of its East and West branches at Hancock, N.Y. downstream to Milrift, Pa. and another 40 miles of river from just south of Port Jervis, N.Y. downstream to the Delaware Water Gap near Stroudsburg, Pa.

In honor of these two important anniversaries, the theme of the 14th annual Delaware River Sojourn was “Conserving Our Wild and Scenic River.” This event, which took place from June 22-28, combined canoeing, kayaking, camping, and educational programs, and has the distinction of being one of the oldest river sojourns in the nation. The DRBC-hosted sojourn web site, [www.delawareriversojourn.org](http://www.delawareriversojourn.org), provides more detailed information about this annual event.

In addition, the NPS offered a number of anniversary events throughout 2008 and DRBC staff participated in two of the programs held during the fall: an Upper Delaware Expo on October 25 in Damascus, Pa. and a day-long symposium on November 8 held in Beach Lake, Pa. that explored the beginnings of the Upper Delaware Scenic and

Recreational River, what has been accomplished, and what is yet to come.

The NPS web site reports that the United States has 3.5 million miles of rivers, but only 11,434 river miles (just over one-quarter of one percent) are included in the National Wild and Scenic Rivers System. In addition to the Upper and Middle Delaware stretches added to the national system thirty years ago, Congress and President Bill Clinton included approximately 39 miles of the Lower Delaware (and about 28 miles of selected tributaries) linking the Delaware Water Gap and Washington Crossing, Pa., just upstream of Trenton, N.J. in 2000. Three-quarters of the non-tidal Delaware River totaling approximately 153 miles is now included in the national system.

More information about the “Wild and Scenic” Delaware River can be found on the commission’s web site at [www.nj.gov/drbc/wild\\_scenic.htm](http://www.nj.gov/drbc/wild_scenic.htm).



U.S. Rep. Rush Holt (N.J.-12) offers remarks to Delaware River Sojourners at the June 27 event commemorating the 40th anniversary of the National Wild and Scenic Rivers System. (Photo by Katharine O’Hara)

# Multi-Jurisdictional Study Completed

The Philadelphia District of the U.S. Army Corps of Engineers and DRBC completed work on their collaborative study, *Enhancing Multi-Jurisdictional Use and Management of the Water Resources of the Delaware River Basin*, in 2008. The project was one of only five chosen nationally by the Assistant Secretary of the Army for Civil Works in 2006 to receive funding made available by a congressional appropriation to support cooperative watershed planning and implementation projects. The study's five focus areas were:

- Long-Term Sufficiency of Water Supply through the Year 2030;
- Flood Risk Management;
- Estuary Inflow;
- Re-evaluation of User Supply Costs to Support Flow Management and Equitable Allocation; and
- Geographic Information System (GIS)/Public Outreach.

## Task 1: Long Term Sufficiency of Water Supply

DRBC led the effort to determine current and future (2030) water demands for the basin and made comparisons of water availability estimates, resulting in the identification of eight watersheds where the supply-demand balance indicated possible water supply issues and need for further study (see map on opposite page). An additional finding of the study was that the projected future growth in water demand for power generation needs may add further stress to the Schuylkill River and could potentially create stress in

*The project was one of only five chosen nationally by the Assistant Secretary of the Army for Civil Works in 2006 to receive funding made available by a congressional appropriation to support cooperative watershed planning and implementation projects.*

other parts of the basin as well. In 2008, DRBC began a series of meetings with power utility companies to better understand future needs and the impact that additional large power generating facilities could have on the basin's water resources.

Study recommendations included conducting a comprehensive drought analysis that incorporates the drought of record (or worse conditions) and an examination of modifications to the existing Blue Marsh and FE Walter reservoirs as well as potential new reservoirs in French Creek, Maiden Creek, and Evansburg that could be possible solutions to meet supply deficits.

In addition, a comprehensive, basinwide "feasibility-level" study was recommended to evaluate alternatives that expand supply or curtail demand. Alternatives that expand supply include aquifer storage and recovery (ASR), reuse of wastewater and stormwater, mine reclamation, desalination, river diversions, and reservoir storage. Alternatives that curtail demand include reducing infrastructure losses, additional

conservation, new regulations, and improved irrigation techniques.

