



Flood Stage  
Delaware River  
At Trenton  
20.00'



March 1902  
Delaware River  
At Trenton  
23.60'



October 1903  
Delaware River  
At Trenton  
28.50'



March 1904  
Delaware River  
At Trenton  
30.60'



September 2004  
Delaware River  
At Trenton  
23.41'



April 2005  
Delaware River  
At Trenton  
25.33'



June 2006  
Delaware River  
At Trenton  
25.09'



2006  
2007  
REPORT DELAWARE  
RIVER  
BASIN  
COMMISSION

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 drinking and industrial use, 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 years 2006 and 2007, was produced by the DRBC's Communications Office with the valuable assistance of numerous commission staff. It is available on the commission's web site at <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)).

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A Sunset View of the Delaware Memorial Bridge. (Photo by Thomas Fikslin, October 2007)

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# Executive Director's Message

By Carol R. Collier

In describing the DRBC's value to appropriators and other potential funders, I try to succinctly state the value of a river basin commission. In a report for the Institute of Water Resources of the U.S. Army Corps of Engineers, Bruce Hooper summed it up well when he wrote:

*"Effective governance in the water sector is not linear, prescriptive and logical; rather it tends to be adaptive and 'messy', responding to the dynamic nature of the political and economic forces operating at the time, and in response to changing environmental conditions (floods, hurricanes, droughts)."*

There is nothing static about managing a river system. Like any natural system, a river is dynamic, presenting new problems to solve around every bend.

In a large river system, especially one with transboundary issues, there needs to be a mechanism to assist multiple authorities in responding to changing conditions. The DRBC and other river basin commissions answer that need by creating the forum for coordinated response to change.

Priorities are constantly shifting. No sooner do we finalize a management plan for drought than the river delivers us three years of major floods. We complete negotiations for a new flow allocation and reservoir releases program only to acquire new understanding about ecological flow needs and discover the presence of an endangered species. Just when we think the water quality of the river has met criteria, analytical methodologies improve, detection levels fall, and new threats are discovered from persistent bioaccumulative toxic chemicals such as PCBs and from emerging contaminants like pharmaceuticals and endocrine disrupters. Each of these scenarios has occurred in the Delaware River Basin.

Compare the management of the Delaware to that of rivers in the southeastern United States. Georgia, Alabama and Florida have been unable to come to resolution on an allocation strategy that will supply enough water to the growing metropolitan area of Atlanta in the headwaters while maintaining sufficient flows for agriculture, potable supply, and ecological needs downstream. Florida's estuaries and their productive oyster beds are dependent on seasonal changes in river flows. Sound familiar?

Managing water resources is not an easy process. It takes trust, flexibility and sacrifice. The multi-year drought of record for the Delaware Basin of the 1960s made all too clear that the minimum reservoir releases and flow allocations assigned by the Supreme Court Decree of 1954 were not sustainable. Fortunately, the five parties to the decree could avail themselves of the DRBC to negotiate a new allocation scheme without resorting to further litigation. Each of the decree parties made sacrifices in order to ensure that the basin as a whole could survive droughts without adversely affecting the region's economy and public health. Since the DRBC's creation in 1961, it has consistently provided the forum for reassessing management strategies in response to change.

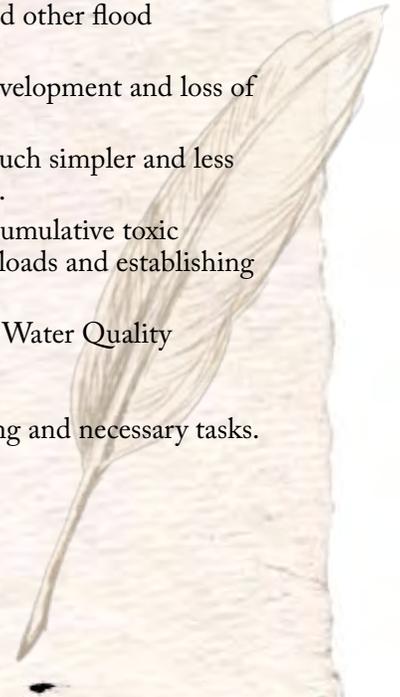
Missing from water management in the southeastern United States, other regions of this country and many areas across the world is a mechanism like the DRBC that allows the parties who use the water to come together to reevaluate their strategies as conditions evolve. Allocation of a river's flows cannot be directed by a single agency or settled once and for all with a simple line in the sand. It must be negotiated and re-negotiated by all parties who use and therefore affect the system, through a continual process of adaptation.

In the Delaware Basin, we have many evolving issues to tackle over the next few years. Here are the major ones:

- Improving instream flow requirements for regulated and unregulated streams.
- Reassessing flow needs so as to maintain the salt front and protect the ecology of the estuary – not only for current conditions, but for future conditions brought about by sea level rise due to climate change.
- Reassessing water needs by subbasin, taking into consideration changes in demand for potable water, energy, industry and other human uses; instream flow needs; flood mitigation; and climate change.
- Improving the basin's flood warning, flood-prone area protection and other flood mitigations systems.
- Evaluating and mitigating the potential impacts of ongoing land development and loss of forest cover in the basin's headwaters.
- Keeping the clean water of the non-tidal river clean, since it is so much simpler and less costly to protect our cleanest waters than to restore impaired waters.
- Working with the basin states to reduce contamination from bioaccumulative toxic chemicals and emerging contaminants by setting criteria, assigning loads and establishing implementation strategies that make sense.
- Establishing nutrient and biological criteria, and updating DRBC's Water Quality Regulations.

I and the DRBC staff look forward to working with you on these challenging and necessary tasks.

Carl R. Collier



# Signatory Members



Major General  
William T. Grisoli



Brigadier General  
Todd T. Semonite



Delaware Governor  
Ruth Ann Minner



New Jersey Governor  
Jon S. Corzine



New York Governor (2006)  
George E. Pataki



New York Governor (2007)  
Eliot Spitzer



Pennsylvania Governor  
Edward G. Rendell

The members of the Delaware River Basin Commission include the four basin state governors and a federal representative appointed by the President of the United States. A 1997 federal law later specified that the president's choice must be a member of the U.S. Army Corps of Engineers who holds a presidential appointment as a regular army officer with Senate confirmation.

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.

## Pennsylvania

Department of Environmental Protection (DEP) Deputy Secretary for Water Management **Cathy Curran Myers** continued to serve as alternate to **Governor Edward G. Rendell**. His second alternate, Division of Water Use Planning Chief **William A. Gast**, retired from DEP during the summer of 2007 after nearly 40 years of distinguished public service. Mr. Gast also served as the second alternate to three previous Pennsylvania governors: Robert P. Casey, Tom Ridge and Mark S. Schweiker.

## New Jersey

**Jon S. Corzine** resigned his seat in the United States Senate to become New Jersey's 54th governor in January 2006, succeeding **Acting Governor Richard J. Codey**.

Governor Corzine named DEP Commissioner **Lisa P. Jackson**, Assistant Commissioner for Environmental Regulation **Samuel**

**A. Wolfe**, Water Supply Division Director **Michele Putnam**, and Research Scientist **Joseph A. Miri** as his alternates. In August 2006, Assistant Commissioner for Land Use Management **Mark N. Mauriello** was appointed by the governor to replace Mr. Wolfe, who left DEP, as his second alternate.

## New York

In May 2006, **Governor George E. Pataki** designated Department of Environmental Conservation (DEC) Commissioner **Denise Sheehan** and Water Quantity Section Chief **Mark Klotz** as his new alternate and fourth alternate, respectively. They join previously named Division of Water Director **Sandra L. Allen** (second alternate) and Assistant Director **Fred R. Nuffer** (third alternate). Mr. Nuffer during 2006 announced his plans to retire from DEC.

**Eliot Spitzer** became the New York member to the DRBC when he took the oath of office as that state's 54th governor in January 2007. He later designated **Alexander B. "Pete" Grannis**, who replaced Ms. Sheehan as DEC commissioner, as his alternate along with Ms. Allen (second alternate), Mr. Klotz (third alternate), and **James DeZolt** from DEC's Division of Water (fourth alternate).

New York City DEP Commissioner Emily Lloyd continued to be Mayor Michael R. Bloomberg's designee as advisor to the New York State DRBC commissioner.

## Delaware

The team of alternates appointed by **Governor Ruth Ann Minner**, who have been in place unchanged since January 2003, included Department of Natural Resources and Environmental Control (DNREC) Secretary **John A. Hughes**, Water Resources Division

Director **Kevin C. Donnelly**, and Senior Science Advisor **Harry W. Otto**. However, Mr. Donnelly announced that he would be leaving DNREC at the end of 2007.

**Federal Government**

**Major General William T. Grisoli**, Commander of the U.S. Army Corps of Engineers North Atlantic Division, was the federal representative appointed by President George W. Bush until he was reassigned to the Pentagon in September 2006.

**Lieutenant Colonel Robert J. Ruch** (Philadelphia District Engineer for the Army Corps of Engineers) and **Lloyd Caldwell** (Director of Programs for the Corps' North Atlantic Division) continued to serve as alternate and second alternate to Maj. Gen. Grisoli during the first half of 2006. In July 2006, Maj. Gen. Grisoli appointed **Colonel Christopher Larsen** (North Atlantic Division Deputy Commander) and **Lieutenant Colonel Gwen E. Baker**, who succeeded Lt. Col. Ruch as Philadelphia District Engineer, as his alternate and second alternate, respectively.

President Bush named **Brigadier General Todd T. Semonite**, the new Commander of the Corps' North Atlantic Division, as the federal representative in May 2007. Col. Larsen and Lt. Col. Baker continued to serve as alternate and second alternate to Brig. Gen. Semonite.

**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 years 2006 and 2007:



DRBC commissioners and senior staff in this July 2006 photo (from left to right) are Joseph Miri (N.J.), Executive Director Carol Collier, Harry Otto (Del.), Maj. Gen. William Grisoli (U.S.), Kevin Donnelly (Del.), Cathy Curran Myers (Pa.), Deputy Executive Director Bob Tudor, William Gast (Pa.), Mark Klotz (N.Y.), Lt. Col. Gwen Baker (U.S.), Michele Putnam (N.J.), and Mark Mauriello (N.J.). (Photo by Ken Najjar)

*January 1, 2006 through June 30, 2006  
(one-year term began July 1, 2005)*

**Chair:** Governor Minner (Delaware)

**Vice Chair:** Major General Grisoli (Federal Representative)

**Second Vice Chair:** Governor Rendell (Pennsylvania)

*July 1, 2006 through June 30, 2007*

**Chair:** Major General Grisoli and Brigadier General Semonite (Federal Representatives)

**Vice Chair:** Governor Rendell (Pennsylvania)

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

*July 1, 2007 through December 31, 2007  
(one-year term to end June 30, 2008)*

**Chair:** Governor Rendell (Pennsylvania)

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

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

The current list of commission members and their alternates can be viewed at <http://www.nj.gov/drbc/commiss.htm>.



