

DELAWARE RIVER BASIN COMMISSION



Annual Report 1999

This report covers calendar year 1999. It was compiled and edited by Christopher M. Roberts, the commission's public information officer. Material for the report was generated by commission staff.

Free copies are available by contacting the commission at P.O. 7360, West Trenton, N.J. 08628. (Phone 609-883-9500, ext. 240; e-mail: croberts@drbc.state.nj.us). The report also is available on the DRBC web site: <www.drbc.net>.

Front cover: "Red Canoe on the St. Jones River near Dover, Del."
(Painting by Michele Green)



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The Delaware River at Hawks Nest (N.Y.) Overlook (Photo by David Jones)

Executive Director's Report

By Carol R. Collier

I was sworn in as the commission's executive director on September 9, 1998. A little over a year later I was given perhaps the most important assignment of my life. Four governors directed me and my staff to develop a new comprehensive water resources plan for the basin.

To assist us in the task, the governors called for the creation of a broad-based watershed advisory council. Members are now being selected and DRBC staff has begun initial work on our blueprint for the future.

The charge to develop the new plan is contained in a resolution signed by the governors of New York, Delaware, New Jersey, and Pennsylvania and unveiled at a "Governors Summit" held September 29, 1999, in Camden, N.J.

The resolution says in part: "... the Delaware River, the last major un-dammed river in the East, is a unique ecosystem that provides a multitude of natural, economic, and recreational benefits for all its inhabitants by being a key part of the Eastern Flyway, having the most abundant horseshoe crab population in the world, having wetlands designated of international significance for shorebirds, and having the second largest freshwater port in the nation."

It goes on to state: "... as trustees of the basin's natural resources, the Delaware River Basin Governors have a shared duty to protect, conserve, and manage the Delaware River Basin waters and ecosystem ... We, the Governors, challenge the basin's community to develop a unifying vision for the basin ... and direct the Delaware River Basin Commission to develop a new comprehensive water resources plan ..., periodically compile an environmental goals and



Delaware Governor Thomas R. Carper signs the resolution calling for a new comprehensive water resources plan for the basin as New Jersey Governor Christine Todd Whitman looks on. (Photo by Clarke Rupert)

indicators report, and establish a watershed advisory council.”

This charge from the governors provides an opportunity for DRBC to work with the basin community in establishing the plan and also to look internally at our operations. In this upcoming year we will make an extensive review of our existing water resource regulations and propose areas of change. We will seek your input in this effort.

As we look to the future it is important that we take a systems approach and avoid fragmentation of the issues.

Another issue to tackle is whether DRBC should have differing roles in the management of interstate waters (shared waters) *vs* intrastate tributaries.

Of course, one of our most critical roles is the management and allocation of water for water supply and in-stream uses. We have embarked on a Flow Needs Strategic Study to better understand flow issues and determine the relationship of flows to river uses, from fishing to boating to water supply. Among other things,

the study will help the commission ascertain if additional storage might be required to meet both flow and water supply needs.

As we look to the future it is important that we take a systems approach and avoid fragmentation of the issues. As Aldo Leopold stated: “Everything is connected to everything else.”

In our evaluation of goals and directions we must consider the environment, the basin community and the economy.

Other exciting things are happening during my watch. I want to mention just one other: the creation of a bipartisan congressional task force to heighten the legislative profile of important river basin issues.

The House Delaware River Basin Task Force is co-chaired by U.S. Reps. Sherwood Boehlert (R-N.Y.), Robert Borski, (D-Pa.), Michael Castle (R-Del.), and Rush Holt (D-N.J.).

Briefings on Capitol Hill about developments in the basin have been held and congressional staff trips to the basin are planned. It is hoped that the task force can garner support for federal funding of our programs and basin-related projects.

Being a steward of a “National Treasure” is a difficult but incredibly rewarding job. I look forward to working with all of you as we plan the future of the Delaware River Basin.

The Commission

Signatory Members

New York



Gov. George E. Pataki
Chair



N. G. Kaul
Alternate

Delaware



Gov. Thomas R. Carper
Vice Chair



Nicholas A. DiPasquale
Alternate

United States



Maj. Gen. Jerry L. Sinn
Second Vice Chair



Col. George C. Clarke
Alternate

Pennsylvania



Gov. Tom Ridge
Member



Irene B. Brooks
Alternate

New Jersey



Gov. Christine Todd Whitman
Member



Robert C. Shinn, Jr.
Alternate

Alternates/Advisors

New York

John L. Middelkoop
Second Alternate

Warren T. Lavery
Third Alternate

Joel A. Miele, Sr.
Advisor

Delaware

Kevin C. Donnelly
Second Alternate

Dr. Harry W. Otto
Third Alternate

United States

Lt. Col. Debra M. Lewis
Advisor

Pennsylvania

William A. Gast
Second Alternate

Kumar Kishinchand
Advisor

New Jersey

Robert Tudor
Second Alternate

DRBC Executive Director



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The Commission at a Glance

The members of the commission are the governors of the four basin states (Pennsylvania, New York, New Jersey, and Delaware) and a federal member appointed by the President of the United States. A federal alternate commissioner also is appointed and the governors select high-ranking officials in the four state environmental regulatory agencies as their representatives.

Annual elections are held for commission chair, vice chair, and second vice chair, based on a rotation of the five signatory parties.

The commission holds regular business meetings and hearings on policy matters and water resource projects under regulatory review. These sessions, along with meetings of the commission's various advisory committees, are open to the public.

Each commissioner has one vote of equal power, with a majority vote needed to decide most issues.

The commission (in good years) is funded by the five signatory parties, receiving additional revenue from project review fees, water use charges, fines, and private and public grants.

The Basin

The Delaware, the last major un-dammed river east of the Mississippi, extends 282 miles from the confluence of its East and West branches near the Catskill Mountain town of Hancock, N.Y., to the head of the Delaware Bay.

The river is fed by 216 tributaries, the largest being the Schuylkill and Lehigh Rivers in Pennsylvania.

In all, the basin takes in 13,539 square miles, draining parts of Pennsylvania, New York, Delaware, and New Jersey.



The basin is a source of water supply for approximately 17.5 million people. This includes 7.5 million people living within the watershed's boundaries and 10 million living outside the basin — mostly either in New York City or northern New Jersey.

About 40 percent of the basin's potable water is exported to the city and the Garden State through underground aqueducts and the Delaware and Raritan (D&R) Canal.

The volume of potable water withdrawn from the basin ranged from some 688,000 million gallons in 1990 to 637,000 million gallons in 1996. This represents a 5.2 percent decrease over the seven years, a period during which the basin's population increased by two percent.

This trend serves as a strong indicator that water conservation programs, like the ones administered by the commission, are working.

Officers Elected

New York Governor George E. Pataki was elected the commission's chair on June 23, 1999.

Elected vice chair was Delaware Governor Thomas R. Carper; the federal representative was elected second vice chair.

Their terms ran from July 1, 1999 through June 30, 2000.

The elections, conducted at a regular monthly commission meeting, have historically been based on an annual rotation of the five signatory parties.

New Appointments

Nicholas A. DiPasquale, secretary of the Delaware Department of Natural Resources and Environmental Control (DNREC), was appointed on June 23, 1999 to serve as Governor Carper's representative on the commission.

Mr. DiPasquale joined DNREC in 1993 as the director of the Division of Air and Waste Management. He was instrumental in implementing the state's Hazardous Substances Cleanup Act and "Brownfields" program and developing Delaware's Extremely Hazardous Substances Program, which has become a national model.

Before coming to Delaware, Mr. DiPasquale spent seven years with the Missouri Department of Natural Resources.

A native of Rochester, N.Y., he is a U.S. Navy veteran having served from 1970 to 1976 as an electronics technician and reactor operator aboard the USS Stonewall Jackson, a Poseidon Class submarine.