## Task 2: Flood Risk Management

The multi-jurisdictional study looked at several different aspects of flood risk management, including updating flood frequency curves, conducting a skew analysis, and identifying priority sites for which a solution matrix and structure inventory were completed. The priority sites included Yardley, New Hope, Upper Makefield, and Easton in Pennsylvania; Lambertville, Harmony, Stockton, and Belvidere in New Jersey; and Rockland and Colchester in New York. The study concluded that flood inundation mapping should be developed for the entire main stem Delaware to be used as a planning and emergency management tool.

## Task 3: Estuary Inflow Evaluation

In order to manage flows to address estuary and bay salinity issues, the multi-jurisdictional study linked three existing water resources computer models:



- Operational Analysis and Simulation of Integrated Systems one-dimensional reservoir operating model (also referred to as the OASIS flow model);
- Dynamic Estuary Model Hydrodynamics Program (DYNHYD5); and
- TOXI5 chloride transport model.

The latter two are collectively referred to as the “estuary salinity model.”

Linking these models enables engineers to better predict the effects of reservoir operating program alternatives on salinity concentrations within the estuary and thus will enhance the ability of DRBC staff to furnish the commissioners with the technical support they require to make informed flow management policy decisions.

**Task 4: Re-Evaluation of User Supply Costs to Support Flow Management and Equitable Allocation Goals**

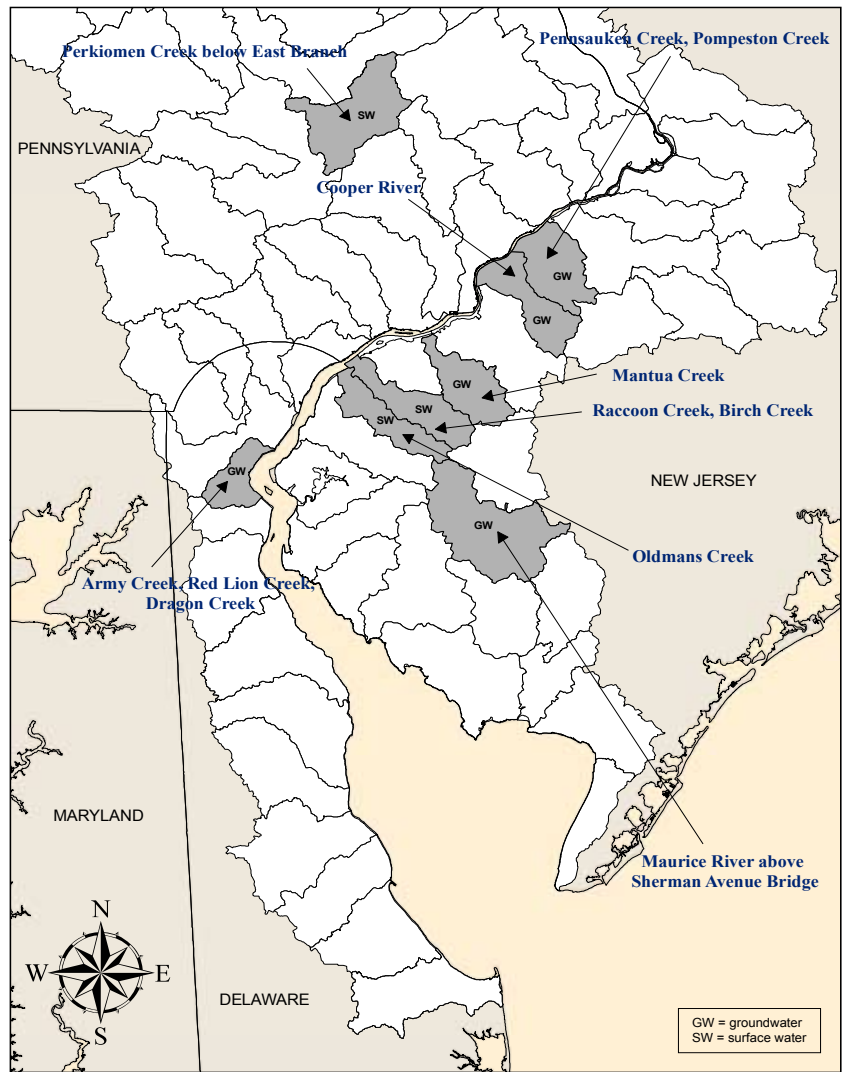
While the DRBC does not own or operate any of the dams within the basin, it has purchased a portion of the storage in two Corps of Engineers reservoirs. This storage is financed through a surface water charging program with rates that have not changed since 1978. Due to ever changing demands in water supply and the potential need for additional storage, this study took the opportunity to review projected costs for water supply and alternate rate calculation methods in order to meet these costs. Additional water supply needs should be re-evaluated