The commission presented Kevin C. Donnelly with the second "Delaware River Basin Commission Stewardship Award" at its December 2007 meeting. The award, in the shape of an American shad, is given to individuals who exemplify environmental stewardship of the basin, promote effective watershed management, bring parties together on environmental issues, look past political boundaries, and promote interstate solutions.

# Commission Staff

## New DRBC Additions

- **William Muszynski**, Project Review Branch Head, 2006. (Bill had been serving as the DRBC's Special Projects Coordinator on a two-year temporary assignment from the U.S. Environmental Protection Agency since January 2004 while remaining a federal employee. He also led the commission's project review branch during that period before deciding to retire from the federal government and officially join the DRBC staff.)
- **J. Kent Barr**, Water Resources Assistant, 2006.
- **Erik Silldorff**, Aquatic Biologist, 2006.
- **Paul Britt**, Geologist/Hydrologist, 2007.
- **Maggie Allio**, Water Resources Assistant, 2007.

## Position Reclassification/Name Change

- **Katharine O'Hara**, Communications Assistant, 2006. (This position was upgraded from part-time to full-time status.)
- **Kim Wobick**, Information Resources Coordinator, 2006. (This was formerly the Librarian position. The Library also was renamed the Information Resources Center.)

## Promotions Resulting From Technical Branch Reorganization

- **Chad Pindar**, Supervisor, Project Review Section, 2007. (He was formerly a Water Resources Engineer.)
- **Namsu Suk**, Supervisor, Modeling Section, 2007. (He was formerly a Water Resources Modeler.)
- **John Yagecic**, Supervisor, Standards and Assessment Section, 2007. (He was formerly a Water Resources Engineer/Modeler.)

## Retirements

- **Richard Fromuth** – Rick retired on September 1, 2007 after an exemplary 25-year career with the commission. He worked in the Operations Branch since 1987 and was promoted to Branch Head in 2003. Rick's understanding of complex hydrologic events and his clear, detailed explanations are second to none.
- **Paul Scally** – Paul retired from his position as Water Resources Engineer in July 2007 with over 21 years of DRBC service.

## Staff Goodbyes

- **Danielle Kreeger**, Estuary Science Coordinator, 2006. (As a result of the ongoing reorganization of

the Delaware Estuary Program, which was previously housed at the DRBC until October 2004, she left the DRBC staff and joined the Partnership for the Delaware Estuary as its Science Director.)

- **Anthony Bonasera**, Geologist/Hydrologist, 2006.
- **Jonathan Zangwill**, Water Resources Planner, 2007.

## Other Noteworthy People News

- **Executive Director Carol Collier** represented the DRBC at a week-long Yangtze River Conference in China at no cost to the commission. A number of river basins throughout the world were represented at this interesting event held in April 2007.



Environmental Toxicologist Ron MacGillivray gave several children of DRBC employees a tour of the water laboratory on "Take Our Daughters And Sons To Work® Day," April 27, 2006.

- **Water Resources Engineer Laura Tessieri** became a Certified Floodplain Manager, or CFM, in 2006 after successfully passing an examination demonstrating her knowledge of basic national standards and programs of floodplain management. The Association of State Floodplain Managers (ASFPM) has established the national CFM program for professional certification of floodplain managers to recognize continuing education and professional development that enhance the knowledge and performance of local, state, federal, and private-sector floodplain managers. Laura was elected chair of the New Jersey chapter of ASFPM at its October 2007 annual conference.
- **Systems Manager Karl Heinicke** earned his masters degree in Computer Information Science in May 2006.
- During 2007, the DRBC Flood Advisory Committee lost three respected members who had served on the committee since its inception in 2000. **Walter Nickelsberg** (National Weather Service), **Michael Reuber** (National Park Service), and **Robert Schopp** (U.S. Geological Survey) retired from their respective agencies with over 90 years of combined federal service.
- Look ....out there in the Delaware River in the middle of winter ..... it's an eagle ..... it's a shad ..... it's DRBC Aquatic Biologist Erik Silldorff! Erik appeared in a December 2007 Hopewell, N.J. newspaper article describing his once a month dip into the Delaware River. Heavy wetsuits are not allowed anytime. In *The Beacon* article, Erik explained, "Anywhere I

travel in the world, I feel like I have to get in [the water] and experience it. Unless I'm in it, it feels like I'm only observing."

#### Contact Information

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

*Effective July 23, 2007, DRBC's five technical branches were reorganized into three to provide overall operating efficiencies and better integrate information technology. The former Modeling and Monitoring Branch became the Modeling, Monitoring and Assessment Branch. This branch, headed by Thomas Fikslin, was given the additional responsibilities of data assessment and development of water quality standards. The former Operations and Project Review branches became the Water Resources Management Branch, headed by William Muszynski. The two functions will remain separate within the new branch. The Planning and Information Services branches were consolidated into the Planning and Information Technology Branch. This new branch, headed by Kenneth Najjar, will have an important role in strategic direction-setting for the agency. The former Information Services staff had been without a branch head since 2003.*

# Hydrologic Summary 2006-2007

## 2006: Main Stem River Flooding in June Ends Spring Drought Watches

For the fourth year in a row, the three New York City (NYC) reservoirs in the upper Delaware River Basin began 2006 with above-normal combined storage (247.668 billion gallons [bg], or 91.4% of usable capacity, and 58.105 bg above the long-term median). January's above-normal precipitation and snow melt impacted streamflows, which averaged two- to three-times higher than normal at many locations throughout the basin, and increased storage in NYC's Cannonsville, Pepacton, and Neversink reservoirs to 281.750 bg (104% of usable capacity) by January 19. Snow pack amounts were below average during most of the 2005-06 winter season and much of it melted in mid-January 2006.

The basin experienced several months of below-normal precipitation beginning in February. The March through May period recorded the lowest streamflows of the year at a time when rivers are usually brimming with water from snow melt and spring rain storms. The dry weather pattern impacted both surface water and ground water, prompting two states to take actions to safeguard supplies for the upcoming peak demand period by urging voluntary water conservation. Pennsylvania issued a statewide drought watch on April 11, the first time that any of its counties had been under a drought declaration since 2003. On May 8, New Jersey declared a statewide drought watch for the first time since the autumn of 2005. Storage in the three NYC upper basin reservoirs and in the lower basin's Blue Marsh and Beltzville reservoirs never reached levels which would have automatically triggered a drought watch under the DRBC's drought

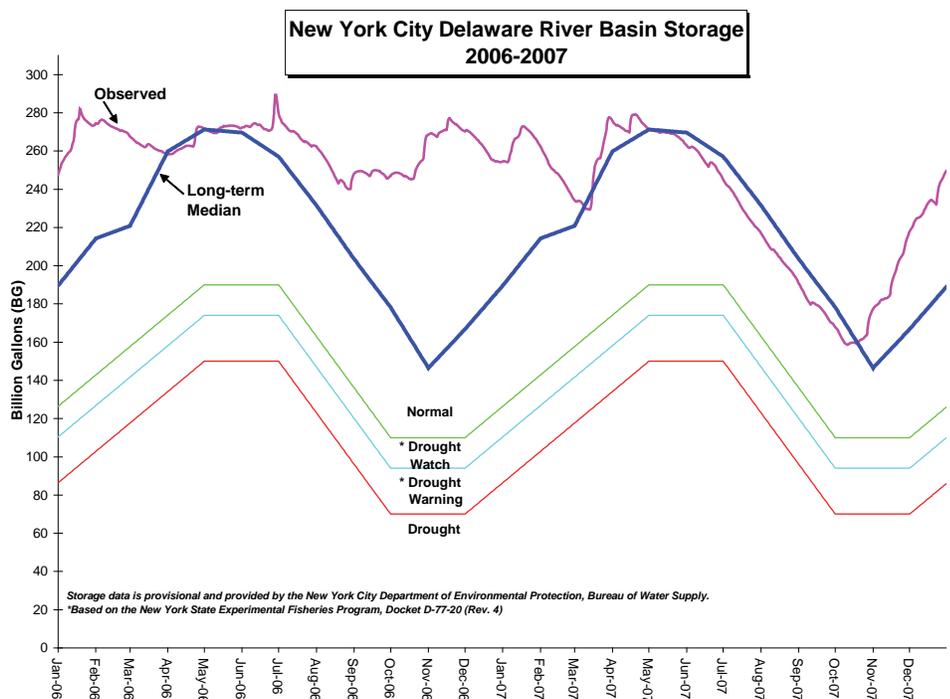
operating program, however.

These state-issued drought watches were lifted by New Jersey on June 28 and on June 30 by Pennsylvania after extremely heavy rainfall from a tropical air mass turned low flows to flood flows within a matter of days, causing flash flooding and record to near-record crests along many streams and rivers throughout the basin. This was the third major flood to hit the non-tidal main stem Delaware River since September 2004.

The rain that caused the June flooding fell over a broad area of the basin and came in two parts. Heavy rain during June 24-26 saturated the ground, filled streambanks, and produced minor flooding conditions by early Tuesday, June 27. This was followed by a second storm on June

27 and early Wednesday, June 28 that produced an additional two to six (or more) inches of rain in the Schuylkill, Lehigh, and Lackawaxen watersheds as well as in Sullivan and Delaware counties in New York State. The saturated ground provided little or no absorption, sending large amounts of runoff into already fast moving creeks, streams, and rivers. National Weather Service (NWS) flash flood warnings were in effect for nearly all counties in the Pennsylvania and New York portions of the basin during Tuesday evening as the rain continued to fall.

Over this multi-day period, NWS data indicated that six to 15 inches of rain fell in the Schuylkill, Lehigh, and upper Delaware River watersheds, with higher amounts in isolated areas. At least five inches fell throughout



This graph shows the observed combined water storage in the NYC Delaware Basin reservoirs (Cannonsville, Pepacton, and Neversink) during 2006 and 2007, 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.

nearly all of the Delaware River Basin, with the exception of portions of New Jersey and the immediate Philadelphia area, which received less.

Flood crests on the main stem Delaware River followed on June 28 and 29. At Montague, N.J., the river crested 7.16 feet above flood stage, the third highest on record and 0.47 feet higher than the flood of April 2005. The Delaware River at Trenton, N.J. reached 5.09 feet above flood stage, the fifth highest on record and 0.24 feet lower than the April 2005 crest.

Several major Delaware tributaries were also hit hard by the June flooding. In the upper basin, the West Branch Delaware River at Hale Eddy, N.Y. crested at more than 8.1 feet above flood stage, the second highest on record. Along the Schuylkill River in Pennsylvania, stream gages at Landingville, Berne, and Reading measured crests of 9.11, 5.54, and 10.63 feet above flood stage, respectively (the second highest flood crests recorded at each location).

The heavy rainfall in late June made up for the earlier precipitation deficits. Streamflows recovered and ground water levels rebounded enough to provide ample base flows for streams and rivers as the basin moved into the hottest and potentially driest months of the year. Releases from the NYC Delaware Basin reservoirs directed by the Delaware River Master to maintain the minimum flow target at Montague as required by the 1954 U.S. Supreme Court decree totaled approximately 14 bg during 2006 and were made only for a brief period from July 30 through August 30.

