

A large flock of birds, likely terns, is captured in flight over a body of water during sunset. The sky is a warm, golden-orange color, and the water reflects the light. The birds are in various stages of flight, with some landing on the shore in the foreground. The overall scene is dynamic and naturalistic.

# Delaware River Basin Commission

*Annual Report*  
1996

This report covers calendar year 1996. 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. Box 7360, West Trenton, N.J. 08628. (Phone: 609-883-9500, ext. 205; e-mail: [croberts@drbc.state.nj.us](mailto:croberts@drbc.state.nj.us))

## Photo Credits

The photographs on the cover (Gulls Take Flight over the Delaware Bay) and on pages 2-3 (Fishing Boats at Little Creek, Del.) were taken by William J. Talarowski. Martin Siebert shot the photos on pages 6, 10-11 (A Chester County Bullfrog), and 32-33 (French Creek, Chester County). The trout photo on page 14 is courtesy of the Pennsylvania Fish and Boat Commission. Michael Hogan photographed the ice scene on pages 20-21. The "Snowmen" photo on page 26 is courtesy of Bruce Smith of the U.S. Fish and Wildlife Service.

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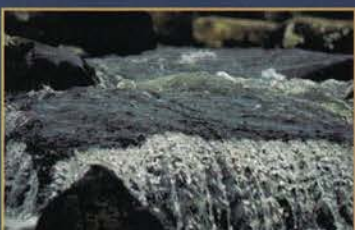
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# The Commission *Charting the Future*

## *A Blueprint for the 21st Century*

**T**he Commission held a retreat on December 12–14, 1995, in an effort to develop policy-level strategy to better meet its goals and objectives, and the mandates of the Delaware River Basin Compact.

The goal of the retreat, held in Princeton, N.J., was to promote dialogue and achieve consensus on important issues among the participants. These included the DRBC commissioners and three high-ranking members of the DRBC staff. Observers included eight other staff members and representatives from the New York City Department of Environmental Protection, the U.S.

Environmental Protection Agency, and the Pennsylvania Department of Environmental Protection.

A summary report on the retreat was issued in 1996. It lists 23 objectives or goals to be pursued by the commissioners and the Commission staff. Working committees have been formed to develop action plans to help achieve the objectives.

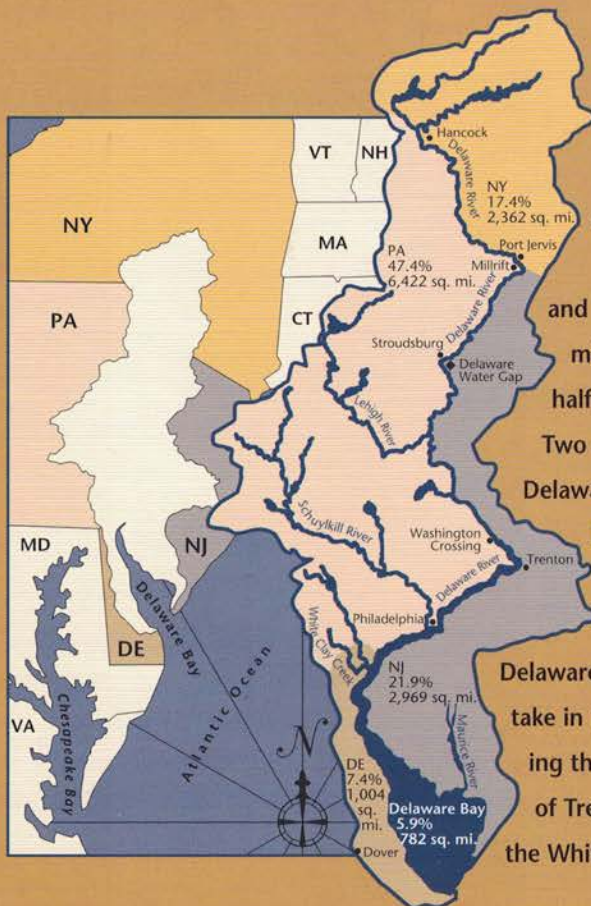


The report also contains five "assumptions" or guidelines to be followed in developing a blueprint for the future:

- The Delaware River Basin Compact will be the basis for this management strategy.
- This strategy will continue to promote interstate comity.
- The commissioners need to develop the strategy in concert with the executive staff.
- The strategy will address both policy and organizational issues.
- The DRBC will hold a future summit meeting or meetings with all DRBC constituencies.