under a thorough drought analysis and may thereby require an update to this evaluation.

**Task 5: GIS/Public Access to Information**

One of the most important aspects of the multi-jurisdictional study is to ensure that the work conducted does not become “just another study,” but continues beyond this study to aid other fed-

eral, state, and local agencies in their work. The public access component provides an opportunity to share gathered data for this study with local communities as well as state and federal agencies for on-going and future study efforts. It is hoped that this study will demonstrate the importance of data sharing and unified data collection.



**DRBC / USACE Long Term Sufficiency of Water Supply Study Watersheds Identified for Further Study**

## Basin News Briefs

### **FERC Issues Preliminary Permit to DRBC for Hydroelectric Project Study**

The Federal Energy Regulatory Commission (FERC) on February 2, 2009 issued DRBC a three-year preliminary permit to study the feasibility of building a hydroelectric plant on Blue Marsh Dam. This dam is owned by the U.S. Army Corps of Engineers and is located on Tulpehocken Creek, a tributary of the Schuylkill River, in Berks County, Pa.

A FERC preliminary application serves as a placeholder for DRBC to look at this project's feasibility. FERC rules are similar to "first-come, first-served" when issuing permits for hydroelectric proposals and DRBC wanted to be first in line for the rights to pursue this project. DRBC's interest is twofold: selling hydropower to the regional power grid would provide an additional source of revenue for the agency and hydroelectric power is a "greener" energy source that would reduce local consumption of fossil fuels.

DRBC will have three years to conduct a study to determine the impacts and feasibility of the hydroelectric project. If DRBC decides to proceed with the project it would have to apply to FERC within this three-year period for a license to build the plant.

In 1982, DRBC successfully applied to FERC for a preliminary permit to do a feasibility study on a similar project at Blue Marsh Dam. The commission was then granted a license to build the plant, but DRBC withdrew the license and never went

forward with the project.

If DRBC gets a license and builds this project, it would be the first time the commission has constructed and operated a hydropower facility. The Corps of Engineers' list of currently authorized purposes for the dam includes flood control, water supply, and recreation, but not hydroelectric power, so it cannot pursue this type of project.

The application was prepared in 2008 by Dr. Richard Tortoriello, who has stayed on as a volunteer after retiring from the DRBC in 2003.

### **Testimony Before Congressional Subcommittee in Washington**

DRBC Executive Director Carol R. Collier offered testimony on comprehensive watershed management and planning at the invitation of the U.S. House of Representatives Committee on Transportation and Infrastructure's Water Resources and Environment Subcommittee.

The executive director noted that she viewed as positive the subcommittee's interest in information on watershed planning and the DRBC. Congressmen John Hall (N.Y.-19) and Frank LoBiondo (N.J.-2), who represent portions of the Delaware River Basin, are subcommittee members. Her testimony from the June 24, 2008 hearing is available on the DRBC web site at [www.nj.gov/drbc/crc.htm](http://www.nj.gov/drbc/crc.htm).

### **New Horseshoe Crab Bookmark**

Depicting a horseshoe crab as it moves on the sand along the Dela-

ware Bay, the newest DRBC bookmark features several important facts about one of the Earth's oldest creatures.

For example, were you aware that the Delaware Bay is the principal breeding location for horseshoe crabs on the East Coast and each spring hungry shorebirds, like the red knot, stop along the bay during their annual migration from South America to feed on horseshoe crab eggs?