The remnants of Tropical Storm Ernesto in early September and several heavy rain events during the autumn months kept streamflows at normal to above-normal levels for the remainder of 2006. The average observed ground water levels in eight reported USGS observation wells in the Pennsylvania portion of the basin also remained above average through the end of the year.

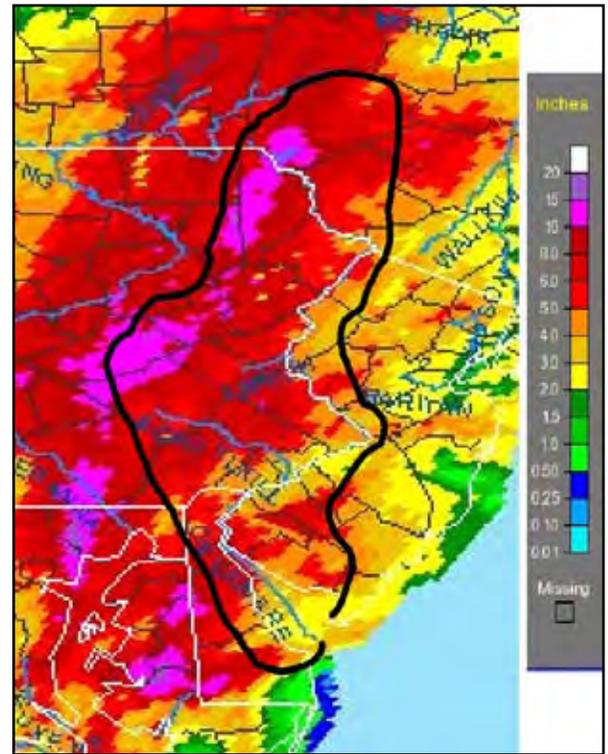
Despite accumulated deficits during early 2006, the majority of the counties within the Delaware

River Basin recovered enough to report normal to above-normal annual precipitation totals by the end of the year. Annual observed precipitation at selected stations above Montague was 51.23 inches, or 7.97 inches above normal. Annual observed precipitation at selected stations above Trenton was 54.22 inches, or 9.33 inches above normal, while 49.41 inches (6.60 inches above normal) fell in Wilmington, Del.

With the exception of the periods from March 31-April 23 and May 4-May 12, combined storage in the NYC Delaware Basin reservoirs remained above the long-term median during 2006.

No directed releases were required during 2006 from 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) to meet the Delaware River's minimum flow target at Trenton. However, between June 15 and 16, the DRBC requested emergency water releases of 300 to 600 cubic feet per second (cfs) from Blue Marsh Reservoir into the Schuylkill River to dilute concentrations of a cyanochloride compound that had contaminated the Wissahickon Creek, a tributary to the Schuylkill.

In addition, no replacement releases were required in 2006 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 certain drought operations. However, several special releases totaling approximately 485 million gallons were made throughout the year to maintain Merrill Creek Reservoir below the maximum operating level of 922.80 feet.



This Doppler radar map shows the total rainfall estimates for June 23-29, 2006. The Delaware River Basin is marked by the dark line. The heaviest rainfall occurred in the northern and western portions of the basin. (Courtesy of the National Weather Service)

### **2007: An April Nor'easter Followed By Year-Ending Drought Watches**

The three NYC reservoirs in the upper Delaware River Basin once again started the new year with above-normal combined storage (254,499 bg, or 94% of usable capacity, and 64,936 bg above the long-term median). By mid-March, a 40 bg void existed in the three NYC reservoirs largely due to the temporary spill mitigation program that had been in effect since September 2006. However, snow melt and rainfall runoff filled this void prior to the arrival of a mid-April Nor'easter.

Rainfall totals during the April 15-16 event ranged from three to seven inches over much of the basin, with some northern areas receiving over six inches of snowfall as cold air wrapped around the storm. The heavy rain resulted in widespread flooding on tributaries. The Assunpink Creek at Trenton reached 13.28 feet, the fourth highest recorded crest (flood stage is seven feet), while the Neshaminy Creek near Langhorne, Pa. crested

about 5.7 feet above flood stage. Significant rises occurred along the non-tidal portion of the main stem Delaware, but the river crested just below flood stage at most locations. At Montague, the river crested at 18.5 feet (flood stage is 25 feet) while at Trenton it crested at 18.82 feet (flood stage is 20 feet). Strong winds associated with the storm contributed to minor tidal flooding on the Delaware River downstream of Trenton and along the Delaware Bay.

In contrast to April, when observed precipitation of 5.37 inches fell at selected stations above Montague, May's rainfall total of 1.40 inches at those same stations was the second driest for that month since recordkeeping began in 1941 according to the Office of the Delaware River Master. Normal precipitation for April and May is 3.77 inches and 4.21 inches, respectively.

Spring ended on a tragic note when slow moving thunderstorms dropped an estimated eight to 11 inches of rain over a small area along the border of Delaware and Sullivan counties in New York State on the evening of June 19 over a two- to three-hour period. Four lives were lost in this catastrophic flash flood. The intense rainfall caused the Beaver Kill (a tributary of the East Branch Delaware River) to rise 5.4 feet in 15 minutes at Cooks Falls.

Pennsylvania issued a drought watch on August 6 for 58 counties due to below-normal rainfall along with declining ground water and streamflow levels. This watch included Carbon, Lackawanna, Lebanon, Luzerne, Monroe, Pike, Schuylkill, and Wayne counties in the Delaware River Basin. August rainfall improved conditions so drought watches were scaled back to 32 counties on September 5, including Monroe, Luzerne, and Schuylkill counties in the basin. However, a lack of significant rainfall during September prompted Pennsylvania to expand drought watches to 53 counties on October 5, including 14 in the basin.

Delaware declared a statewide drought watch on October 20 in response to low rainfall amounts

over the summer that resulted in declining stream flows and extremely dry soil conditions, especially in Kent and Sussex counties. The U.S. Department of Agriculture granted Governor Minner's request for a drought disaster designation due to the soil conditions and resulting crop losses.

The drought watches issued by Pennsylvania and Delaware depicted in the adjacent map remained in effect from October 20 through the remainder of 2007. As was the case during 2006, storage in the three NYC upper basin reservoirs and in the lower basin's Blue Marsh and Beltzville reservoirs never reached levels which would have automatically triggered a drought watch under the DRBC's drought operating plan.

The observed precipitation for the Delaware River Basin at selected stations above Montague during 2007 was 47.63 inches or 4.37 inches above normal. Similarly, the observed precipitation at selected stations above Trenton was 49.27 inches or 4.38 inches above normal. However, the 41.81 inches of precipitation that fell during 2007 in Wilmington, Delaware was one inch below normal.

Combined storage in the three NYC Delaware Basin reservoirs was below the long-term median for nearly half of the year (March 10 - March 15 and May 2 - October 19), in contrast to about a month during 2006. These reservoirs ended 2007 with combined storage of 249.485 bg (92.1% of usable capacity), or 60.657 bg above the long-term median.

Releases from the NYC Delaware Basin reservoirs directed by the



These state-issued drought watches were in effect in the noted counties from October 20, 2007 through the remainder of the year.

Delaware River Master to maintain the minimum flow target at Montague totaled about 54 bg during 2007 between May 27 and October 22. No directed releases were required during 2007 from Beltzville Reservoir, but releases totaling 453 million gallons from Blue Marsh Reservoir were directed by DRBC over the period October 3-10 to meet the Delaware River's minimum flow target at Trenton. No replacement releases were required in 2007 from Merrill Creek Reservoir to make up for evaporative water losses caused by power generation, but special releases totaling nearly 252 million gallons were made April 23-24 to maintain the reservoir below the maximum operating level of 922.80 feet.

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

# DRBC's Role in Flood Loss Reduction Efforts

## *Three Delaware River Main Stem Floods in Two Years*

Between September 2004 and June 2006, three major floods caused severe and repeated damage to thousands of structures, and disrupted the lives of thousands of people along the main stem Delaware River. The flooding was the worst since the record flood of 1955.

However, this was not the first time in the basin that three major floods occurred over a two-year period. According to information compiled by the National Weather Service (NWS), the first, third, and seventh highest recorded flood crests on the Delaware River at Trenton occurred over a two-year period about 100 years ago: March 8, 1904 (30.60 feet), October 11, 1903 (28.50 feet), and March 2, 1902 (23.60 feet). This compares to April 4, 2005 (25.33 feet; fourth highest), June 29, 2006 (25.09 feet; fifth highest), and September 19, 2004 (23.41 feet; eighth highest). The flood stage at Trenton is 20 feet.

The 2004, 2005, and 2006 events were analyzed by the NWS, which found that the flooding was primarily the result of unusually heavy rain and/or snowmelt in the long, but relatively narrow watershed. During the most recent flood event in June 2006, rainfall totals at some locations in the western and northern portions of the basin totaled more than 15 inches over a seven-day period. According to precipitation frequency tables developed by the National Oceanic and Atmospheric Administration for the period of observed record (NOAA Atlas 14), the chance of rainfall of this magnitude is 1 in 700 in any given year. Large areas of the western and northern basin received over 10 inches of rain during the period – which is a 1 in 100 chance event in any given year.

While we do not yet know for certain how storm patterns may

be changing in response to climate change, research appears to be pointing to more extreme precipitation cycles, whether they are wet or dry.

The DRBC is one of many organizations working to achieve flood loss reduction in the Delaware River Basin. One of the strengths of the DRBC is its ability to bring together various government and non-government stakeholders across jurisdictional boundaries for the shared interest of the watershed.

Here are some of the major actions undertaken by the DRBC during 2006 and 2007 in response to the floods:

### **Delaware River Basin Flood Mitigation Task Force**

The Delaware River Basin Interstate Flood Mitigation Task Force on July 12, 2007 forwarded to the four basin state governors its action agenda for a more proactive, sustainable, and systematic approach to flood damage reduction.

The formation of the task force was requested in a September 21, 2006 letter jointly signed by Delaware Gov. Ruth Ann Minner, New Jersey Gov. Jon Corzine, New York Gov. George Pataki, and Pennsylvania Gov. Edward Rendell, who also serve as DRBC members. The four governors noted in their letter, "Individually, the Basin states can move forward with policies and regulations to reduce and mitigate the impacts of flooding, but we believe that through coordinated effort on a regional basis, we can do more to reduce flood loss within the Basin than we could accomplish acting separately, on our own. The Delaware River Basin Commission is the obvious vehicle for developing flood loss reduction and flood mitigation plans that cannot be accomplished by any single state or local government but that require a holistic watershed approach. As much as any time since the Commission was created in 1961, now seems an appropriate moment



DRBC Deputy Director Robert Tudor facilitating discussion at the first meeting of the task force. (Photo by Katharine O'Hara)

for coordinated action through the DRBC.”

“The task force members, after evaluating flood prevention and mitigation options and considering public written and verbal comments, concluded that no set of mitigation measures will entirely eliminate flooding along the Delaware River,” DRBC Executive Director Carol R. Collier wrote in her cover letter accompanying the final report. “However, they believe that a combination of measures will improve the basin’s capacity to prepare for and recover from flooding in the future.”