An overview of the retreat was presented to the public at a Commission meeting held January 24, 1996. Gerard L. Esposito, who represents Delaware Gov. Thomas R. Carper on the Commission, noted some of the top priorities to emerge from the process:

- Development of a strategic plan to update the Commission's Comprehensive Plan.



## The Delaware River Basin

The mainstem Delaware River extends 330 miles from the confluence of its East and West branches near Hancock, N.Y., to the mouth 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, including the 782 square-mile Delaware Bay, which lies roughly half in New Jersey and half in Delaware.

Two reaches of the Delaware River and the Maurice River in New Jersey, a Delaware Bay tributary, have been included in the national Wild and Scenic Rivers System. The first section of the Scenic Delaware extends 73 miles from Hancock, downstream to Millrift, Pa.; the second extends 34 miles from just south of Port Jervis, N.Y., downstream to the Delaware Water Gap near Stroudsburg, Pa. Combined, the two river corridors take in 124,929 acres. Another reach of the Delaware, a 54-mile stretch linking the Delaware Water Gap and Washington Crossing, Pa., just upstream of Trenton, N.J., is being studied for possible inclusion in the system, as is the White Clay Creek, which flows from Pennsylvania into Delaware.

- Better defining how the commissioners and staff work together as a unit.
- Determination of how the Commission can better accommodate the public's concerns.
- The need for the Commission to develop a GIS (geographic information system) and upgrade its overall computer system.

Another top goal mentioned at the January 24 meeting was developing a strategy to ensure consistent funding for the Commission in the future.

As part of the retreat process, the Commission held two of its regular monthly meetings during 1996 at basin state capitols to underscore the importance of increasing the involvement of the basin's governors and legislators in Commission business. The May meeting was held in Harrisburg, and the October meeting in Dover. Legislative briefings were built into each session.

### **The DRBC: A Pioneer in Partnerships**

The commitment to a bright future is coupled to a past that has seen many accomplishments over more than three decades. Years before there was an EPA, or a federal Clean Water Act, or even an environmental movement, the Commission was hard at work restoring life to the Delaware, one of America's most polluted rivers.

The lower reach was an open sewer at the height of World War II. Along some stretches the fouled water was devoid of the oxygen needed to support fish and other aquatic life.

Blazing a new trail in water pollution abatement, the DRBC in 1967 adopted the most comprehensive water quality standards of any interstate river basin in the nation. The standards were tied to an innovative wasteload allocation program that factored in the waste-assimilative capacity of the tidal Delaware River.

Interior Secretary Stewart Udall declared at the time that only the Delaware among the nation's river basins was moving into "high gear" in its pollution abatement efforts.

**"Only the Delaware among the nation's river basins is moving into high gear in its program to combat water pollution."**

*—Interior Secretary Stewart Udall, 1968*

A year later the DRBC adopted regulations for implementing and enforcing the standards, prompting the Federal Water Pollution Control Administration to observe: "This is the only place in the country where such a procedure is being followed. Hopefully, it will provide a model for other regulatory agencies."

Today, the cleanup of the Delaware is hailed as one of the world's top water quality success stories.

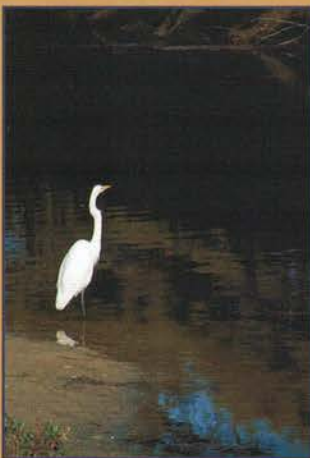
At the vanguard of environmental protection, the Commission got its start on October 27, 1961, the day the Delaware River Basin Compact became law. The Compact's signing marked the first time since the nation's birth that the federal government and a group of states came together as equal partners in a river basin planning, development, and regulatory agency.

"The Commission, which pioneered the concept of partnerships, has the tools through its organizational structure to oversee a unified approach to the development and control of the river system without regard to political boundaries," Gov. Carper, then Commission chair, noted in a September 1996 speech commemorating the DRBC's 35th anniversary.