Also, did you know that the horseshoe crab's blue blood is used to test intravenous drugs, vaccines, and medical devices to ensure that they are free of bacterial contamination?

Previous bookmarks created by the DRBC feature the American shad and the bald eagle. Visit "Ed. Web," the commission's education web site, at [www.drbc-edweb.net](http://www.drbc-edweb.net) to learn more about the fascinating subjects of all three bookmarks.

### **Multi-Jurisdictional Flood Mitigation Plan for the Non-Tidal, N.J. Section of the Basin Approved by FEMA**

DRBC led the development of a flood mitigation plan for 43 New Jersey municipalities located in Hunterdon, Mercer, Sussex and Warren counties that elected to participate in the process. This plan, which was approved by the Federal Emergency Management Agency



(FEMA) in a letter dated November 7, contains over 160 locally developed mitigation actions that, if implemented, could reduce future flood loss.

The plan is unique in that while it will meet the flood mitigation plan requirements of each municipality, it also will employ a watershed management approach to ensure that final mitigation actions address both local jurisdictional needs and regional, multi-jurisdictional needs.

One of the purposes of the flood mitigation plan is to enable participating municipalities to get one step closer to becoming eligible to compete for FEMA funding aimed at flood mitigation.

The N.J. Department of Environmental Protection and the state's Office of Emergency Management partnered with the DRBC in this planning initiative, which began in 2006 thanks to a grant awarded by FEMA. DRBC Water Resources Engineer Laura Tessieri led the commission staff effort on this project.

Detailed information about this project, including the plan, can be found on the commission's web site at [www.nj.gov/drbc/Flood\\_Website/NJmitigation/index.htm](http://www.nj.gov/drbc/Flood_Website/NJmitigation/index.htm).

### **Floodplain Regulations Evaluation Subcommittee Created**

The Delaware River Basin Interstate Flood Mitigation Task Force issued a report in July 2007 identifying recommendations for a proactive, sustainable, and systematic approach to flood damage reduction. In May 2008, commissioners from New Jersey and Pennsylvania requested that a subcommittee of the DRBC Flood Advisory Committee (FAC) be formed to address Task Force Recommendation FR-1: Catalog, Evaluate and Update Existing

Floodplain Regulations in the Basin.

The Floodplain Regulations Evaluation Subcommittee was formed to review and evaluate the similarities and differences in floodplain regulations throughout the Delaware River Basin and to develop and present recommendations on the potential for more effective floodplain management.

The subcommittee first convened in November 2008 and has been asked to present its findings and recommendations to the FAC in the spring of 2009. Following a review by FAC members, findings and recommendations will be presented to the commissioners for their consideration later in 2009.

Updated information can be found on the commission's web site at [www.nj.gov/drbc/Flood\\_Website/FRES/index.htm](http://www.nj.gov/drbc/Flood_Website/FRES/index.htm).

### **New Watershed Highway Signs in New Jersey and Pennsylvania**

The Delaware Riverkeeper Network (DRN) on July 10 announced construction of "Welcome to the Delaware River Watershed" highway signs in New Jersey and Pennsylvania as part of its new Remember the River Campaign. The announcement occurred at events held along the banks of the Delaware River at Penn Treaty Park in Philadelphia, Pa. and at the boat access area behind the Trenton Thunder's Riverfront Park in Trenton, N.J.

DRBC Executive Director

Carol R. Collier joined Delaware Riverkeeper Maya van Rossum at both events, which also featured state and local officials. In addition, the announcement was supported by Philadelphia Mayor Michael Nutter who was unable to attend, but expressed his support in the following statement: "The City of Philadelphia and surrounding communities have spent countless hours and tremendous energy creating a civic vision for the Delaware River waterfront. I know that people value the Delaware, but people must remember the River in their everyday actions and decisions if we are to succeed in making an effective change for its permanent protection."

The highway signs will be located along the boundary of the Delaware River Watershed at the following locations: in New Jersey on I-80, Route 46, I-76, Route 202, Route 206, I-195, and the Atlantic City Expressway; in Pennsylvania on the Pa. Turnpike and the Northeast Extension.