The 45 flood loss reduction recommendations identified by the task force were based on a set of guiding principles that included floodplain restoration and protection, institutional and individual preparedness, local stormwater management and engineering standards, and the judicious use of structural and non-structural measures. Six management areas were addressed: reservoir operations, structural and non-structural mitigation, stormwater management, floodplain mapping, floodplain regulation, and flood warning.

In response to the public perception of a cause and effect relationship between spilling reservoirs in the upper basin and flood occurrence in the main stem river between Hancock, N.Y. and Trenton, N.J., the task force concluded that flooding would still occur along the Delaware even if a year-round void program was implemented. Historic data indicate that major flooding on the main stem Delaware River occurred before New York City reservoirs were built or in the absence of spills after they were put into service.

While stopping short of advocating permanent voids, task force members

called for evaluating the cumulative effects of operations at all existing major basin reservoirs to develop a coordinated action plan to reduce the likelihood and volume of spills as long as water supplies are not adversely affected.

Other immediate actions proposed by the task force included:

- Establishing areas of priority funding for acquisition, elevation, and flood proofing.
- Developing and implementing a consistent set of comprehensive floodplain regulations beyond minimum National Flood Insurance Program standards across the entire Delaware River Basin.
- Enabling stormwater utilities. This approach has water quality and quantity benefits and reinforces the states’ existing momentum for stormwater management and control of non-point source (runoff) pollution.

The 31-member task force representing a broad array of government interests (both legislative and executive) as well as private sector and non-profit perspectives convened nine months earlier on October 25, 2006, and developed a preliminary action plan that was submitted to the governors along with a progress letter on December 29, 2006. This draft plan was the focus of four public meetings attended by over 200 people that were held throughout February 2007 in Delhi, N.Y., Wilmington, Del., Ewing, N.J., and Easton, Pa. An additional 60 written letters were submitted during the public comment period. DRBC Deputy Executive Director Robert Tudor led the staff support of this effort.

Task force members decided to make several changes to the final

report based on the public feedback process, but retained the basic recommendation architecture of the public review draft action plan. Key changes involved adding a more detailed description concerning hydrologic conditions in the basin that contribute to tributary and main stem flooding, a reservoir operations findings statement addressing the issue of using water supply reservoirs for flood control, more specific implementation accountability for each of the actions, a new recommendation regarding the need for an ice jam monitoring and communication plan, and various corrections, edits and clarifications to the substance of specific recommendations. An appendix was added to the report to document the public participation process and an implementation matrix was developed to provide for a structured implementation process over the short and medium term timeframe.

The complete report, along with additional task force information, can be viewed on the commission’s web site at [http://www.nj.gov/drbc/Flood\\_Website/taskforce/index.htm](http://www.nj.gov/drbc/Flood_Website/taskforce/index.htm).

### **Delaware River Basin Flood Analysis Model Project**

The four basin governors in their September 21, 2006 letter directing the formation of the flood task force also pledged \$500,000 towards the development of a flood analysis model. This tool will enable the commission (four basin states and the federal government) and the 1954 U.S. Supreme Court decree parties (four basin states and New York City) to evaluate the feasibility of various reservoir operating alternatives and the effect of reservoir voids of different magnitudes on flooding at locations downstream from 15 major

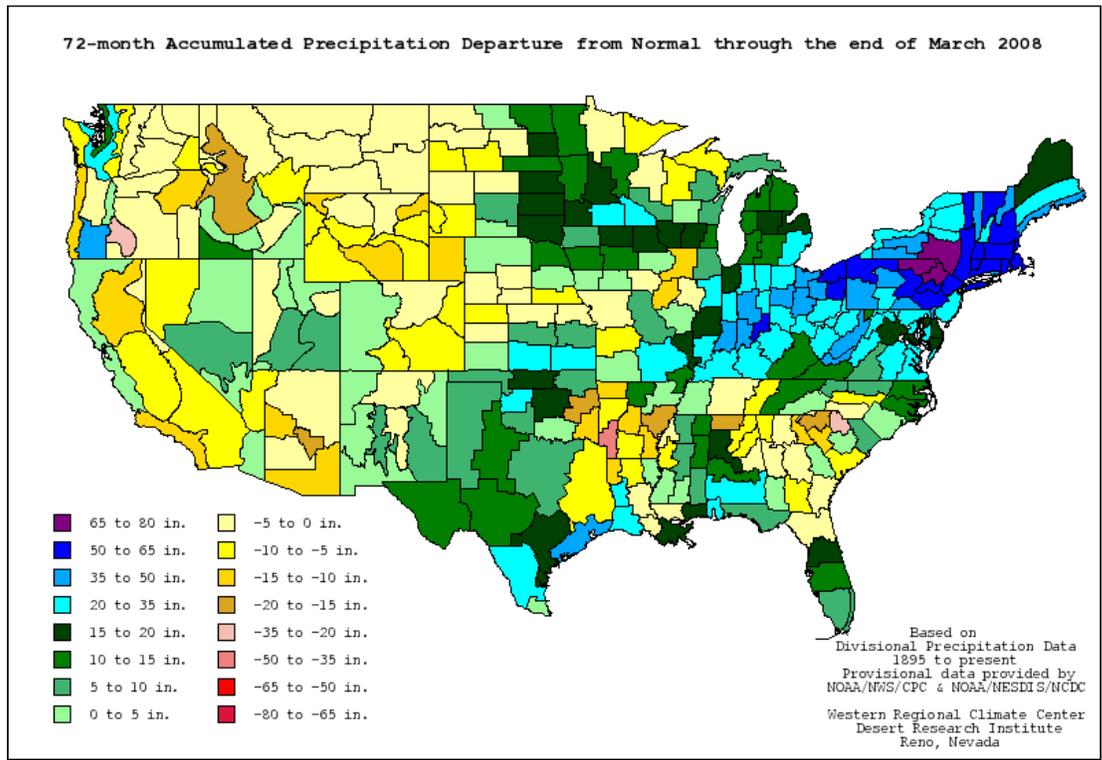
reservoirs in the basin. The model will use data from the September 2004, April 2005, and June 2006 floods. The U.S. Geological Survey (USGS) led the development of the interagency proposal, including additional funds and in-kind services from USGS, NWS, and the U.S. Army Corps of Engineers totaling \$265,000. Agreements with DRBC were finalized in June 2007 and work began in August 2007. The model is expected to be completed by this team of federal agencies in January 2009.

This project is consistent with the flood task force's recommendation that a flood analysis model be developed to 1) assess the downstream effects of reservoir voids of different magnitudes; 2) evaluate alternative reservoir operating plans (including spill and discharge mitigation plans); and 3) seek release programs that would reduce the likelihood and volume of spills from reservoirs during storm events in order to mitigate flooding, without adversely affecting the functions for which the reservoirs were built.

Additional information can be found on the DRBC web site at [http://www.nj.gov/drbc/Flood\\_Website/floodanalysismodel.htm](http://www.nj.gov/drbc/Flood_Website/floodanalysismodel.htm).

### Temporary Spill Mitigation Program

At its September 27, 2006 meeting, the DRBC, with the required unanimous consent of the five decree parties, established a temporary spill mitigation program for the three



This map shows accumulated precipitation departure from normal for the six-year period through March 2008. Most of the Delaware River Basin received 50 to 65 inches of accumulated precipitation above normal over this period. However, the purple area covering the upper basin received 65 to 80 inches of accumulated precipitation above normal over this stretch of time, which included the three main stem floods. For comparison of the other extreme, the accumulated precipitation deficit during the drought of the 1960s that extended over a six-year period was around 40 inches. Normal annual precipitation in the basin is 42 to 45 inches. (Courtesy of the National Oceanic and Atmospheric Administration/Western Regional Climate Center)

New York City Delaware Basin water supply reservoirs to be effective through May 2007. The expiration date was later extended until September 30, 2007.

This temporary program was intended to reduce the likelihood that the three reservoirs in the upper Delaware River Basin – Cannonsville, Pepacton, and Neversink – could be full and spilling coincident with a major storm or thaw. The program would not prevent flooding, but it could add a measure of seasonal peak flow reduction, particularly in the tailwaters below the dams. This effect would diminish with the distance from the reservoirs as the river receives runoff from drainage areas downstream.

Releases totaling approximately 190 billion gallons (equivalent to 73 percent of the combined usable storage in the three reservoirs) were triggered by this program from its inception in late-September 2006 through

April 2007. However, reservoir storage levels remained consistently above normal for most of this period because the spill mitigation releases under the temporary program were being offset by the rainfall/snow melt running off into the reservoirs. For the 180-day period ending April 21, 2007, precipitation averaged four inches above normal throughout the basin (based on NWS-gathered precipitation gage reports for 38 of the 42 counties located totally or partially within the basin).

The termination of this interim program would coincide with adoption of a new year-round Flexible Flow Management Program (FFMP) for the three reservoirs, which would include a spill mitigation component. Information about the FFMP agreement reached by the decree parties on September 26, 2007 and the DRBC public rulemaking process that began during December 2007 can be found in the article on page 15.

## **U.S. Congress Funds Flood Warning Enhancements**

Thanks to the strong support of the Delaware River Basin's representatives and senators in Washington, D.C., \$235,000 was appropriated in the October 1, 2007-September 30, 2008 federal fiscal year to develop enhancements to the basin's flood warning system. Possible use of the funds, which will be distributed through the National Oceanic and Atmospheric Administration/NWS budget, include: 1) inventorying and evaluating existing precipitation/stream gage networks; 2) gage hardening; 3) flood inundation mapping; 4) evaluating and establishing new flood forecast points; and 5) flood warning education/outreach efforts. All of these projects coincide with flood task force recommendations.

U.S. Reps. Rush Holt (N.J.), Charles Dent (Pa.), Maurice Hinchey (N.Y.), Michael Castle (Del.), and Jim Gerlach (Pa.), who co-chaired the Congressional Delaware River Basin Task Force, were instrumental in obtaining this funding, as were Senators Frank Lautenberg (N.J.) and Robert Menendez (N.J.). Senator Joseph Biden (Del.), along with Reps. Kristen Gillibrand (N.Y.), Scott Garrett (N.J.), Christopher Smith (N.J.), Jim Saxton (N.J.), John Hall (N.Y.), Mike Ferguson (N.J.), and Robert Andrews (N.J.) joined the congressional task force co-chairs in urging key negotiators to support this

funding during the final stages of the legislative process.

## **Multi-Jurisdictional Flood Mitigation Plan for the Non-Tidal N.J. Section of the Delaware River Basin**

Municipalities nationwide are required to prepare flood and/or all-hazard mitigation plans in order to qualify for disaster mitigation funding from the Federal Emergency Management Agency (FEMA). Thanks to a grant awarded by FEMA, a planning initiative was formed in 2006 to combine the resources of state and county agencies to assist the 64 municipalities located within Sussex, Warren, Hunterdon and Mercer counties in New Jersey that have boundaries either partially or entirely within the Delaware River Basin in the preparation of a multi-jurisdictional Flood Mitigation Plan (FMP).

The goal of flood mitigation planning is to make communities more disaster resistant by reducing the long-term risks to loss of life and property from flooding. DRBC along with the New Jersey Office of Emergency Management (NJOEM) and New Jersey Department of Environmental Protection (NJDEP) are leading this effort to develop the FMP, which will be part of future all-hazard mitigation plans.