He holds a bachelor's degree in public administration from State University of New York, Brockport, and a master's in energy and environmental policy from Washington University, St. Louis.

Kevin C. Donnelly, director of DNREC's Division of Water Resources, was named by Governor Carper to serve as his second alternate on the DRBC.

As director, Mr. Donnelly supervises some 130 full-time employees and administers a \$21 million budget.

The Division of Water Resources is responsible for monitoring and assessing the quality of the state's ground and surface waters, overseeing the use and management of water supplies, and regulating wastewater discharges.



Mr. Donnelly

Mr. Donnelly previously had served as an environmental program administrator in DNREC's Division of Soil and Water Conservation

where he headed up the Delaware Nonpoint Source Management Program under the Clean Water Act and the Sediment and Stormwater Management Program.

He holds a bachelor's degree in forestry with a minor in land use planning from the University of Maine in Orono.

Farewell!

David B. Everett, who rose to chief engineer during a 32-year career with the commission, retired in 1999, as did his wife, Carol, a secretary in both the Administrative Division and the Public Information Office for 12 years.

Mr. Everett joined the DRBC as a water resources engineer, advancing to head of the Project Review Branch, then to the chief engineer post which he held for eleven years.

He was one of the leading architects of the commission's flow management and drought operating plans and a strong advocate of the DRBC's water conservation program that won national acclaim.

As a mentor to younger staff members, he provided invaluable guidance in their professional growth and development.

Mr. Everett also will be remembered by commission staff for his problem solving abilities and his institutional memory that served as a valuable asset to those around him.

Ms. Everett is remembered for her loyalty and work ethic that often kept her at her post well past closing time simply because there was a task she felt needed to be completed.

She was someone you could always depend on.

Susan M. Weisman, who served as an officer of the commission in the capacity of secretary, retired on August 1, 1999.

A stickler for detail and accuracy, she was in large part responsible for the smooth operation of commission meetings and public hearings. Her finely honed professional skills also were evident in her preparation of complex public and legal notices, as well as policy resolutions for commission action.

She performed these duties with a record of hard working dependability, competence and sound judgment for 17 years.

Ronald Rulon, a commission employee for 31 years, also retired in 1999.

An engineer, Ron wore many hats during his career, serving in the old Water Quality Branch, the Planning Branch, and the Project Review Branch.

He was highly regarded for his skills in dealing with complex water quality permits, and had another distinction — perhaps the longest commute of any DRBC employee.

He resides in the Mullica River bank town of Sweetwater, N.J., where the fishing and hunting made all those tedious miles from the office to home worthwhile.

We Miss You

The commission lost two friends in 1999.

H. Page Fielding, the DRBC's senior geologist who over a career of three decades captured the respect of fellow workers through his steadfast commitment to exact science, and Mary H. Zaroff, a versatile and talented secretary who retired in 1992 after serving 21 years in a variety of positions, died during the year.

A honed craftsman from the old school, Mr. Fielding radiated a keen understanding of earth's complex formations. He was intolerant of non-scientific cures for scientific ills, at times offering gruff rebukes to those who dared tread on nature's natural laws.

Ms. Zaroff joined the commission in 1970 and over the years provided secretarial support for the chief engineer, the chief administrative officer, the Operations Branch, and the old Water Quality Branch.

A warm and caring person, she met adversity with a smile.

Promotions

The commission has two new managers — Warren Huff has been promoted to head of the Information Services Branch and Thomas Brand to head of the Project Review Branch.

Mr. Brand, whose artistic talents can be found on the covers of many DRBC publications, joined the commission in 1989.

Prior to that, he worked for BCM Engineers, Environmental Systems, and Chicago Bridge and Iron. His experience includes the design and construction of dams, bridges, and water distribution systems, as well as wetlands restoration and geo-structural investigations.

Mr. Brand has a bachelor of science degree in civil engineering from the University of Delaware and a bachelor of arts degree in fine arts from the University of the Arts in Philadelphia.

In addition to creating covers for commission reports, he designed the commission's popular new logo.

While working as a water resources planner at the commission, Mr Huff caught the computer bug and began taking evening courses at Beaver College to learn more about this fast paced technology. He went on to earn a second college degree, this one in computer science.

He then was named the DRBC's supervisor of computer operations, playing a key role in moving the commission into the computer age.

In addition to proving computer support, the Information Services Branch is the hub for GIS mapping, library services, and water use inventory. It also works closely with the commission's Public Information Office in the on-going development of the DRBC web site.



Deputy Delaware River Master Gary Paulachok stands in front of the Montague, N.J. gage that measures flow in the river downstream of New York City's three water supply reservoirs. Mr. Paulachok was appointed deputy river master in February of 1999.

Former Deputy River Master William Harkness listens to testimony at a January 5, 1999 commission meeting to address worsening drought conditions in the basin. Mr. Harkness played a key role in administering the commission's drought operating plan during his 15 years in the post. He officially retired on April 3, 1999. (AP/Wide World Photos)



Deputy River Master Named

Gary N. Paulachok, a 20-year veteran with the U.S. Geological Survey (USGS), was named Deputy Delaware River Master on Feb. 12, 1999, succeeding William Harkness, who had held the post for 15 years.

In announcing the appointment, Delaware River Master William J. Carswell thanked Mr. Harkness "for an outstanding job" and wished him the very best in his future endeavors.

Mr. Paulachok had previously served as USGS's Pennsylvania representative and the state's district chief of the Survey's Water Resources Division. In that capacity he was responsible for hydrologic data collection, studies, and research programs conducted by a staff of 125 scientists, technicians, and support personnel.

Mr. Paulachok received his undergraduate degree in environmental geology from Temple University and a master's degree in engineering geology from Drexel University.

He has taught graduate courses in hydrology at Drexel and also to personnel of the U.S. Environmental Protection Agency, the Delaware Department of Natural Resources and Environmental Control, and the New Jersey Department of Environmental Protection.

The deputy river master, who is stationed in Milford, Pa., oversees the diversions of water from New York City's three upper basin reservoirs to the city as well as releases from the reservoirs into the Delaware River to maintain a minimum streamflow for the benefit of downstream users. The water apportionment formula resulted from a 1954 U.S. Supreme Court decree that settled a dispute over water allocations in the basin.

Welcome Aboard

These employees were hired during the calendar year 1999:

Gail Blum, water resources technician; Forsyth Kineon, coordinator, Delaware Estuary Program; Clarke Rupert, assistant public information officer; Patricia McSparran, water resources

engineer; Esther Siskind, integrated resources planner; Pamela Bush, commission secretary; and Hernan Quinodoz, geohydrologist.

Getting to Know You

The commission stepped up efforts during 1999 to educate the basin's citizens and congressional delegation about its policies and programs with the hope of generating heightened constituent input and federal backing to help shape future initiatives.

The creation of the River Basin Washington Project (RBWP) was an important step in the process.

The project is designed to help advance interstate watershed management within the Delaware, Susquehanna, and Potomac river basins. In particular, it seeks to educate members of Congress about river basin issues and increase their legislative profile.

To advance these efforts, basin bipartisan task forces have been assembled.

The House Delaware River Basin Task Force is co-chaired by U.S. Reps. Sherwood Boehlert (R-N.Y.), Robert Borski (D-Pa.), Michael Castle (R-Del.), and Rush Holt (D-N.J.).

The RBWP was created by the Northeast-Midwest Institute, a nonprofit and nonpartisan research organization based in the nation's capitol.

The RBWP organizes briefings on Capitol Hill and congressional staff trips to the river basins. It also is seeking support for federal funding of basin-related projects and programs.

The Northeast-Midwest Institute, formed in the mid-1970s, is dedicated to economic vitality, environmental quality, and regional equity for Northeast and Midwest states.