Additional information about the Remember the River Campaign can be found on the DRN web site at [www.delawareriverkeeper.org](http://www.delawareriverkeeper.org).



DRBC Executive Director Carol R. Collier speaks at Penn Treaty Park in Philadelphia along the banks of the Delaware River during DRN's event announcing new watershed highway signs. (Photo by Katharine O'Hara)





The Eastern Scheldt Barrier protects residents of the Netherlands' Zeeland Province from North Sea storm surges. The barrier consists of gates that are only closed during extreme high tides allowing water to continue to flow through the tidal inlet. (Photo by Amy Shallcross)

### **DRBC Staff and Penn Students Visit the Netherlands on Fact Finding Trip**

Thanks to a grant from the William Penn Foundation, the University of Pennsylvania's Urban Design School conducted a planning study on climate change impacts in the Delaware River Basin. DRBC was the client for the study and Executive Director Carol R. Collier, Operations Section Supervisor Amy Shallcross, and Senior Engineer/Hydrologist Hernan Quinodoz served as advisors to the students.

The grant provided for the students, faculty, and advisors to travel to the Netherlands in the fall of 2008 to interview officials about their plans to address climate change, particularly sea level rise. The delegation was able to dialog with these officials to gain a better understanding of their philosophy and approaches for adaptation to climate change.

The Dutch realize that they cannot continue to only rely on building stronger defenses, higher dikes and increased drainage, but need more sustainable solutions to safeguard the natural functioning of wetlands, coasts, rivers, and deltas. Although that nation's primary adaptation strategy is still dikes and barriers, officials noted a new program

for the Muse and Rhine rivers called "Room for the River," which consists of measures aimed at creating more space for the river to decrease high water levels during flooding and includes restoring river bank areas to floodplains and moving dikes further inland. The group also visited the Maeslant and Eastern Scheldt Barriers, part of a larger network of dams, sluices, locks, dikes, and storm surge barriers called the Deltaworks.

With the insights gained during the trip and the research conducted throughout the semester, the students produced a report, "Climate Change: Impacts and Responses in the Delaware River Basin," focusing their recommendations on Philadelphia and the Port Jervis, N.Y. area. One message the students noted was that the basin is already experiencing the effects of climate change and actions are needed now.

The students shared their findings at the December 10, 2008 commission meeting and their powerpoint presentation is available on the DRBC's web site at [www.nj.gov/drbc/climatechange.htm](http://www.nj.gov/drbc/climatechange.htm).

### **Delaware Bay Oyster Revitalization Efforts Continue**

This ongoing program planted 430,000 bushels of shell to enhance oyster recruitment and re-establish the reef during 2008. It is estimated that the \$4.3 million federal investment to date has resulted in a \$168 million benefit. In April, the project received the 2008 Government Award from the Water Resources Association of the Delaware River Basin.

Beyond the economic benefits, Delaware Bay oysters also play an important role in improving water quality. Each adult oyster is capable of filtering 50 gallons of water

per day as it feeds on microscopic organisms.

The project, now in its fourth year, has consistently received the valuable support of Sen. Joseph Biden (Del.), Sen. Thomas Carper (Del.), Sen. Frank Lautenberg (N.J.), Sen. Robert Menendez (N.J.), Rep. Michael Castle (Del.-At Large), Rep. Frank LoBiondo (N.J.-2), Governor Ruth Ann Minner, and Governor Jon Corzine.

Partnering organizations in the Delaware Bay Oyster Restoration Task Force include the Cumberland County Empowerment Zone, Delaware and New Jersey Shellfish Industry, Delaware Department of Natural Resources and Environmental Control, Delaware River and Bay Authority, DRBC, Delaware State University's College of Agriculture and Related Sciences, New Jersey Department of Environmental Protection, Partnership for the Delaware Estuary, Rutgers University's Haskin Shellfish Research Laboratory, and the U.S. Army Corps of Engineers - Philadelphia District.

### **Kids Help Celebrate World Water Monitoring Day**

Over 75 local school children and their teachers learned from and interacted with staff from the DRBC, U.S. Geological Survey's New Jersey district office, N.J. Department of Environmental Protection, New Jersey Water Supply Authority, New Jersey Watershed Ambassadors, and the Lower Delaware Wild and Scenic Management Committee as these agencies demonstrated different water quality monitoring techniques on October 16 as part of the World Water Monitoring Day (WWMD) celebration.