A regional planning team meeting was held on October 11, 2006 in Clinton, N.J., which was followed

by kick-off meetings in each of the four counties between November 28 and December 7. Engaging local participation in the planning process is crucial for the identification of critical facilities, flood-prone areas, community goals, and desired local mitigation actions for successful FMP development. To assist in this effort, four county-specific planning workshops were held during March 2007, which were followed in October 2007 with technical assistance workshops in each of the counties. DRBC, NJOEM, and NJDEP continue to work with the local communities on the goal of completing and submitting the plan to FEMA in 2008.

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

*An automated application has been developed by the DRBC's John Yagecic that retrieves daily river forecast data from eight stations in the NWS Advanced Hydrologic Prediction Service (AHPS) via the Internet and compares forecasted stages to station-specific flood action levels. If a forecasted stage exceeds the station-specific flood action level (which is below flood stage), the program generates and sends an e-mail warning to a list server. By subscribing to the list server, individuals can get e-mail warnings about NWS-forecasted flood events on the main stem Delaware River, the Lehigh River, and the Schuylkill River. Building upon this work, the NWS announced at a 2007 DRBC Flood Advisory Committee meeting that it has developed a tool that is now available to the public to access important weather information. For more details, including important caveats, please visit [http://www.nj.gov/drbc/Flood\\_Website/FloodEmail.htm](http://www.nj.gov/drbc/Flood_Website/FloodEmail.htm).*

# Flexible Flow Management Program Agreement Reached By Decree Parties

## DRBC Begins Public Rulemaking Process in 2007

On December 3, 2007, the DRBC published proposed changes to its Water Code to implement a Flexible Flow Management Program (FFMP) for operation of the three New York City Delaware Basin reservoirs. It also announced the scheduling of two informational meetings (December 18, 2007 in Matamoras, Pa. and January 8, 2008 in Philadelphia, Pa.) and a public hearing to receive comments on January 16, 2008 in West Trenton, N.J.

This was in response to action taken by the DRBC commissioners at their September 26, 2007 meeting directing staff to begin the public rulemaking process to incorporate the FFMP agreement reached earlier that day by the five parties to the 1954 U.S. Supreme Court Decree into the commission's rules and regulations.

The proposed changes to the DRBC Water Code are intended to provide a more adaptive means for managing the city-owned 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 decree, which resolved an interstate water dispute centering on these reservoirs, made no provision for spill mitigation,



Colin Apse from The Nature Conservancy testifies on the initial version of the FFMP agreement at the DRBC public hearing held March 27, 2007 in Hawley, Pa. Nearly 40 persons testified at the afternoon and evening hearings, which were attended by over 200 people. (Photo by Clarke Rupert)

conservation or ecological releases.

A previous proposal had been negotiated by the decree parties and submitted to the DRBC for consideration earlier in 2007. That agreement was the focus of two public hearings and an informational meeting held in Hawley, Pa. on March 27. Over 400 comments were received from approximately 120 agencies, organizations, elected officials, and private citizens by the time the written comment period closed on April 6. The decree parties decided to withdraw that version from receiving further DRBC consideration and resumed negotiations, taking under advisement the comments received. Those deliberations concluded with the current version that was unanimously agreed to on the morning of September 26 just prior to the afternoon commission meeting.

The FFMP agreement reached by the decree parties on September 26 is being implemented on a temporary basis by New York State and New York City, in coordination with the Delaware River Master appointed under the decree, while DRBC conducts its notice and comment rulemaking process. The previous interim fishery releases program and temporary spill mitigation program expired on September 30, 2007.

A central feature of the fishery management program that had previously been in effect was the creation of reservoir storage "banks" to be used for narrowly defined purposes under specific hydrologic and temperature conditions at certain times of the year.

The decree parties' FFMP agreement would largely eliminate the reservoir storage banks previously used for habitat protection purposes and instead base releases on storage levels, resulting in larger releases when water

The 1961 law creating the DRBC gives the commission the power to allocate the waters of the basin, but prohibits it from adversely affecting the New York City reservoir releases or diversions as provided in the 1954 U.S. Supreme Court Decree without the unanimous consent of the five decree parties. The decree parties include Delaware, New Jersey, Pennsylvania, New York State, and New York City. The members of the DRBC are the four basin states and the federal government.

is abundant and smaller releases when reservoir storage is at or below normal. This approach would more closely approximate natural flows and provide more gradual transitions from higher to lower releases, which has been a concern voiced in the past by Upper Delaware anglers.

The FFMP agreement's 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. It does not include specified void targets.

Based on the public comments received during the rulemaking process, the DRBC may modify its proposed Water Code changes and request that the decree parties consent to their adoption. (*Editor's note: In response to numerous requests, the DRBC announced on January 17, 2008 that the comment period was being extended from January 18 to March 3, 2008.*)

Additional information can be found on the commission's web site at [www.drbc.net](http://www.drbc.net).

# Federal Coordination Summit

Shortly after becoming DRBC chair, Major General William Grisoli on July 20, 2006 convened representatives from various federal offices and agencies at the commission's West Trenton headquarters to discuss "Integrated Water Management in the Delaware River Basin."

In his opening remarks, Maj. Gen. Grisoli said it was important for the federal agencies to get together as a team to consider the various challenges facing the basin. Since "no one has buckets of money to spend," he hoped the summit would provide an opportunity for the agency representatives to get to know each other as partners, stimulate thought and discussion, provide better agency coordination, leverage available funds, and avoid redundancies. Maj. Gen. Grisoli also noted that the input from the various federal agency leaders in attendance would help him to better represent them as the DRBC's federal member.

Executive Director Carol R. Collier reminded the approximately 50 attendees that the 30-year basin plan adopted in September 2004 is a good focusing tool for federal collaboration. Following her presentation, four different subject areas were discussed, each led by a DRBC commissioner. They included "Protect and Restore Water Quality" led by Delaware Commissioner Kevin Donnelly, "Water Supply and Instream Flow Needs" led by Pennsylvania Commissioner Cathy Curran Myers, "Flood Loss Reduction" led by New Jersey Commissioner Mark Mauriello, and "Integrated Water Resources Management" led by New York Commissioner Mark Klotz.

One subject that received considerable attention was the need for improved monitoring coordination

among federal agencies, the basin states, and DRBC. Specifically, it was noted that current monitoring efforts should be evaluated to assure that programs are complementary, not redundant; moreover, there is a need to use uniform methods and evolve from discrete sampling to more real time monitoring. The DRBC agreed to hold a monitoring workshop for federal agencies and the basin states through the commission's Monitoring Advisory Committee. Another subject area that rose to the top as benefiting from agency coordination was flood loss reduction.

A number of additional follow up actions were identified, including an assessment by each agency on opportunities for collaboration in key projects. The DRBC agreed to host meetings of multiple offices within single agencies which have



DRBC Chair Maj. Gen. Grisoli and his alternate, Lt. Col. Gwen Baker, listen to the ongoing discussion at the federal summit. (Photo by Katharine O'Hara)

responsibilities within the watershed, such as the National Park Service and the U.S. Geological Survey. Based on the positive feedback among attendees, the commission also announced that it would host a second federal summit in 2008.

The following federal offices and agencies were represented at the July 20 coordination summit:

- Congressional Delaware River Basin Task Force (Offices of U.S. Reps. Rush Holt [N.J.], Jim Gerlach [Pa.], and Michael Fitzpatrick [Pa.]
- Federal Emergency Management Agency
- Federal Energy Regulatory Commission
- National Park Service
- National Weather Service
- Natural Resources Conservation Service
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture
- U.S. Department of the Interior, Office of Surface Mining
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Geological Survey

# Delaware River Interstate Water Trail Launched

DRBC joined its federal, state, and nonprofit organization partners at an event held on April 20, 2007 along the Delaware River at Washington Crossing Historic Park in Pennsylvania to focus attention on the river as an Interstate Water Trail. It also featured the release of the newly completed, free water trail guide along with updated recreation maps which are available for sale to the public.

The event featured numerous speakers representing the various partners, including American Canoe Association (ACA) Executive Director Pamela Dillon, as well as representatives from the offices of U.S. Congressmen Rush Holt (N.J.), Patrick Murphy (Pa.), and Christopher Carney (Pa.). Eighth-grade students from FDR Middle School (Bristol, Pa.) also participated. In addition, Pennsylvania Department of Conservation and Natural Resources (DCNR) Bureau of Recreation and Conservation Director Cindy Adams Dunn presented the Delaware River Greenway Partnership (DRGP) a \$45,000 grant award for continued water trail outreach and a signage program.

The steering committee for the Delaware River Water Trail Project includes representatives from the DRBC, DRGP, DCNR, ACA, Pennsylvania Fish and Boat Commission, National Park Service, and the Delaware and Lehigh Canal National Heritage Corridor.

The water trail project's main objective is to provide newcomers and existing recreational users alike with new tools and sources of information that will make for a safer and more enjoyable river experience, while reducing potential negative impacts on water quality, wildlife, riparian habitat, and public and private property. The *Leave No Trace* stewardship



Eighth-grade students from FDR Middle School officially presented the new Delaware River water trail guides and recreation maps to American Canoe Association Executive Director Pamela Dillon at an April 2007 event along the Delaware River. (Photo by Katharine O'Hara)

program, an international program designed to assist outdoor enthusiasts with decisions on how to reduce their impacts on the environment, is essential to implementing the latter portion of this objective, and is prominently displayed on both the water trail guides and recreation maps.

The free water trail guide, a folded double-sided poster that depicts a general map of the non-tidal Delaware River from Hancock, N.Y. to Trenton, N.J., also briefly describes the river's history, resources, and amenities. The DRBC concurrently produced an updated reprint of its popular recreation map set which includes additional sections of the Delaware River than the previous 1991 version. This collection of 10 GIS-based, waterproofed maps covers portions of the river's east and west branches upstream of Hancock, the entire 200-mile non-tidal reach of the

main stem river, and an additional 25 miles of the tidal river downstream of Trenton to Northeast Philadelphia and Pennsauken, N.J. A portion of the proceeds from the \$25 sale of the recreation maps will help fund the commission's educational/outreach programs and activities.

Visit the commission's web site at <http://www.nj.gov/drbc/recreation.htm> for information on how to obtain the water trail guide or recreation maps.