Listening to Constituents' Concerns

Another example of heightened outreach to improve commission visibility was a panel discussion on land use changes, impacts on water resources, and the image of the Delaware River Basin, held in Jim Thorpe, Pa. on October 26, the day before a regularly scheduled commission meeting.

The public event was co-sponsored by the Economic Development Council of Northeastern Pennsylvania (EDCNP) and the commission.

It was designed to give the DRBC commissioners and staff an opportunity to learn about the special interests and concerns of the commission's constituents in the Lehigh River Watershed and also a chance for EDCNP staff to discuss their interests in the basin with commission personnel.

Panelists included Howard J. Grossman, the EDCNP's executive director; Carol R. Collier, executive director of the DRBC; Davis R. Chant, president, Pike County Chamber of Commerce; Jim Clauser, director, Carbon County Conservation District; Mathilda Harrison, deputy executive director, Pocono Mountains Vacation Bureau; Tom Kerr, executive director, Wildlands Conservancy; William McDonnell, director of the Northeast Regional Office of the Pennsylvania Department of Environmental Protection; Fred Osifat, director, Carbon County Planning Commission; Alan Saches, executive director, Delaware & Lehigh National Heritage Corridor; and Craig Todd, director, Monroe County Conservation District.

The EDCNP is a private nonprofit corporation organized to further economic, social, and physical development in Carbon, Lackawanna, Luzerne, Monroe, Pike, Schuylkill, and Wayne counties.

Kinder Kilowatts

The commission has entered into an agreement with the U.S. Environmental Protection Agency to take part in its Energy Star Buildings and Green Lights Program.

The project is designed to cut energy use in office buildings through advanced technology.

To date, the commission has purchased Energy Star computers and an energy-saving chiller (air conditioning unit) and installed energy efficient lighting and additional roofing insulation.

It also has a waterless urinal in one of its lavatories and has installed low-flow plumbing fixtures in a new handicap-equipped bathroom.

Hurricane Washes Away Drought

The remnants of a nasty hurricane caused serious flooding in the Delaware River Basin in the late summer of 1999, breaking the back of an unprecedented drought that destroyed thousands of acres of farm crops and dried up streams.

Tropical Storm Floyd brushed the New Jersey coast on September 16, unleashing up to 10 inches of rain in portions of the basin. Extensive flood damage occurred along tributary streams of the lower Delaware River, which rose eleven feet in about eight hours at Trenton, N.J.

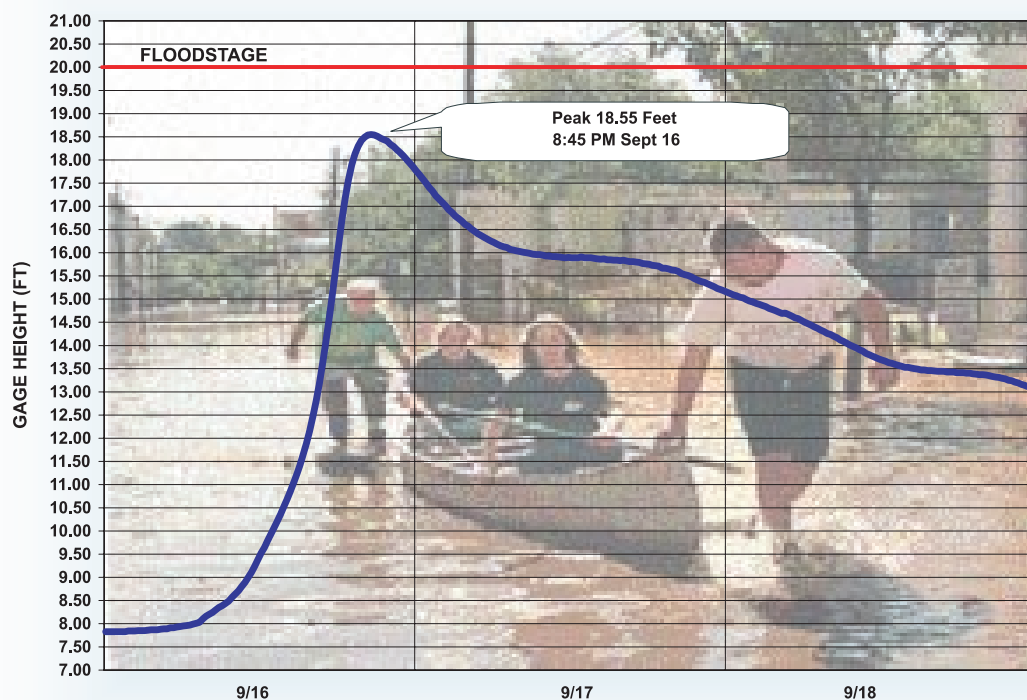
Despite the sharply contrasting weather patterns, the year ended up pretty normal from a hydrologic standpoint.

In New Jersey, for instance, precipitation totaling 48.92 inches fell in 1999, 3.06 inches above the normal amount. For many that was startling, considering the devastating damage from the drought.

Andrew Straug, 4, plays among the rocks exposed by record low water levels in the Brandywine Creek as it flows through Wilmington, Del. on July 15, 1999. The Brandywine is the city's main drinking water source. (*The News Journal/Robert Craig*)



DELAWARE RIVER AT TRENTON, NEW JERSEY: EFFECTS OF HURRICANE FLOYD ON GAGE HEIGHT SEPTEMBER 16-18, 1999



“That makes it (1999) the 23rd wettest of the century, interesting because April through July was the second driest of the century,” noted David Robinson, state climatologist at Rutgers University.

“It was a year of feast or famine when it came to rain, drought or deluge,” he said. “The deluge was January when we had several rains and, of course, Tropical Storm Floyd. It was one of those cases when if you wait around long enough it will average out.”

On August 18, 1999, the commission took emergency action to deal with the drought, including a decision to marshal water supplies in federal, state, and power company reservoirs in order to bolster streamflows by coordinating releases from the impoundments.

The DRBC commissioners also agreed to require large self-supplied water users to prepare and submit to the commission contingency plans for water curtailment had that become necessary.

The reservoirs benefitted from the winter and spring runoff and are masking the true nature of this drought

— Carol Collier, DRBC’s executive director

Emergency Actions Warranted

The commission noted that while drought warning and emergency indicators based on reservoir storage levels that are set forth in its own operating plans had not yet been triggered, emergency actions were warranted due to the severity of the water shortage.

“The reservoirs benefitted from the winter and spring runoff and are masking the true nature of this drought,” noted Carol R. Collier, the DRBC’s executive director.

Deeming it in the public interest, the commission went on record as officially supporting the drought management actions already taken by the four basin states — Delaware, New Jersey, New York, and Pennsylvania.

“We want to send a clear message to our constituents that management plans are in place throughout the Delaware River Basin to deal with different aspects of the drought,” noted Ms. Collier. “The DRBC’s drought operating plans focus on streamflow management and controlling salinity intrusion in the Delaware River. The states’ plans look at other factors like soil moisture, ground water levels, crop damage, even the potential for forest fires. Municipalities and townships have their own plans to deal with unique local conditions.”

In other action, the commissioners at the August 18 meeting:

- ratified an earlier July 21 decision to reduce the Trenton flow objective from 3,000 cubic feet per second (cfs) to 2,700 cfs to preserve storage in two lower basin reservoirs — Blue Marsh on the Schuylkill River and Beltzville on the Lehigh River.
- agreed to continue an arrangement with the U.S. Army Corps of Engineers to store water at the Corps’ F.E. Walter Reservoir to provide releases for flow augmentation. The reservoir, located on the Lehigh River near Wilkes-Barre, Pa., normally is used just for flood control, meaning the pool level is held to a low elevation so the dam can capture runoff from storms.

Less than two months later, the commission lifted the emergency measures after Floyd, and an earlier tropical storm (Dennis) soaked the Northeast.