The event took place at the





Aquatic Biologist Erik Silldorff discusses macroinvertebrates with students attending the October 2008 World Water Monitoring Day event along the Delaware River in Stockton, N.J. (Photo by Katharine O'Hara)

historic Prallsville Mills in Stockton, N.J. along the Delaware River, Wickecheoke Creek, and the Delaware and Raritan Canal.

Following brief opening remarks, the students and their teachers divided into groups and spent about 20 minutes at each of the various stations set up on the grounds. The subjects of the eight stations included biological monitoring, chemical monitoring, stream flow monitoring, marine water monitoring, groundwater monitoring, and watersheds.

WWMD is coordinated by the Water Environment Federation and the International Water Association to engage the public in global efforts to protect and enhance worldwide water quality. Additional information can be found on the commission's Ed. Web at [www.drbc-edweb.net](http://www.drbc-edweb.net).

### **2008 Delaware River and Bay Integrated List Water Quality Assessment Report**

DRBC worked closely with its state partners to conduct the 2008 Delaware River and Bay Integrated List Water Quality Assessment which was completed in April. This assessment, which reviewed data

compiled from 2004 through 2006, is an important measure of how well water quality management activities in the basin are working and helps to identify where more work is needed.

In performing the assessment, DRBC reports the extent to which waters of the

Delaware River and Bay are attaining designated uses in accordance with DRBC's Water Quality Regulations as required by the federal Clean Water Act. The designated water uses to be protected within the Delaware include public water supplies, wildlife, fish and other aquatic life, recreation, and navigation.

To conduct the assessment, performed every two years, DRBC compares key water quality parameters with applicable DRBC water quality criteria. The sophistication of the assessment continues to evolve and improve. For the next report due to EPA on April 1, 2010, DRBC expects to include the results of several years of biological monitoring in its assessment. Biological monitoring takes the assessment to a new level by looking at the integrated impacts of multiple stressors on the actual biological communities in the river.

The complete 2008 report can be viewed on the DRBC web site at [www.nj.gov/drbc/public.htm](http://www.nj.gov/drbc/public.htm).

### **Snowpack Monitors Installed in Neversink and Pepacton Watersheds**

DRBC received a federal flood warning grant from the National Oceanic and Atmospheric Administration to purchase two automated snowpack monitors for installation in the Neversink and Pepacton watersheds. New York City Department of Environmental Protection (NYCDEP), which will be responsible for maintenance and telemetry, installed these electronic load-type sensors in 2008.

Snowpack-based storage management is a type of discharge mitigation that has previously been implemented in the Delaware River Basin. Such programs are based on the concept that a percentage of the water equivalent in the snowpack in the watershed above a reservoir will eventually flow into the reservoir and can be counted as storage. Automated monitors will be used to supplement NYCDEP's manual snow surveys and thereby enhance the collection of accurate snowpack data.



Members of the NYCDEP Watershed Monitoring and Operations Support staff install the first automated snowpack water equivalent monitor (or "snow pillow") in the Neversink Watershed in January 2008. (Photo courtesy of NYCDEP)

# Financial Summary

On March 12, 2008, the commissioners unanimously approved the DRBC's current expense budget of \$5,088,000 for fiscal year 2009, which extends from July 1, 2008 through June 30, 2009. It calls for the following signatory party shares: Pennsylvania \$893,000 (25%), New Jersey \$893,000 (25%), Federal Government \$715,000 (20%), New York \$626,000 (17.5%), and Delaware \$447,000 (12.5%). This was the same level of signatory party contributions as last year. In addition, the commissioners approved the DRBC capital budget (Water Supply Storage Facilities Fund) reflecting revenues of \$3,456,300 and expenditures of \$2,576,000.

During fiscal year 2008, which extended from July 1, 2007 through June 30, 2008, New Jersey and Pennsylvania, each paid their full fair share of \$893,000. Delaware's actual contribution of \$434,000 was \$13,000 short of its full share, New York's payment of \$608,000 was \$18,000 below its 17.5% full fair share, and the Federal Government's contribution was \$0.