## The DRBC at a Glance

**T**he members of the Commission are the governors of the four basin states (Pennsylvania, Delaware, New York, and New Jersey) and a federal member appointed by the President of the United States. Traditionally, the federal member has been the U.S. Secretary of the Interior. The president also appoints an alternate commissioner, as do the four governors, selecting high-ranking officials in the four state environmental regulatory agencies.

Commission programs include: water quality protection, water supply allocation, regulatory review, water conservation initiatives, regional planning, drought management, flood control, and recreation.



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 monthly 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. Exceptions are votes on the Commission's annual budget and drought declarations which require unanimity.

The Commission is funded by its signatory parties, receiving additional revenue from project review fees; water use charges; fines; and federal, state, and private grants.



# The DRBC 1996

## Delaware



Gov. Thomas R. Carper  
*Chair*



Christophe A.G. Tulou  
*Alternate*

## United States



Interior Secretary Bruce Babbitt  
*Vice Chair*



Vincent P. D'Anna  
*Alternate*

## Pennsylvania



Gov. Tom Ridge  
*Second Vice Chair*



Irene B. Brooks  
*Alternate*

## New York



Gov. George E. Pataki  
*Member*



Michael D. Zagata  
*Alternate*

## New Jersey



Gov. Christine Todd Whitman  
*Member*



Robert C. Shinn, Jr.  
*Alternate*

## Second/Third Alternates and Advisors

**Delaware**  
Gerard L. Esposito  
*Second Alternate*

**United States**  
Lt. Col. Robert B. Keyser  
*Advisor*

**Pennsylvania**  
Stephen A. Runkle  
*Second Alternate*

Kumar Kishinchand  
*Advisor*

**New York**  
N.G. Kaul  
*Second Alternate*

Warren T. Lavery  
*Third Alternate*

Joel A. Miele, Sr.  
*Advisor*

**New Jersey**  
Steven P. Nieswand  
*Second Alternate*

Pennsylvania Gov. Tom Ridge sent birthday greetings, observing, "Our great Commonwealth was founded by the spirit of community and will continue to grow and prosper as we look to dedicated organizations, such as yours, for guidance, information and protection. Your efforts to promote interstate comity and to remove the causes of controversy among the states in the uses of water resources are unquestionably worthy of honor."

## New Officers Elected

Delaware Gov. Thomas R. Carper was elected the Commission's chair on June 26, 1996, succeeding New Jersey Gov. Christine Todd Whitman. Elected vice chair was U.S. Interior Secretary Bruce Babbitt. Pennsylvania Gov. Tom Ridge was elevated to second vice chair. Their terms run from July 1, 1996, through June 30, 1997.

The fifth Commission member is New York Gov. George E. Pataki. The annual election of officers is based on a rotation of the five signatory parties to the Commission.

## DRBC Staff 1996

(with phone extensions and e-mail ID)

When contacting a staff member by e-mail, follow the e-mail ID with @drbc.state.nj.us

Gerald M. Hansler (ext. 200, ghansler)  
Executive Director

David J. Goldberg (ext. 222)  
General Counsel

Susan M. Weisman (ext. 203, sweisman)  
Commission Secretary

Christopher M. Roberts (ext. 205, croberts)  
Public Information Officer

Richard C. Gore (ext. 201, rgore)  
Chief Administrative Officer



Gerald M. Hansler

### Engineering Division

David B. Everett (ext. 202, deverett)  
Chief Engineer

Jeffrey P. Featherstone (ext. 208, jfeather)  
Policy Analyst

### Branch Heads

George C. Elias (ext. 221)  
Project Review

David P. Pollison (ext. 255, pollison)  
Planning

Richard C. Tortoriello (ext. 229, toriello)  
Operations

### Planning

Richard C. Albert (ext. 256, ralbert)

Thomas J. Fikslin (ext. 253, tfikslin)

Robert C. Kausch (ext. 252, bkausch)

Todd W. Kratzer (ext. 261, tkratzer)

Ronald B. Rulon (ext. 269, rrulon)

Paul J. Scally (ext. 251, pscally)

Paul J. Webber (ext. 236, pwebber)

Yun-Tai Wu (ext. 266)

### Project Review

Carol Adamovic (ext. 216, carola)

Thomas L. Brand (ext. 217, tbrand)

Gregory J. Cavallo (ext. 270, gcavallo)

H. Page Fielding (ext. 225, fielding)

Karl S. Heinicke (ext. 271, heincke)

### Operations

Richard K. Fromuth (ext. 232, rfromuth)

Warren R. Huff (ext. 237, whuff)