In the last two weeks of September storage in the three huge upper basin water supply reservoirs (Pepacton, Neversink, and Cannonsville) rose by 23 billion gallons. Streamflows also rebounded and ground water levels, some at record lows during the summer, were showing signs of recovery.

The heavy rains also flushed the “salt front” in the Delaware River downstream to just north of the Delaware Memorial Bridge, about eight miles below its normal location for that time of year. If the salty water migrates too far upstream it can threaten water supplies, cause corrosion problems for industries which use Delaware River water, and increase costs for water treatment.

Despite lifting the restrictions on September 30, commission officials urged the basin’s citizens to continue to conserve, noting that water conservation should be a lifelong habit.

Go With the Flow

During the summer of 1999, blue crabs, the ones you dust with Old Bay and quaff down with beer, visited Dover, Del., swimming within site of the state capitol building.

The salty water in the upper St. Jones River suited them just fine.



Record low stream flows caused by the drought resulted in salinity intrusion in many of the basin’s waterways. The salty water simply crept upstream because there wasn’t enough fresh water flowing downstream to hold it back.

The crabs, which normally inhabit the salty and brackish water near or in the Delaware Bay, followed the “salt front” as it migrated inland.

Salinity intrusion also occurred on Delaware’s Christina River. In early August there was an elevated concentration of chlorides that exceeded 600 milligrams per liter — almost three times higher than the drinking water standard set by the U.S. Environmental Protection Agency.

This prompted the commission to waive stream flow pass-by requirements on White Clay Creek, a Christina tributary, so that water utilities could capture as much fresh water flow as possible. That action, combined with releases from an upstream reservoir, helped stabilize the situation.



Kids Quiz

Flood Preparedness: Room for Improvement

The DRBC hosted and participated in a meeting on December 2, 1999 at its West Trenton offices to seek input from experts on the existing level of flood preparedness in the basin and explore areas for improvement. It was attended by representatives from 11 different organizations with flood preparedness responsibilities.

The meeting originally had been set for September 16, the day the nasty remnants of Hurricane Floyd caused serious flooding in the basin. It's as if the storm had arrived on cue.

The overall goal of flood preparedness is to reduce the loss of life and property damage caused by flooding. There are many activities, in addition to flood warning and response, which support this goal. These activities — such as flood plain regulations, property buyouts, storm water management, flood-proofing, structural flood control, and flood insurance administration — are particularly important to prevent new flood damage in developing areas and encourage wise flood plain use.

Even with the success of such programs, existing flood plain development and the potential for damage require an effective flood forecasting, warning, and response system.

A new feature on the DRBC's web site is a section about floods geared for children. The site has a quiz about flooding as well as links to PBS programs like NOVA and to the Franklin Institute Science Museum.

Youngsters can learn how weather is forecast and read about exciting rescues of people and animals. They also can click on real life flood survival stories from flood survivors from around the world.

In addition to the children's site, these topics are covered:

- the reasons floods occur
- what people can do to protect themselves and their families
- flood loss reduction (including information about flood insurance)
- flood warnings, forecasts (via links to other web sites)

In addition to DRBC staff, the meeting was attended by personnel from the National Weather Service, the U.S. Army Corps of Engineers, the U.S. Geological Survey, the New York City Department of Environmental Protection, the New Jersey Office of Emergency Management, the New Jersey Department of Environmental Protection, the New York State Department of Environmental Conservation, the Susquehanna River Basin Commission, the National Park Service, the Upper Delaware Council, and the Delaware River Joint Toll Bridge Commission.

The attendees identified 12 items for improvement in flood preparedness in the Delaware River Basin. Included were increasing public awareness of flooding potential and improving coordination among various agencies in an effort to increase funding levels. Participants also were asked to designate representatives for a Flood Advisory Committee.

One of the top priorities of the committee will be to secure funding for data collection, forecasting, and mapping components of an improved flood response system.

Water Conservation Initiatives: Are They Working?

The commission has created a water use database which will be used to project future water demand and evaluate the effectiveness of water conservation programs which, based on preliminary analyses of the data, seem to be having a positive impact.

The data, for the period 1990 through 1996, also will be helpful in putting together a profile of water use in the basin and developing consumptive use estimates.

The database includes the following information:

- monthly ground water and surface water withdrawals
- location of each withdrawal (latitude/longitude)
- use categories (public water supply, industry, power, golf courses; and commercial, institutional, and agricultural as available)

The data currently are undergoing quality control checks and are being entered into a Geographic Information System (GIS) format.

The Delaware River Basin was a source of water supply for approximately 17.5 million people in 1996. This includes 7.5 million people living within the basin's boundaries and 10 million living outside the basin — mostly either in New York City or northeast New Jersey.

About 40 percent of the basin's potable water is exported to the city and the Garden State through underground aqueducts and the Delaware and Raritan (D&R) Canal.

The volume of potable water withdrawn from the basin ranged from some 688,000 million gallons in 1990 to 637,000 million gallons in 1996. This represents a 5.2 percent decrease over the seven years, a period during which the basin's population increased by two percent.

This trend serves as a strong indicator that water conservation programs, like the ones administered by the commission, are working.

Since the late 1980's, the commission has adopted regulations that:

- require leak detection and repair programs for in-basin, public water suppliers in an effort to locate unaccounted-for water projected at some 240 million gallons a day when the regulation was enacted back in 1988. Estimated treatment and delivery costs for that lost water: \$80 million a year.
- require the metering of major, in-basin, public water supply systems at the customer end of the pipe with all water bills based on metered usage instead of a flat, periodic rate for an unlimited supply. Thus, water conservation became a pocketbook issue with a compelling economic incentive: save water, save money.
- establish water conservation performance standards for such plumbing fixtures and fittings as toilets, urinals, faucets, and shower heads that are installed during new construction or major renovations. Basin-wide savings of some 110 million gallons a day are projected by the year 2020 as a result of switching to these water-saving devices.
- promote the adoption of retail water pricing to encourage conservation. These rate structures provide incentives to customers to reduce average or peak water use. Such pricing is characterized by rates based on metered usage and may include seasonal rates or excess-use surcharges to reduce water use during peak periods like summer.
- require large water companies to submit conservation plans to the commission with applications for new or expanded water withdrawals.

Population Within the Basin Versus Water Withdrawals 1990 – 1996 (preliminary)

	POPULATION % CHANGE	WITHDRAWAL % CHANGE
Pennsylvania	+1.2%	-7%
Delaware	+5.7%	-8.6%
New Jersey	+3%	+2%
New York State	+0.5%	+6%
Four State Average	+2.0%	-5.2%

Water conservation has a stabilizing effect on the rate of water withdrawals which helps maintain flows in rivers and streams.

Water conservation also saves money by reducing or delaying the need for developing new water supply systems which consist of costly infrastructure like treatment plants, pumping stations, reservoirs, and distribution systems.

Conservation has a stabilizing effect on the rate of water withdrawals which helps to maintain flows in rivers and streams and reduce the potential for over-pumping of ground water.

Data recently published by the U.S. Environmental Protection Agency show that water and wastewater utilities will need to invest over \$277 billion to protect public health and accommodate growth over the next 20 years. The commission estimates that its regulation governing the use of low flow toilets alone would defer about \$500 million of those capital costs within the basin.

In order to meet the needs of present and future populations and ensure that ecosystems are protected, water must be sustainable and renewable. Sound water resources management, emphasizing efficient use of water, is essential to achieve these objectives. Efficient water use can have major environmental, public health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water sources.

It should be noted that the water use information that is reported to the commission and contained in the new database does not include withdrawals under 100,000 gallons per day (gpd) for New Jersey, New York, and Pennsylvania (outside the Ground Water Protected Area), 10,000 gpd inside the Protected Area, and 50,000 gpd for Delaware. (For more information on the Protected Area see page 20)

Despite this, DRBC staff believes that over 90 percent of the water withdrawals are accounted for in the current database, a description of which can be located on the commission's web site (www.drbc.net).