## Good News from Washington!

The 100-year compact creating the DRBC stipulates that the five signatory parties agree to support the commission's annual current expense budget. However, the federal government had not contributed any funding towards the DRBC's annual operating budget since October 1996, resulting in a cumulative shortfall totaling \$7,849,250 as of June 30, 2008.

This situation was finally addressed when the U.S. Congress approved the fiscal year 2009 Omnibus Appropriations bill, signed into law by President Obama on March 11, 2009, providing \$715,000 to fulfill the federal obligation to support the commission's current expense budget. This law directs federal funding from October 1, 2008 through September 30, 2009.

"This is wonderful news and the

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*We thank all the senators  
and representatives who supported  
this legislation..."*

*—DRBC Executive Director  
Carol R. Collier*

culmination of years of work by many individuals," DRBC Executive Director Carol R. Collier said. "We thank all the senators and representatives who supported this legislation. In particular, we would like to recognize and thank Reps. Rush Holt (N.J.-12), Charlie Dent (Pa.-15), Maurice Hinchey (N.Y.-22), and Michael Castle (Del.-At Large), who serve as co-chairs of the Delaware River Basin Congressional Task Force, and Rep. Tim Holden (Pa.-17), who made this a top legislative priority. We also would like to thank Reps. Jim Gerlach (Pa.-6),

"The respective signatory parties covenant and agree to include the amounts so apportioned for the support of the current expense budget in their respective budgets next to be adopted, subject to such review and approval as may be required by their respective budgetary processes."

*Delaware River Basin Compact (Public Law 87-328, Article 13, Section 13.3c)*

Allyson Schwartz (Pa.-13), Robert Brady (Pa.-1), John Hall (N.Y.-19), and Christopher Carney (Pa.-10) who all supported our request with House Appropriations leadership.”

“In addition, federal funding restoration would not have been possible without the efforts of Senator Arlen Specter (Pa.), who was joined by Senators Frank Lautenberg (N.J.), Tom Carper (Del.), Charles Schumer (N.Y.), Robert Casey, Jr. (Pa.), Robert Menendez (N.J.), and former Senator Hillary Rodham Clinton (N.Y.) in supporting our request before Senate appropriators. Vice President Joseph Biden also was a staunch advocate of funding restoration while serving as Delaware’s senior senator,” Collier added.

“On behalf of the DRBC commissioners and staff, I would also

like to thank the many individuals and organizations who wrote letters and voiced their support of the commission over the years,” Collier said.

Funding also was restored to two other mid-Atlantic river basin commissions created by compact with federal membership. Like the DRBC, the Susquehanna River Basin Commission (SRBC) and the Interstate Commission on the Potomac River Basin (ICPRB) had their operating budget support from the federal government suspended since 1996. Congress had previously authorized funding for all three commissions in their respective compacts and in the Water Resources Development Act of 2007. “The three commissions worked together to reach out to their respective congressional delegations to garner support for this

DRBC’s financial records are audited annually as required by the Delaware River Basin Compact and are available for inspection, upon request, at the commission’s West Trenton headquarters.

funding restoration effort and the DRBC is grateful to those senators and members of Congress representing the SRBC and ICPRB drainage areas who also backed the DRBC’s request,” Collier said.

Delaware River Basin Commission Fiscal Summary-Agencywide	
	FY08
<b>Revenues:</b>	
Signatory Contributions	\$ 2,828,000
Grants & Special Projects	2,274,450
Surface Water Supply Charges	2,789,943
Project Review Fees, Investment Income & Other	605,688
<b>Expenses:</b>	
Salaries & Benefits	\$ 4,133,567
Operating Expenses	3,016,244
Debt Service and Depreciation	1,245,286
Building Improvements/Equipment Acquisition	252,346

Delaware River Basin Commission  
25 State Police Drive  
P.O. Box 7360  
West Trenton, NJ 08628

Phone: 609-883-9500  
Fax: 609-883-9522  
Web Site: [www.drbc.net](http://www.drbc.net)