# Water Quality Activity Highlights

## Special Protection Waters – Lower Delaware River

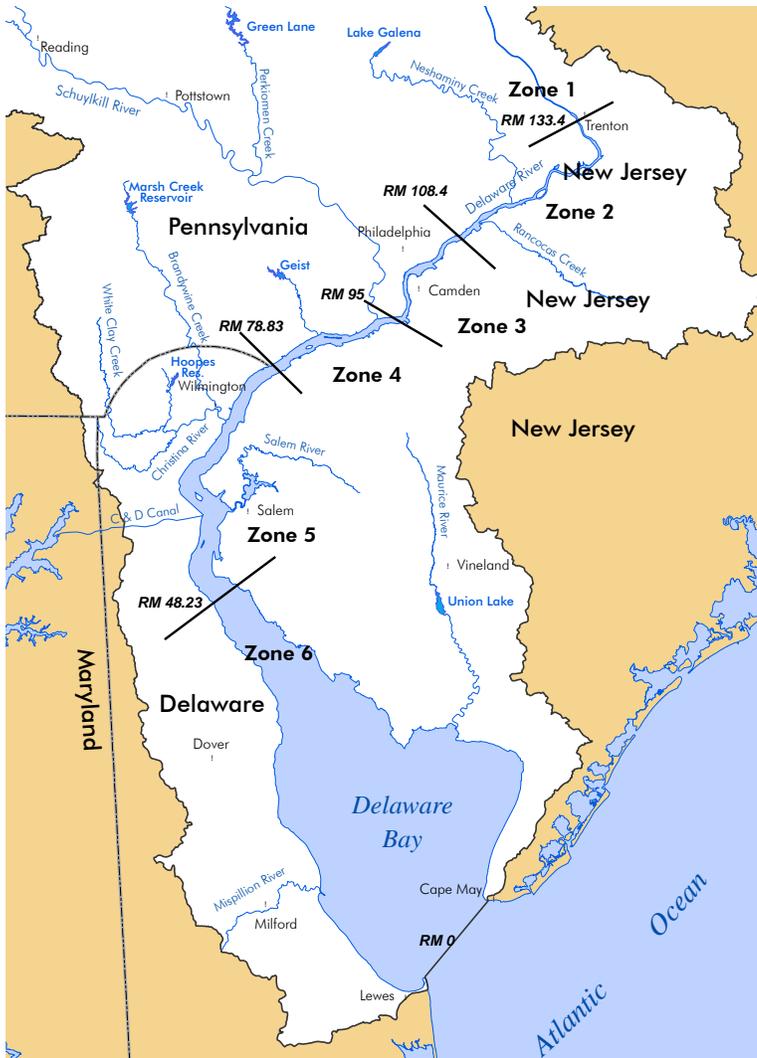
Proposed regulatory changes to permanently designate the Lower Delaware as Significant Resource Waters under the commission's Special Protection Waters (SPW) program were published during September 2007. This proposed rulemaking would include establishing numeric values for existing water quality in 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.

"If adopted, this rulemaking will protect the existing high water quality in the Lower Delaware River and expand the coverage of the commission's SPW anti-degradation regulations to encompass the entire 197-mile non-tidal Delaware River from Hancock, N.Y to Trenton," DRBC Executive Director Carol R. Collier said. "This clearly demonstrates the DRBC's long-term objective of keeping our clean water clean."

Informational meetings were held during 2007 in Stockton, N.J. on October 25 and in Easton, Pa. on November 1. A public hearing followed on December 4 at the DRBC's headquarters in West Trenton, N.J. and written public comments were accepted through December 6.

The Lower Delaware has been temporarily classified as Significant Resource Waters since January 2005, making it subject to all SPW regulations except those that require a no measurable change assessment from numeric values for existing water quality. The commissioners at their September 26, 2007 meeting approved an extension of this temporary designation until May 15, 2008 to allow adequate time to complete the proposed rulemaking process.





Map of the DRBC's Water Quality Management Zones (RM= river mile)

*(Editor's note: The commissioners extended the temporary designation through July 31, 2008 at their May 14, 2008 DRBC meeting.)*

The DRBC's SPW regulations, adopted in 1992, are designed to protect existing high water quality in applicable areas of the Delaware River Basin considered "to have exceptionally high scenic, recreational, ecological and/or water supply values."

Additional information can be found on the DRBC web site at

<http://www.nj.gov/drbc/spw.htm>.

### **PCB TMDL for Delaware Bay Established in 2006**

On behalf of the states of Delaware and New Jersey, and based on work conducted by DRBC, the U.S. Environmental Protection Agency (EPA) Regions II and III established a total maximum daily load (TMDL) for polychlorinated biphenyls (PCBs) from the head of the Delaware Bay at Liston Point, Del. to the mouth of the

bay at Cape Henlopen, Del. and Cape May, N.J. in December 2006. This Delaware Bay area also is referred to as DRBC Water Quality Management Zone 6.

The Zone 6 TMDL is built upon the TMDLs developed in 2003 for Zones 2-5, which covered the 85-mile tidal stretch of the Delaware River from Trenton, N.J. downstream to the head of the Delaware Bay near Liston Point.

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.

The development of Stage 1 TMDLs for Zones 2-6, which cover the entire estuary, took place under a court-mandated schedule resulting from a lawsuit against the federal government. The Stage 1 TMDLs also include tidal portions of the tributaries in this covered area. Each TMDL must provide for the achievement of the applicable water quality standard within each zone and also must ensure that water quality in adjacent zones is adequately protected.

A staged approach is being used to establish the PCB TMDLs. DRBC staff developed and calibrated a water quality model for one particular type of PCB (known as "Penta-PCBs") that represents about one-quarter of the total PCBs present in the estuary. This, in turn, was extrapolated for total PCBs in order to develop the Stage 1 TMDLs. DRBC, EPA, and the estuary states will continue to further refine the TMDLs through more detailed monitoring and modeling. The Stage 2 TMDLs using other types

of PCBs are targeted for development by December 2009.

PCBs, which have been classified by EPA as a probable human carcinogen, 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. 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 [http://www.nj.gov/drbc/toxics\\_info.htm](http://www.nj.gov/drbc/toxics_info.htm).

### **Emerging Contaminants**

There are more than 85,000 chemicals commercially available in the U.S., with new chemicals and technologies introduced each year. The number of substances released to the environment, improved analytical

methods, and a growing body of information on adverse effects has increased interest among scientists, the public, and regulators. These emerging contaminants are substances that have been detected in humans or other living organisms, found to be toxic in some way, or are persistent in the environment; therefore, they have the potential to cause adverse effects on human health or the environment, but toxic effects have not been historically monitored or assessed. Examples include phthalates, perfluorooctanoic acids, brominated flame retardants, nanoparticles, pharmaceuticals, and personal care products.

DRBC staff conducted an inventory of the work on emerging contaminants in the basin that is either underway or has already been completed by the states and federal agencies, such as the U.S. Geological Survey, in order to determine which of a very large group of chemicals should be subject to more intensive investigation. Formally approved or published analytical methods are lacking for many of these emerging contaminants. The staff's report, entitled "Emerging Contaminants of Concern in the Delaware River Basin, Vulnerability Assessment Preliminary Report," was completed in February 2007. It identified 42 compounds, including pharmaceuticals, personal care products, a group of flame retardants and several perfluorooctanoic acid compounds that have been in the news in connection with Teflon-related products. These have been detected both in fish and in ambient water samples collected in the basin.

The commissioners at their July 18, 2007 meeting adopted a resolution authorizing staff to enter into a contract for laboratory analysis of selected emerging contaminants in samples collected during low flow periods at 16 sampling stations from Liston Point, Del. upstream to Trenton, N.J. Approximately \$20,000

is available from EPA Section 106 water quality grants in 2007-2008 to conduct this survey.

Additional information, including the complete February 2007 report, can be found on the DRBC web site at <http://www.nj.gov/drbc/emc.htm>.

### **Delaware River Toxics Reduction Program**

The Delaware River Toxics Reduction Program (DelTRiP) was created in 2004 as a joint effort between the DRBC, EPA, Pennsylvania Department of Environmental Protection (PADEP), New Jersey Department of Environmental Protection (NJDEP), and Delaware Department of Natural Resources and Environmental Control (DNREC). The New York State Department of Environmental Conservation joined in 2007. The goal of DelTRiP, which is funded by an EPA grant, is to identify, prioritize, track, and report the status of sites within the basin that significantly contribute or have the potential to significantly contribute toxic loadings to the Delaware River Basin.

Since its inception, DelTRiP has been focused on identifying sites contaminated with PCBs. In 2006, EPA, NJDEP, PADEP, and DNREC submitted about 1,000 sites to DelTRiP as potential PCB sources; of those, 263 were identified as containing PCBs. DRBC compiled and published the first DelTRiP annual report in 2006, which included a listing of these 263 identified sites.

The 2007 annual report addressed the 263 sites referenced in the previous report. In researching the sites for the 2007 report, DRBC staff found that many of the 263 sites had been previously remediated to their respective state standards. The 2007 DelTRiP report details the remediation history of these sites, as well as the ongoing PCB remediation (which includes ongoing site

investigation and active remediation) at 56 sites. Several site histories were unavailable during the preparation of the 2007 report, and these are planned to be addressed in future reports.

In the coming years, the DelTRiP committee will continue to focus on sites with ongoing remediation, as well as attempt to obtain history and remediation information on sites that are currently not available. Prioritization of these sites also may be included. State and federal agencies will continue to take, revise, and initiate remediation actions at those particular sites. If new sites are found, they will be added into the program. Future reports also will emphasize and prioritize sites with other contaminants in addition to those with PCBs.

Additional information, including the 2006 and 2007 reports, can be viewed on the DRBC web site at <http://www.nj.gov/drbc/deltrip/index.htm>.

### **Schuylkill River Watershed Initiatives**

- The Exelon Schuylkill River Watershed Restoration Program resulted from the DRBC's October 27, 2004 decision to approve Exelon's application for an opportunity to demonstrate that greater operational flexibility with respect to cooling water needs at its Limerick Generating Station (LGS) would not cause negative environmental impacts to the Schuylkill River. Moreover, less usage of Delaware River water could be realized.

Exelon's contribution to the restoration fund is based on the amount of water that is not required to be pumped from the Delaware River for cooling purposes at its nuclear-powered LGS located in Montgomery County, Pa. during the demonstration period, which is

set to expire no later than 2008.

The docket language states that Exelon will make its fund payments to a non-profit or not-for-profit organization of its choosing, which will oversee, manage, and administer the restoration program. The restoration program monies are to be used solely for the purpose of supporting projects in the Schuylkill River Basin that are consistent with restoration and water management goals for the Schuylkill River.

Exelon announced in early 2006 that the Schuylkill River Heritage Area (SRHA) was its choice to oversee the Schuylkill River Watershed Restoration Program. SRHA is a non-profit organization dedicated to assisting communities, organizations, and citizens of the Schuylkill River region to preserve and sustain their cultural heritage and natural environment for future generations.

A committee comprised of representatives from the DRBC, Partnership for the Delaware Estuary, Exelon, SRHA, EPA, PADEP, and the Philadelphia Water Department reviews grant applications and makes award recommendations to the DRBC's executive director, who must approve the recipients prior to the distribution of funds.

In August 2006, the Perkiomen Conservancy, Berks County Conservation District, and Berks County Conservancy were awarded grants from funds generated in 2005. The projects that were chosen focused on agricultural improvements, streambank restoration, and headwaters protection.

The grant recipients announced

in August 2007 were the Berks County Conservancy, Delaware Riverkeeper Network, and the Schuylkill Headwaters Association. The selected projects will help correct water quality problems resulting from agricultural runoff, eroding streambanks, and acid mine drainage.

For more information, visit the DRBC's web site at <http://www.nj.gov/drbc/SchuylkillRestProgram.htm>.