Water Savings in the Big Apple

New York City, which draws about half its water from the Delaware River Basin, has aggressive water conservation programs in place that have shown some pretty impressive results.

Wastewater flows to the city's 14 treatment plants have been reduced by roughly 16 percent over six years and all the plants are now operating under their design capacity.

Water consumption in the city has dropped from 1,400 million gallons a day (mgd) in 1990 to 1,200 mgd in 1997; per capita consumption dropped from 204 gallons per day (gpd) to 164 gpd during the same period.

Locks have been installed on one third of the city fire hydrants, resulting in a 68 percent reduction in open hydrant complaints.

A leak detection program has resulted in an 80 percent reduction in measured losses.

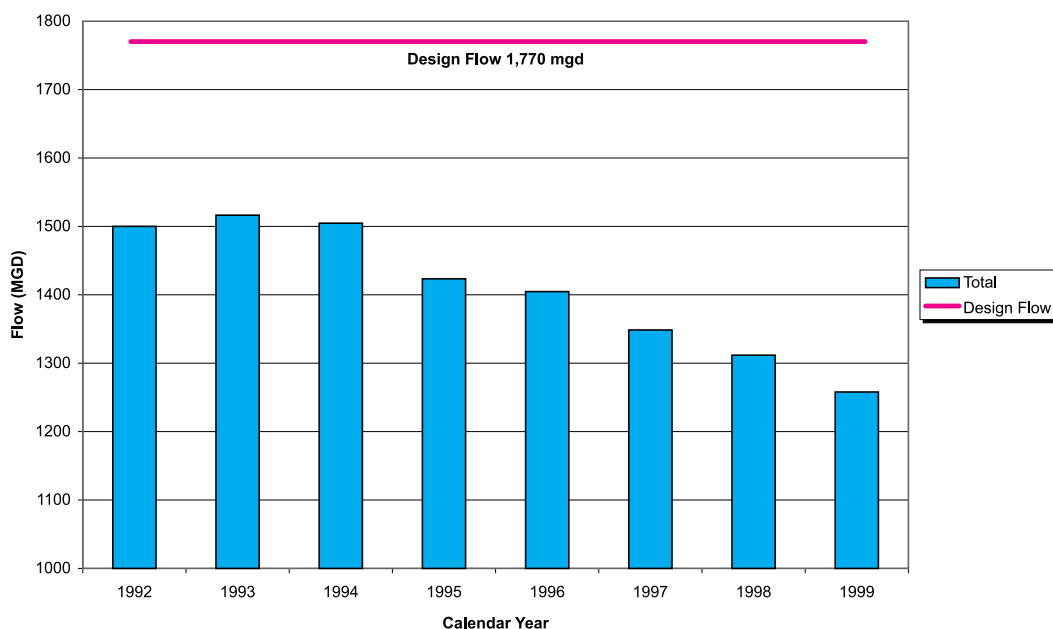
A low flow toilet rebate program is credited with saving between 70 to 90 mgd.

The conservation initiatives, which began in the late 1980s, also have focused on stopping leaks in abandoned buildings and replacing old, leaky plumbing fixtures and fittings in multi-family dwellings with new water saving devices.

A metering program, started in 1988, is still underway. When all of the meters have been installed and all water customers are billed on metered usage, additional conservation gains can be expected.

The city also is looking into a clothes washer incentive program that would provide rebates to residential and commercial users who switch to

New York City Dry Weather Wastewater Flows (MGD)



Source: New York City Department of Environmental Protection, July 2000

front loading machines. These washers have the potential to reduce water usage by up to 40 percent per load.

The clothes washer initiative was endorsed by the New York City Department of Environmental Protection's Nitrogen Technical Advisory Committee which has found that water conservation provides numerous benefits for nitrogen removal at the city's wastewater treatment plants.

To reduce the cost of the front-loading units (which normally are more expensive than top-loaders), the committee recommends that the city consider the bulk purchase of the machines and the selection of retailers to market and distribute them. (Austin, Tex., through a recent bulk purchase, was able to reduce the price of the front loading models from \$799 to \$599.)

It is estimated by the committee that a fifty percent change-out in clothes washers might net an additional 15 to 20 mgd in water savings citywide.

One of the committee's seven members is Dr. Jeffrey Featherstone, the DRBC's deputy executive director.

Water: At What Price?

In some countries water is not a sustainable and renewable commodity.

People living in many Mideast towns and villages, for instance, may have water only one or two days a week during droughts. When water is available the pressure is so low that residents living at higher elevations have to trek down to lower ones to fetch it or have it delivered by tanker.

Stacks of dirty dishes sit unwashed for days. Toilets go un-flushed.

The World Commission for Water for the 21st Century estimates that some 1.2 billion people have no access to clean water and the poorest people in developing countries pay up to 100 times more for water than do the wealthier folks. The problem is that municipal pipelines invariably reach the richest customers first despite the fact they often are built with funds earmarked for the poor, who end up paying sky high prices to vendors selling jug water.



Limits Placed on Ground Water Withdrawals

The commission in June of 1999 amended its Ground Water Protected Area regulations for Southeastern Pennsylvania to establish numerical withdrawal limits for 62 additional subbasins, or watersheds.

As a result, the entire Protected Area is now covered by specific numerical ground water withdrawal limits for its 76 watersheds. Withdrawal limits for the 14 watersheds in the Neshaminy Creek Basin were set by the commission in 1998.

The commission established the Protected Area in 1980 at the request of the Commonwealth of Pennsylvania after it became evident that development was negatively impacting ground water levels.

“The goal of the Protected Area regulations is to prevent depletion of ground water, protect the interests and rights of lawful users of the same water source, and balance and reconcile alternative and conflicting uses of limited water resources in the region,” notes Irene Brooks, Pennsylvania Governor Tom Ridge’s representative on the commission.

Lowered water tables in the Protected Area have reduced flows in some streams and dried up others. This reduction in baseflows affects downstream water uses, negatively impacts aquatic life, and can reduce the capacity of waterways in the region to assimilate pollutants.

The Protected Area regulations use a two-tiered system of water withdrawal limits.

The first tier serves as a warning that a subbasin is “potentially stressed.” In potentially stressed subbasins, applicants for new or expanded ground water withdrawals are required to implement one or more programs to mitigate adverse impacts of additional ground water withdrawals. Acceptable programs include conjunctive use of ground water and surface water, expanded water conservation programs, programs to control ground water infiltration, and artificial recharge and spray irrigation.



The second tier serves as the maximum withdrawal limit. Under the regulations, ground water withdrawals can not exceed that limit.

The regulations also:

- Provide incentives for holders of existing DRBC docket and Protected Area permits to implement one or more of the above programs to reduce the adverse impacts of their ground water withdrawals. If docket or permit holders successfully implement one or more programs, the commission will extend the docket or permit duration for up to ten years;
- Specify criteria for the issuance and review of dockets and permits as well as procedures for revising withdrawal limits to correspond with integrated water resource plans adopted by municipalities for subbasins. (These plans would address such areas as future water demand, options for wastewater discharge, and flood plain and stormwater management practices.);
- Establish protocol for updating and revising withdrawal limits to provide additional protection for streams designated by Pennsylvania as “exceptional value,” “high quality,” or “wild, scenic or pastoral” as defined by the state’s Scenic Rivers Program.

The limits were derived from baseflow characteristics of geologic formations that were developed in a study by the U.S. Geological Survey (USGS). A geographic information system (GIS) was then used to generate overlay maps of the original 14 subbasins located in the Neshaminy Creek Basin. The study later was broadened to include the 62 additional subbasins that fall either entirely or partially within the Protected Area. GIS mapping also was prepared for these watersheds.

The Ground Water Protected Area takes in 1,200 square miles and includes 127 municipalities. In addition to the Neshaminy Creek Watershed, other large drainage areas include the Brandywine Creek, Perkiomen Creek, and Wissahickon Creek subbasins.

In addition to all of Montgomery County, the following areas in surrounding counties fall within the Protected Area:

- Berks: the townships of Douglass, Hereford, and Union.
- Bucks: the townships of Bedminster, Buckingham, Doylestown, East Rockhill, Hilltown, Lower Southampton, Middletown, Milford, New Britain, Newtown, Northampton, Plumstead, Richland, Upper Southampton, Warminster, Warrington, Warwick, West Rockhill, and Wrightstown; the boroughs of Chalfont, Doylestown, Dublin, Hulmeville, Ivyland, Langhorne, Langhorne Manor, New Britain, Newtown, Pennel, Perkasio, Quakertown, Richlandtown, Sellersville, Silverdale, Telford, and Trumbauersville.
- Chester: the townships of Birmingham, Charlestown, East Bradford, East Coventry, East Goshen, East Pikeland, Easttown, East Vincent, East Whiteland, North Coventry, Schuylkill, South Coventry, Thornbury, Tredyffrin, Warwick, West Bradford, West Goshen, Westtown, Willistown, and West Whiteland; the boroughs of Elverson, Malvern, Phoenixville, Spring City and West Chester.
- Lehigh: Lower Milford Township.

DRBC Hosts Panel on Watershed/Land Use Management

The commission hosted a panel discussion March 8, 1999 on the role integrated resource planning plays in resolving complex water and land use issues.

The event was held the day before the commission's public hearings on proposed amendments to regulations that set limits on ground water withdrawals in the Ground Water Protected Area of Southeastern Pennsylvania.

Among other provisions, the regulations encourage municipalities within the Protected Area to work together in adopting integrated resource plans to address the relationship between watershed management and land use planning. The plans must cover such areas as future water demand, options for wastewater discharge, the protection of instream flows, and flood plain and stormwater management.

The six panelists provided different perspectives on integrated resource planning and the role government agencies should play in preparing and implementing such plans. The panelists were:

Jan Bowers, executive director, Chester County Water Resources Authority; Thomas Cahill, Cahill and Associates; Jerry Cardamone, Esq.; David Milan, chief executive officer, Superior Water Co.; Gregory Prowant, manager, Lower Pottsgrove Township; and Michael Stokes, assistant director, Montgomery County Planning Commission.

The goal of the Protected Area regulations is to prevent depletion of ground water, protect the interests and rights of lawful users of the same water source, and balance and reconcile conflicting uses of limited water resources in the region

— Irene Brooks,
Gov. Ridge's
representative
on the commission

A Blueprint for the Future

At the dawn of the millennium, the commission was engaged in developing a new comprehensive water resources plan for the basin, an assignment given out by four governors.

The governors challenged the basin community to play an active role in drawing up the visionary blueprint for the watershed's future and called for the creation of a broad-based Watershed Advisory Council to assist the DRBC.

At its October 1999 meeting, the commission adopted a resolution creating the council. Selection of members carried over into the year 2000.

The charge to develop the plan and the council was contained in a document titled "Resolution on the Protection of the Delaware River Basin" that was signed by Governors Christine Todd Whitman of New Jersey and Thomas R. Carper of Delaware at a Governors' Summit held September 29, 1999 at the New Jersey State Aquarium. Governors George E. Pataki of New York and Tom Ridge of Pennsylvania also signed the resolution but were unable to attend the event. They were represented by the top officials in their state environmental agencies, John P. Cahill and James M. Seif, respectively.

The resolution also was signed by Brigadier General M. Stephen Rhoades, commander, North Atlantic Division, U.S. Army Corps of Engineers; U.S. Environmental Protection Agency (EPA) Region II Administrator Jeanne Fox; then-EPA Region III Administrator Michael McCabe; and National Park Service (NPS) Northeast Regional Director Marie Rust in support of the actions taken by the governors.

Each of the basin states presented an award to recognize a person who has made significant efforts to benefit the natural resources of the Delaware River Basin. The winners were:

- Peg and Hal Haskin (New Jersey)
- John C. Bryson (Delaware)
- Ruth M. Jones (Pennsylvania)
- Raymond M. Christensen (New York)

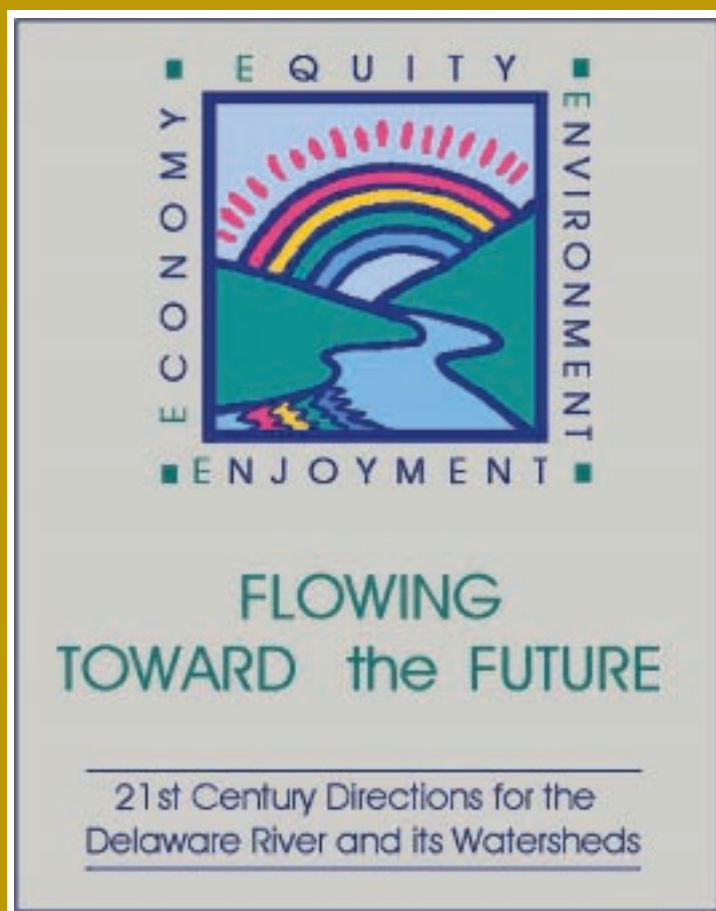
A Shared Vision

The Governors' Summit was the second step in a three-step process named Flowing Toward the Future. The other elements were regional workshops and a watershed-wide conference.

The process began in April and May 1999 with approximately 350 people attending ten workshops held at five locations in the Delaware River Watershed — Dover, Del.; Philadelphia, Pa.; Bridgeton, N.J.; Narrowsburg, N.Y.; and Bethlehem, Pa. In addition, students attending a regional Youth Summit in Pennsylvania held their own workshops in May using an abbreviated format.

The purpose of the workshops was to gather information and ideas for developing a shared vision for the future of the Delaware River Basin as well as “21st Century Directions” for attaining this vision.

Each workshop used a focus group process where participants were divided into one of four interest groups — preservation/advocacy, commerce/utilities, recreation, and government. Several mixed groups also were conducted. Trained facilitators led these breakout groups through a three-hour process where participants prioritized and described vision elements, challenges, and directions. The 26 breakout sessions held at the ten workshops yielded lists for 71 priority vision elements, 826 challenges to be overcome, and 880 directions needed to overcome the challenges.



After the workshops were completed, the information was analyzed for themes. The 71 priority elements were consolidated into five vision statements that collectively describe a 21st Century vision — Ecological; Water Supply; Livable, Pleasing Places; Vibrant Economy; and Stewardship. The over 1,700 challenges and directions, in turn, yielded suggested directions grouped under the following headings — Good Science; Watershed Education; Watershed Image and Marketing; Land Resources; Water Management; and Working Better Together. These are not stand-alone directions, but packages that collectively will attain the five vision statements making up the 21st Century Delaware River Basin vision. Each represents a collection of related activities that should, or could, be done by agencies, organizations, and/or citizens of the basin.