- DRBC participated in a November 2006 event announcing the groundbreaking for a new recreation facility and a series of acid mine drainage reclamation projects in and around the town of Mary D, at the headwaters of the Schuylkill River in Schuylkill County, Pa.

The overall effort was financed in significant part from several sources, including the Commonwealth of Pennsylvania, The William Penn Foundation, and with funds from a DRBC settlement with Exelon.

A large group of watershed associations as well as state and federal agencies participated in the projects, which will benefit stream quality throughout the Schuylkill River. Acid/abandoned mine drainage is the largest source of stream impairment in the Upper Schuylkill Watershed.

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

- DRBC along with the other members of the Schuylkill Action Network (SAN) held a free workshop entitled *Monitoring Matters* in October 2006. Organized by DRBC and held

in Pottstown, Pa., the workshop focused on improving monitoring and assessment capacity in the Schuylkill River Watershed, the Delaware River Basin's largest subbasin. Attendees also learned about SAN workgroup activities and progress in areas such as agriculture, abandoned mine drainage, stormwater, and pathogens/compliance.

The purpose of SAN is "To improve the water resources of the Schuylkill River Watershed by working in partnership with state agencies, local watershed organizations, water suppliers, local governments, and the federal government to transcend regulatory and jurisdictional boundaries in the implementation of protection measures." Additional information about SAN can be found on its web site at <http://www.schuylkillactionnetwork.org/>.

### Periphyton Pilot Study

A "Pilot Study: Implementation of a Periphyton Monitoring Network for the Non-Tidal Delaware River" was completed in March 2007. Periphyton are diatoms and algae that live attached to aquatic substrate such as rocks. Periphyton monitoring programs have grown in popularity in recent years, and are used as regulatory tools in the United Kingdom, Australia, and several U.S. states. Periphyton are characteristically non-mobile and are excellent indicator organisms of specific environmental conditions. They are accurately reflective of the physical, chemical, and biological disturbances that occur at a site over a period of months.

The pilot study revealed a system generally indicative of high water quality and high biological integrity. The upper river periphyton appeared to



Pennsylvania Department of Environmental Protection (PADEP) Secretary Kathleen McGinty presented a check awarded to the Mary D Recreation and Schuylkill River Improvement Projects. Pictured in this photo are just a few of the dedicated individuals involved with this effort: (from left to right) Pa. State Representative David Argall, Dane Bickley of Exelon, Secretary McGinty, William Reichert of the Schuylkill Headwaters Association, Todd Stell of Stell Environmental Enterprises, Inc., Carol Collier of DRBC, and Curtis Peiper of PADEP. (Photo by Katharine O'Hara)

be less diverse (which is characteristic of low nutrient systems) and less pollution tolerant than the lower non-tidal river periphyton. The periphyton found in the lower river are indicative of high nutrient concentrations. These results can be used to inform the development of future nutrient criteria.

The complete report can be found on the DRBC web site at <http://www.nj.gov/drbc/public.htm>.

### 10-Year Water Quality Monitoring Strategy

DRBC submitted its Water Monitoring and Assessment Strategy to EPA in May 2006. In a letter acknowledging receipt of the document, EPA Region 3 Water Protection Division Director Jon M. Capacasa wrote, "This effort has resulted in an informative

document that describes the extensive water quality monitoring activities conducted by the DRBC." The report was prepared in a way that responds to the EPA's request for a long-term monitoring strategy and also is useful to DRBC as part of its six-year strategic planning process. This strategy will be implemented through federal Section 106 grant work plans.

# Completion of First Phase of DRBC Stormwater Demonstration Project

The commission on July 18, 2007 celebrated the completion of the first phase of an ongoing effort to demonstrate how an older site can be transformed (or retrofitted) to properly handle stormwater, a continuing source of flooding and water quality impairment.

“The existing office building and five-acre site is representative of the land development practices of the 1970s with essentially no stormwater management except the immediate transport of runoff offsite through pipes or over paved surfaces,” DRBC Executive Director Carol R. Collier said. “As a leader in water resource management, we felt it was appropriate for the DRBC to set a good example on how to control runoff and provide on-the-ground examples of different stormwater best management practices, or BMPs. Retrofitting a site for stormwater management is more complicated than incorporating BMPs into the design of new construction. When the three-phase master plan is completed, the DRBC headquarters site will serve as a model demonstration of innovative methods and materials for stormwater management and use of runoff as a resource, while working with existing site conditions.”

Funding for the construction of the first phase at the front entrance to the property was obtained through a federal Section 319(h) grant administered by the N.J. Department of Environmental Protection (NJDEP). The remaining phases must still be financed. When finished, there will be a bioretention swale (consisting of a soil bed planted with native vegetation located above an underdrained sand layer), a landscaped detention basin, pervious pavement to increase infiltration of stormwater back into the ground, underground

dry wells, an infiltration wetland, and a cistern to collect roof runoff.

Environmental goals desired in this retrofit project include:

- Increasing and restoring the site’s ground water recharge capability (up to 100% of pre-development recharge);
- Reducing discharge of non-point source pollutants from the site to a Delaware River tributary;
- Reducing the volume of stormwater runoff from two-year, ten-year, and 100-year storm events;
- Installing as many NJDEP-approved non-structural measures, landscaping, drainage alterations, and water quality improvement devices as funds allow in order that the site can serve as a water management educational center; and
- Improving on-site management practices, such as reduced use of fertilizers, pesticides, and deicing materials.



Pictured at the ribbon cutting ceremony (from left to right) are Executive Director Carol Collier, Commissioner Cathy Curran Myers (Pa.), Commissioner Harry Otto (Del.), Commissioner Michele Putnam (N.J.), Commissioner Mark Klotz (N.Y.), and Commissioner Lt. Col. Gwen Baker (federal government). (Photo by Katharine O’Hara)

The design team assisting DRBC is led by representatives from Princeton Hydro, LCC. (Ringoes, N.J.), Pickering, Corts & Summerson, Inc. (Newtown, Pa.), and Mark Shablin Landscape Contracting (Newtown, Pa.). Pickering, Corts & Summerson, Inc. won the 2007 Merit Award from the New Jersey Chapter of the American Society of Landscape Architects for its design of the DRBC headquarters’ stormwater management and retrofit master plan.



BEFORE



AFTER

# Basin News Briefs



Congressman Holt uses a basin map to discuss flooding issues with Assistant Secretary of the Army Woodley along the banks of the Delaware in Trenton. (Photo courtesy of the U.S. Army Corps of Engineers)

## **\$1 Million Grant for the Corps of Engineers Philadelphia District to Advance Basin Priorities**

In 2006 the Philadelphia District of the U.S. Army Corps of Engineers was selected to receive \$1 million in federal funds to study potential enhancements to the use and management of water resources in the Delaware River Basin. The Philadelphia District was one of only five chosen nationally by the Assistant Secretary of the Army for Civil Works to receive a portion of \$4.5 million made available by a congressional appropriation to support cooperative watershed planning and implementation projects.

The study, *Enhancing Multi-Jurisdictional Use and Management of the Water Resources of the Delaware River Basin*, did not require state or local matching funds. The Philadelphia District and DRBC staffs worked closely together to develop the selected proposal. The *Water Resources Plan for the Delaware River Basin (Basin Plan)*, which was signed by the four signatory states and multiple federal agencies in 2004, provided the groundwork for the proposal, making it possible to establish priorities as well as inter-agency and political support quickly. Each state furnished a letter of support, as did members of the

Delaware Basin Congressional Task Force. According to the Assistant Secretary of the Army, a primary reason for the Philadelphia District's success in the competition was the fact that the commission and its Watershed Advisory Council, a diverse group of key stakeholders, had previously developed and endorsed the *Basin Plan*.

The priority project areas to be addressed include: sustainable water use and supply, flood damage reduction, estuary inflow model development, a re-evaluation of DRBC's approach to water supply user costs, and improving data management/data sharing capability among government agencies and the general public. The final study is expected to be completed in 2008.

## **Two Federal VIPs Visit the Delaware River Basin**

DRBC staff was pleased to have the opportunity to meet with Lieutenant General Carl A. Strock, Chief of Engineers and Commanding General of the U.S. Army Corps of Engineers, on November 3, 2006 at the commission's office building. Following the hour-long discussion, where DRBC staff members shared information about the commission and its ongoing activities, LTG Strock and Lieutenant Colonel Gwen Baker (the alternate federal member on the DRBC) traveled to nearby Lambertville, N.J. There they met with several city officials, including Mayor David DelVecchio, and viewed some of the areas in this riverfront community that were hard hit by recent main stem flooding along the Delaware.

Several days later, Assistant Secretary of the Army John Paul Woodley, Jr., who directs and supervises the Corps' civil works program, visited the Trenton area

on November 9. DRBC Executive Director Carol R. Collier and Communications Manager Clarke Rupert joined the assistant secretary, U.S. Rep. Rush Holt (N.J.), and Trenton Mayor Douglas Palmer to view the Island section of the city which was hard hit by the main stem flooding. This visit was an opportunity to make Assistant Secretary Woodley aware of the Delaware River flooding problems and the importance of committing resources towards flood mitigation in the basin. He later returned during September 2007 to tour flood-damaged areas in the upper basin.

## **Musconetcong Wild and Scenic Rivers Act Signed Into Law**

On December 22, 2006, President George W. Bush signed legislation into law designating 24.2 miles of the Musconetcong River (New Jersey's largest non-tidal tributary to the Delaware River) as a component of the National Wild and Scenic Rivers System. This includes the 3.5-mile segment from Saxton Falls to the Route 46 Bridge and the 20.7-mile stretch from the King's Highway Bridge to the railroad tunnels at Musconetcong Gorge. The Musconetcong is a "Partnership River" whereby a number of municipalities coordinate on its management with



DRBC Deputy Executive Director Robert Tudor briefs LTG Carl Strock at the DRBC headquarters before traveling to Lambertville. (Photo by Katharine O'Hara)

the National Park Service.

The Musconetcong bill was introduced by then-Senator Jon Corzine and co-sponsored by Senator Frank Lautenberg. Similar legislation was introduced and co-sponsored by U.S. Representatives Scott Garrett, Rodney Frelinghuysen, Mike Ferguson, Rob Andrews, Jim Saxton, Robert Menendez (who later replaced Jon Corzine in the Senate when he became governor), Frank Pallone, Jr., Donald Payne, Steven Rothman, Frank LoBiondo, Rush Holt, Bill Pascrell, Jr., and Christopher Smith.

Additional information about all of the federally designated Wild and Scenic River stretches in the basin can be found at [http://www.nj.gov/drbc/wild\\_scenic.htm](http://www.nj.gov/drbc/wild_scenic.htm).

### **Trenton Thunder Partners to Promote Water Education**

New Jersey Watershed Ambassador Lorna Gifis, who was hosted by the DRBC, coordinated an environmental stewardship program with the Trenton Thunder, the Double-A affiliate of the New York Yankees, in 2007. Following in-school presentations by the watershed ambassadors, New Jersey students were asked to sign a form promising to do their part to conserve water and limit the amount of pollution that they and their family contribute to their local watershed. Examples included pledging to turn off the water when brushing teeth or to clean up after pets. In return for their stewardship, the Thunder rewarded the students with two free tickets to games on April 21 or Earth Day, April 22.