The information and insights generated from the workshops were used to develop the September 1999 report, “21st Century Visions and Directions for the Delaware River and its Watersheds.”

The final Flowing Toward the Future event was the watershed-wide conference held November 15-17, 1999 in Philadelphia. This conference was designed to build upon the first two events, helping to establish directions and models for cooperative action that will sustain the river, its tributaries, and its watersheds into the 21st Century and beyond. The conference featured more than 150 presenters and was attended by nearly 500 people over the two-and-a-half days.

Conference sponsors included the Delaware Estuary Program, Heritage Conservancy, National Park Service, William Penn Foundation, U.S. EPA, PECO Energy, Pennsylvania Department of Conservation and Natural Resources, Delaware Department of Natural Resources and Environmental Control, and the Port of Philadelphia and Camden.

The organizers of the Flowing Toward the Future process included the DRBC, the basin’s four state environmental agencies, Alliance for a Sustainable Future, Delaware Estuary Program, Heritage Conservancy, National Park Service, Partnership for the Delaware Estuary, Upper Delaware Council, U.S. EPA, and the Water Resources Association of the Delaware River Basin. New Jersey Future and the Stroud Water Research Center also helped to organize the Governors’ Summit and November conference.

The 26 breakout sessions held at the ten workshops yielded lists for 71 priority vision elements.



Governor Whitman presents Peg and Hal Haskin the “Flowing Toward the Future” Award “in gratitude for the time and effort they have generously given to benefit the natural resources of the Delaware River Basin.” Looking on are Carol Collier, the DRBC’s executive director, and Robert C. Shinn, Jr., commissioner of the New Jersey Department of Environmental Protection and Governor Whitman’s representative on the DRBC.
(Photo by Clarke Rupert)



A participant at the Narrowsburg, N.Y., workshop votes with multi-colored dots for his favorite challenges and directions as part of the Flowing Toward the Future process to forge a new comprehensive plan for the basin.
(Photo by David B. Soete)

Taking on Toxics

Three hearings were held during May of 1999 to give the public an opportunity to comment on the commission's proposed determination that several toxic pollutants exceed water quality criteria in the Delaware River between Trenton, N.J., and the Delaware Bay.

The targeted pollutants are 1,2 - dichloroethane (DCE), tetrachloroethene (PCE), chronic toxicity and acute toxicity.

These pollutants can be toxic to aquatic life and have the potential to be harmful to humans through ingestion of untreated river water and/or the consumption of fish.

Chronic toxicity refers to adverse effects of the wastewater discharges as a whole resulting from exposure over an extended time while acute toxicity refers to short-term adverse effects.

Both DCE and PCE have been identified by the U.S. Environmental Protection Agency as "probable human carcinogens." Both are solvents used in the manufacture of chemicals and in the dry cleaning business.

The public hearings were held May 3 in Wilmington, Del.; May 5 in at the DRBC office in West Trenton, N.J.; and May 11 in Philadelphia.

The commission's toxics management program is shaped in large part by input from its Toxics Advisory Committee which formed in the early 1990s. Committee members include representatives from the environmental regulatory agencies in the four basin states, the regulated community (municipal and industrial dischargers), the environmental community, academia, agriculture, fish and wildlife management, and public health.

Fish tissue contamination by other toxic pollutants such as polychlorinated biphenyls (PCBs) in the Delaware River have been highlighted in recent years by the issuance of fish consumption advisories by state environmental agencies. Anglers have been warned either not to eat or reduce consumption of such species as recreational-sized striped bass, catfish, white perch, and American eel.



Ed Santoro (left), the DRBC's monitoring coordinator, prepares a water sampler before deploying it in the Delaware Estuary, while Dr. Tom Fikslin, head of the commission's Modeling and Monitoring Branch, fills a sample container with river water during a recent toxics study conducted from the deck of a vessel owned by the Delaware Department of Natural Resources and Environmental Control.

(Photos by Fikslin/Santoro)

Water Snapshot '99

Commission staff participated in two well-attended special events around Earth Day, April 22, 1999 to educate the public about the DRBC and its fourth annual “Water Snapshot” project.

On April 17, DRBC representatives spent a breezy Saturday along the White Clay Creek at the Stroud Water Research Center’s “UpStream Festival” in Avondale, Chester County, Pa. The following weekend staff relocated to Fred Lewis Island along the Delaware River to participate in the 18th Annual Lambertville (N.J.) Shad Festival.

“The three days provided us with an excellent outreach opportunity,” DRBC Executive Director Carol R. Collier said. “Children and adults alike seemed to enjoy the chance to learn from DRBC staff and take some hands-on, water quality measurements.”

Staff conducted demonstrations on collecting and analyzing water from the Delaware River and the White Clay, a tributary of the Christina River. Samples were tested for water temperature, dissolved oxygen, pH, and conductivity.

The Stroud Water Research Center, established in 1967, is one of the premier stream research laboratories in North America. Its “UpStream Festival” featured outdoor classroom activities, workshops, crafts, music and exhibits.

The Lambertville Shad Festival celebrates the arrival of spring and heralds the shad’s return up the Delaware River to spawn, an unthinkable event 50 years ago when pollution was widespread. The two-day event, sponsored by the Lambertville Area Chamber of Commerce, salutes ongoing efforts to revitalize and maintain the quality of the Delaware River. The festival features shad hauling, arts and crafts, children’s activities, entertainment and food.

Participating DRBC staff at both events included Ms. Collier, Bob Kausch, Dave Pollison, Tom Fikslin, Rick Fromuth, Bob Limbeck, Sue Weisman, Todd Kratzer, Forsyth Kineon, Chris Roberts, and Clarke Rupert.



Sarah Baker of Lambertville, N.J., signs her name to a water quality data collection chart where she posted her monitoring results during the Water Snapshot event in her hometown. (Photo by Chris Roberts)

Financial Summary

The Energy and Water Appropriations Bill (P. L. 104-206) eliminated federal funding for the Delaware River Basin Commission for the federal fiscal year 1997 (October 1, 1996 through September 30, 1997). The impact of this action amounted to a \$427,000 decrease in federal funding.

The fiscal year 1997 budget was amended to reflect this action and the fiscal year 1998 and 1999 budgets were adopted on June 25, 1997 and February 18, 1998 respectively. These budgets were adopted without a federal contribution.

The fiscal year 2000 budget was adopted on December 9, 1998 with a federal contribution of \$627,250. This contribution was not received. Efforts have been undertaken for the restoration of federal funding.

Effective July 1, 1997, the commission changed the method of accounting and reporting activities relating to the Water Supply Storage Facilities Fund.

These activities are accounted for as a Proprietary Fund Type. They were previously accounted for as a Governmental Fund Type.

This change required the reclassification of certain assets and liabilities which had previously been reported in account groups.

Comprehensive audited financial statements are available for inspection at the commission's headquarters.