Organized by the NJDEP Division of Watershed Management, the Watershed Ambassadors Program is a community-oriented AmeriCorps environmental effort designed to raise awareness about watershed issues in

New Jersey. Through this program, AmeriCorps members are placed in watershed management areas across the state to serve their local communities.

### **Emergency Response Conference**

The DRBC and the Philadelphia Water Department, in cooperation with the Water Resources Association of the Delaware River Basin, presented an “Emergency Response and Drinking Water Resources in the Delaware River Basin” conference on March 21, 2007 at the New Jersey Rutgers Ecomplex in Bordentown, N.J. Speakers included DRBC Deputy Executive Director Robert Tudor and Water Resources Engineer/Modeler John Yagecic.

### **Delaware Estuary News**

- Delaware Bay Oyster Revitalization efforts continued for the third year in 2007 with the planting of 681,584 bushels of surfclam and ocean quahog shell to enhance oyster recruitment, or survival

among juvenile oysters. This represents an increase of 36% over 2006 and an increase of 145% since the program’s inception in 2005. The “shell planting,” which takes place during the late June/early July timeframe, provides oyster larvae with a clean, hard place on which they can attach, grow, and reach their full potential.

It is estimated that the Delaware Bay Oyster Restoration Project has contributed approximately \$40 for every \$1 invested, or roughly \$168 million, to the state economies of both Delaware and New Jersey. This has been made possible by local, state and federal partners who have banded together since 2005 to revive an oyster population that has suffered for decades as a result of climate change, habitat loss, and other natural factors.

Congressional funding of this project was initiated by U.S. Senators Joseph Biden (Del.),



Students are recognized at Waterfront Park for their pledge to help protect our water resources. Also pictured are Watershed Ambassador Lorna Gifis and Boomer, the Thunder’s mascot.

Thomas Carper (Del.), Frank Lautenberg (N.J.), and Robert Menendez (N.J.). Project funding also was supported by U.S. Reps. Michael Castle (Del.) and Frank LoBiondo (N.J.) as well as by Governor Ruth Ann Minner and Governor Jon Corzine.

The \$2 million budget in 2007 was administered by the U.S. Army Corps of Engineers - Philadelphia District, a member of the Delaware Bay Oyster Restoration Task Force. Other task force members included 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, and Rutgers University's Haskin Shellfish Research Laboratory. The Delaware River and Bay Authority provided an additional \$134,000 toward this project in 2007 and the Partnership for the Delaware Estuary continued to fulfill its education and outreach objectives. The New Jersey and Delaware oyster industries have contributed a total of \$377,855 on a per-harvested-bushel basis as matching funds over the multi-year project period.

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.

- A successful Second Delaware Estuary Science Conference was held January 22-24, 2007 in Cape May, N.J. The theme was *Linking Science, Management and Policy to Set Achievable Environmental Goals in the Delaware Estuary*. A Delaware Estuary Environmental Summit was held in conjunction with the science conference, where environmental organizations and other interested parties came together to discuss current and emerging issues in the estuary and to showcase activities that are resulting in environmental improvement. The Partnership for the Delaware Estuary, a National Estuary Program, plans to reconvene the science conference every two years.

### **Climate Change Presentations**

Anthony J. Broccoli, Ph D., an associate professor in the Department of Environmental Sciences at Rutgers University, gave a presentation on *Future Changes in Climate, Sea Level and Hydrology* at the July 19, 2006 DRBC conference session preceding the commissioners' afternoon business meeting. Dr. Broccoli focused on several questions:

- How has the climate changed in the past?
- How is the climate expected to change in the future?
- How will climate change affect sea level and hydrology?
- How can we meet the challenges of climate change?

The DRBC also hosted a climate change "brown bag lunch" discussion a year later on July 19, 2007 that featured Dana Isherwood. Isherwood, who lives in West Windsor, N.J., is one of approximately 1,000 people

who has been trained by Al Gore to offer this "global climate crisis" presentation. She used portions of the former vice president's original slide show on climate change, which formed the basis for the film, *An Inconvenient Truth*.

Additional climate change information, including Dr. Broccoli's powerpoint presentation, can be viewed at <http://www.nj.gov/drbc/weather.htm>. This subject will be the focus of increased attention in the coming years as climate change considerations pose increasing uncertainty in the management of the Delaware River Basin.

### **Newark Reservoir**

A ribbon-cutting ceremony was held in 2006 to mark the completion of the new 318 million gallon Newark Reservoir in Newark, Delaware. The first new public water supply reservoir constructed in the state in the last seventy years and the first to be constructed in the basin since the Chester County Water Resources Authority built Hibernia Dam in 1994, this project was an important outcome of Governor Ruth Ann Minner's Delaware Water Supply Coordinating Council (WSSCC). The WSSCC worked with water purveyors to develop over two billion gallons of additional water supply to meet water demand forecasts in the state through 2020.

### **DRBC Staffer Plays Key Role in Developing Water Audit Software**

The American Water Works Association (AWWA) web site during 2007 began featuring free water audit software for use by water purveyors. DRBC Water Resources Analyst David Sayers took the lead in developing the reporting spreadsheets offered in this free product.

As explained by the AWWA, “Water Loss Control represents the efforts of drinking water utilities to provide stewardship and accountability in their operations by reliably auditing their supplies and keeping their system losses to a reasonable minimal level.” An estimated 150 million gallons per day is physically lost from public water supply distribution systems in the basin. The DRBC’s Water Management Advisory Committee (WMAC), chaired by Robert Molzhan (Water Resources Association of the Delaware River Basin) and a WMAC subcommittee chaired by Mary Ellen Noble (Delaware Riverkeeper Network) have been reviewing water accountability and water loss methods.

Please visit <http://www.nj.gov/drbc/wateruse/index.htm> for more information, including a link to the AWWA water audit software.

### Delaware River Sojourn

The 12<sup>th</sup> and 13<sup>th</sup> annual Delaware River Sojourns took place during June 2006 and 2007. These weeklong events combined canoeing, kayaking, camping, educational programs, and more. The sojourn’s purpose is to heighten awareness of, and appreciation for, the ecological, historical, recreational, and economic significance of the Delaware River.

The theme for the 2006 event was *A Long Drink of Water*, which recognized the Delaware River’s vital role in supplying drinking water to millions of people, including two of America’s largest cities -- New York City and Philadelphia. In addition to paddling almost 70 miles on the main stem Delaware River, sojourners had the opportunity to experience stretches of two tributaries -- the Schuylkill River in Pennsylvania and the Cooper River in New Jersey.

The 2007 sojourn theme was *Celebrating Native American Culture*, which recognized the river’s first settlers. Programs were offered to teach participants about the history of different native cultures and efforts to keep that history alive today. In addition to paddling over 50 miles on the main stem Delaware River, sojourners experienced stretches of two tributaries -- the Lackawaxen River in northeastern Pa., renowned for its Class I and II+ whitewater, and the tidal North Branch of the Rancocas Creek in Burlington County, N.J.

The non-profit event is organized by a steering committee representing various organizations and government agencies in the Delaware River Basin, including the DRBC. The 2006 and 2007 committees were chaired by a representative from Pennsylvania’s Delaware Canal State Park. The DRBC hosts the sojourn web site, [www.delawariversojourn.org](http://www.delawariversojourn.org).

### DRBC Awards

- Executive Director Carol Collier in November 2007 received the American Water Resources Association’s Mary H. Marsh

Medal for Exemplary Contributions to the Protection and Wise Use of the Nation’s Water Resources. It is awarded to individuals who have achieved a status of eminence in some aspect of public service related to water resources education and/or management.

- Operations Branch Head Richard Fromuth and Richard Tortoriello received an external partnering team award from the U.S. Army Corps of Engineers - Philadelphia District on June 15, 2006 in recognition of their contributions as members of the F. E. Walter Dam Flow Management Working Group. Since retiring from the DRBC in 2003, Dick Tortoriello has worked for the commission on a volunteer basis, contributing hundreds of hours. The DRBC is very fortunate to have such a dedicated alumnus.



Delaware River Sojourners on June 30, 2007 after paddling the North Branch of the Rancocas Creek in Burlington County, N.J. (Photo courtesy of Sandy Schultz, National Park Service Upper Delaware Scenic and Recreational River)

# Financial Summary

Delaware River Basin Commission Fiscal Summary-Agencywide		
	FY06	FY07
<b>Revenues:</b>		
Signatory Contributions	\$2,643,000	\$2,766,000
Grants & Special Projects	2,213,082	2,361,212
Surface Water Supply Charges	2,507,781	2,553,975
Project Review Fees, Investment Income & Other	1,275,786	2,073,084
<b>Expenses:</b>		
Salaries & Benefits	\$3,577,203	\$3,936,363
Operating Expenses	2,277,056	2,871,838
Debt Service and Depreciation	1,523,941	1,380,290
Building Improvements/Equipment Acquisition	120,357	216,445

On February 28, 2007, the commissioners unanimously approved the DRBC's current expense budget of \$5,004,000 for Fiscal Year 2008, which extends from July 1, 2007 through June 30, 2008. 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 first signatory party contribution increase in six years.

During Fiscal Year 2007, which extended from July 1, 2006 through June 30, 2007, Delaware, Pennsylvania, and New York each paid their full fair shares while New Jersey's actual contribution of \$857,000 was \$10,000 short of its full share. Thanks to efforts by the State Senate and State Assembly, New York's contribution of \$608,000 signaled the first time since Fiscal Year 1998 that the "Empire State" paid its full fair share.

The federal Energy and Water Development Appropriations Act (Public Law 104-206) eliminated U.S. funding support of the DRBC's annual operating budget beginning in

October 1996. Federal funding has not resumed since that time and the resulting cumulative shortfall totaled \$7,134,250 through June 30, 2007.

Although the federal contribution has not yet been restored, promising news arrived from Washington when the following language appeared in the Water Resources Development Act of 2007 (WRDA), which became Public Law 110-114 on November 9, 2007 after it was enacted over a presidential veto:

SEC. 5019. SUSQUEHANNA, DELAWARE, AND POTOMAC RIVER BASINS, DELAWARE, MARYLAND, PENNSYLVANIA, AND VIRGINIA.

(b) Authorization To Allocate – The Secretary [of the Army] shall allocate funds to the Susquehanna River Basin Commission, Delaware River Basin Commission, and the Interstate Commission on the Potomac River Basin to fulfill the equitable funding requirements of the respective interstate compacts.

This language received widespread support among the basin's senators and representatives, and the commission is grateful for all of their efforts. While Congress still needs to appropriate the

funding, the DRBC is hopeful that the WRDA language will send a strong message to House and Senate members as they consider federal spending plans during 2008.

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.

*"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)*

# Delaware River Basin



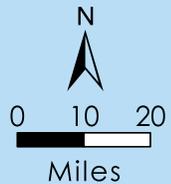
New York

Pennsylvania

New Jersey

Maryland

Delaware



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