Statement of Revenues and Expenditures – General Fund

Year Ended June 30, 1999	Budget	Actual
Revenues		
Signatory parties:		
Delaware	\$392,000	\$392,000
New Jersey	784,000	792,000
New York	481,500	481,500
Pennsylvania	784,000	813,000
Water Quality Pollution Control Grant	257,500	257,500
Sale of Publications	5,970	5,971
Project Review Fees	32,520	32,520
Reimbursement of Overhead-Agency Fund	80,000	80,000
Investment Income	229,314	229,315
Fines, Assessments and Other Income	39,192	39,192
Total Revenues	\$3,085,996	\$3,122,998
Expenditures		
Personnel Services	\$2,140,415	\$2,140,523
Special and Contractual Services	274,921	274,921
Other Services	148,976	148,976
Supplies and Materials	142,074	142,074
Building Operations	156,381	156,381
Communications	53,321	53,321
Travel	62,509	62,509
Maintenance, Replacements and Acquisitions	141,389	141,389
Fringe Benefits	495,014	495,014
Total Expenditures	\$3,615,000	\$3,615,108
Excess of expenditures over revenues	(\$529,004)	(\$492,110)
Other financing sources:		
Operating transfers in	\$0	\$586,918
Operating transfers out	-	(261,020)
Net transfers in	\$0	\$325,898
Excess of expenditures over revenues and other financing sources	(\$529,004)	(\$166,212)

**Statement of Revenues, Expenses and Retained Earnings –
Water Supply Storage Facilities
Proprietary Fund Type**

Year Ended June 30, 1999

Operating Revenue

Water Charges	\$1,926,799
Total Operating Revenue	\$1,926,799

Operating Expenses

Personnel Services	\$52,523
Special and Contractual Services	174,458
Supplies and Materials	1,004
Travel	5,589
Maintenance, Replacement, Acquisition and Rental	466
Amortization and Depreciation	421,947
Fringe Benefits and Other Contributions	24,981
Total Operating Expenses	\$680,968

Operating Income **\$1,245,831**

Nonoperating Revenue (Expenses)

Investment Income	\$429,198
Interest Expense	(582,881)
Total Nonoperating Revenue	\$(153,683)

Income Before Operating Transfers **\$1,092,148**

Operating Transfers Out **\$(599,386)**

Net Income **\$492,762**

Retained Earnings – Beginning of Year **\$4,058,553**

Retained Earnings – End of Year **\$4,551,315**

Schedule of Changes in Special Projects Advance/(Receivable) Balance-By Project

Project	Balances at July 1, 1998	Cash Receipts (A)	Transfers	Expenditures (B)	Balances at June 30, 1999
Advances:					
USGS Monitors	\$55,753	\$96,226	\$27,507	\$(149,694)	\$29,792
Groundwater – PA Protected Area	3,979	265,000	(39,671)	(93,131)	136,177
Upper Delaware Ice Jam	214,656	19,223	(1,824)	(64,155)	167,900
Delaware Estuary Project – PA	967	–	–	(967)	–
Delaware Estuary Project – DE	32	–	–	(32)	–
Maurice River Study	–	34,229	–	(30,805)	3,424
Subtotal Advances	\$275,387	\$414,678	\$(13,988)	\$(338,784)	\$337,293
Accounts Receivable:					
Delaware Estuary Project – EPA	\$(8,546)	\$109,574	\$(12,465)	\$(116,996)	\$(28,433)
Delaware Estuary (RIMS) – EPA	(6,520)	61,853	1,162	(64,724)	(8,229)
High Flow Management Objectives	(42,588)	52,237	(7,293)	(22,704)	(20,348)
Christina River Basin Study	(89,372)	160,354	–	(107,736)	(36,754)
Estuary Salinity Model	(4,974)	–	4,974	–	–
Water Quality Models	(63,099)	125,781	–	(69,430)	(6,748)
TMDLs – Brandywine Christina	–	–	–	(10,540)	(10,540)
Subtotal Accounts Receivable	\$(215,099)	\$509,799	\$(13,622)	\$(392,130)	\$(111,052)
Totals	\$60,288	\$924,477	\$(27,610)	\$(730,914)	\$226,241

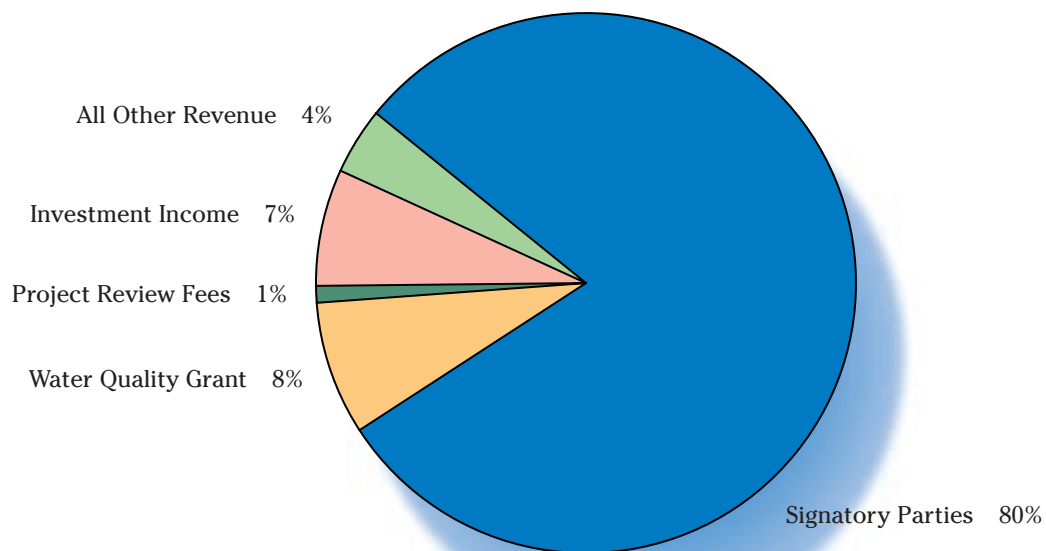
(A) Cash receipts were derived from:

United States Government	\$297,208
Commonwealth of Pennsylvania	373,697
State of New Jersey	86,466
State of Delaware	51,657
Interest	4,223
Third party fees for services	111,226
Total	\$924,477

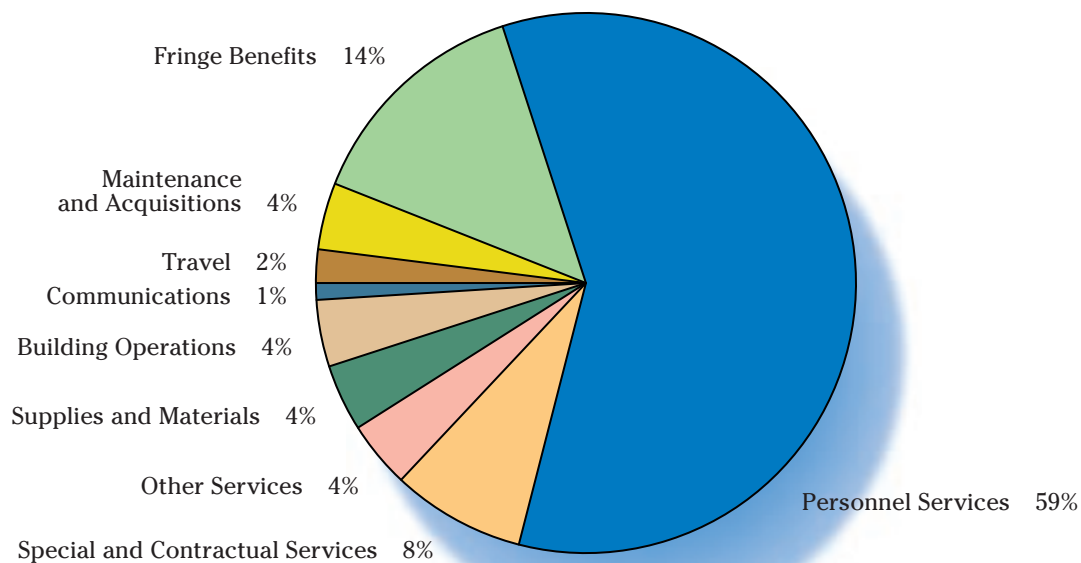
(B) Expenditures were primarily for payroll costs and contractual services.

The records of the Commission are audited annually as required by the Compact.

DRBC FY99 Revenues



DRBC FY99 Expenses



Delaware River Basin Commission

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