Timothy R. Lazaro (ext. 274, tlazaro)

Robert L. Limbeck (ext. 230, rlimbeck)

Pamela Merritt (ext. 228, pmerritt)

Stephen B. Schlags (ext. 241)

### Administrative

Gregg Dusecina (ext. 245, dusecina)

Carolyn M. Hartman (ext. 249, chartman)

Joseph Sosi (ext. 211, jsosi)

Judith L. Strong (ext. 263, jstrong)

### Directorate/Engineering

Carolyn B. Everett (ext. 240, ceverett)

Susan C. Owens (ext. 213, sowens)

Judith G. Scouten (ext. 224, jscouten)

Anne M. Zamonski (ext. 222, annez)

## Advisors Named



*Lt. Col. Keyser*

Lt. Col. Robert B. Keyser, sworn in as the commander and district engineer for the U.S. Army Corps of Engineers' Philadelphia District in July of 1996, is the Commission's new federal advisor. A graduate of the U.S. Military Academy where he earned a bachelor of science degree, he also holds a master's degree in engineering from the University of Florida.

Lt. Col. Keyser has served with the 588th Engineer Battalion at Fort Polk, La., the 2nd Engineer Battalion in Korea, and the 94th Engineer Battalion in Germany and Southwest Asia.



*Mr. Miele*

New York Mayor Rudolph W. Giuliani named Joel A. Miele, Sr., commissioner of the city's Department of Environmental Protection (DEP), as the city's advisor to New York State on Commission matters. The appointment became effective October 17, 1996.

A professional engineer and planner, Mr. Miele holds a civil engineering degree from the Polytechnic Institute of New York. He is a fellow of the American Society of Civil Engineers and past president of the New York State Society of Professional Engineers.

# Water Quality *A Team Effort*

## *The DRBC Adopts Toxics Regulations*

**T**he Commission has approved regulations governing the discharge of toxic pollutants from wastewater treatment plants to the tidal Delaware River.

The regulations, adopted October 23, 1996, set uniform water quality criteria for the pollutants for the 85-mile reach of the river from the head of tide at Trenton, N.J., downstream to the Delaware Bay, including tidal portions of tributary streams. They also establish procedures for setting wasteload allocations and effluent limitations where required for 83 riverbank treatment plants.

The water quality criteria are designed to address the effects of acute and chronic toxicity to aquatic life and the potential for harmful effects on humans through ingestion of river water and/or the consumption of resident fish and shellfish. The wasteload allocation program limits the amount of pollutants that can be discharged by individual treatment plants to achieve the criteria.

Numerous toxic substances, some carcinogenic, are covered under the new rules. They include chlordane, PCBs, metals such as lead and mercury, DDT, and volatile organic compounds.

The Commission held four public hearings in October 1995 on a proposal to add the toxics regulatory package to its existing water quality regulations. A fifth public hearing was held in September 1996 on proposed modifications to the original plan. In all, 65 oral and written comments were received from individuals and organiza-

tions, as well as from a coalition of 14 industrial and municipal dischargers to the tidal Delaware River.

The regulations, which took effect on January 1, 1997, were crafted in response to 1987 amendments to the federal Clean Water Act, which required states to adopt water quality criteria for toxic pollutants and identify those stretches of waterways where the criteria were being exceeded.

In an effort to meet the federal mandate, Delaware, Pennsylvania, and New Jersey independently developed criteria for the tidal reach of the Delaware, which serves as the states' common border. These new sets of criteria complemented the Commission's interpretive guidelines and narrative standards for toxics, which already were on the books. Problems inherent in this splintered approach soon became apparent, and in 1989, at the request of the three states, the Commission established the Delaware Estuary Toxics Management Program.



The regulations were developed with scientific and policy input from the Commission's Water Quality Advisory Committee, which includes representatives from the state environmental agencies in Delaware, New Jersey, Pennsylvania, and New York, the U.S. Environmental Protection Agency (Regions II and III); and the University of Rhode Island and the Academy of Natural Sciences in Philadelphia.

A recently formed second group, the Commission's Toxics Advisory Committee, also provided input. Charged with developing recommendations for managing toxic substances found in waters throughout the entire Delaware River Basin, the committee has 13 members representing environmental regulatory agencies, industry, academia, public health interests, municipal governments, agriculture, fish and wildlife resource agencies, and environmental groups.

### Tributaries Added to Study

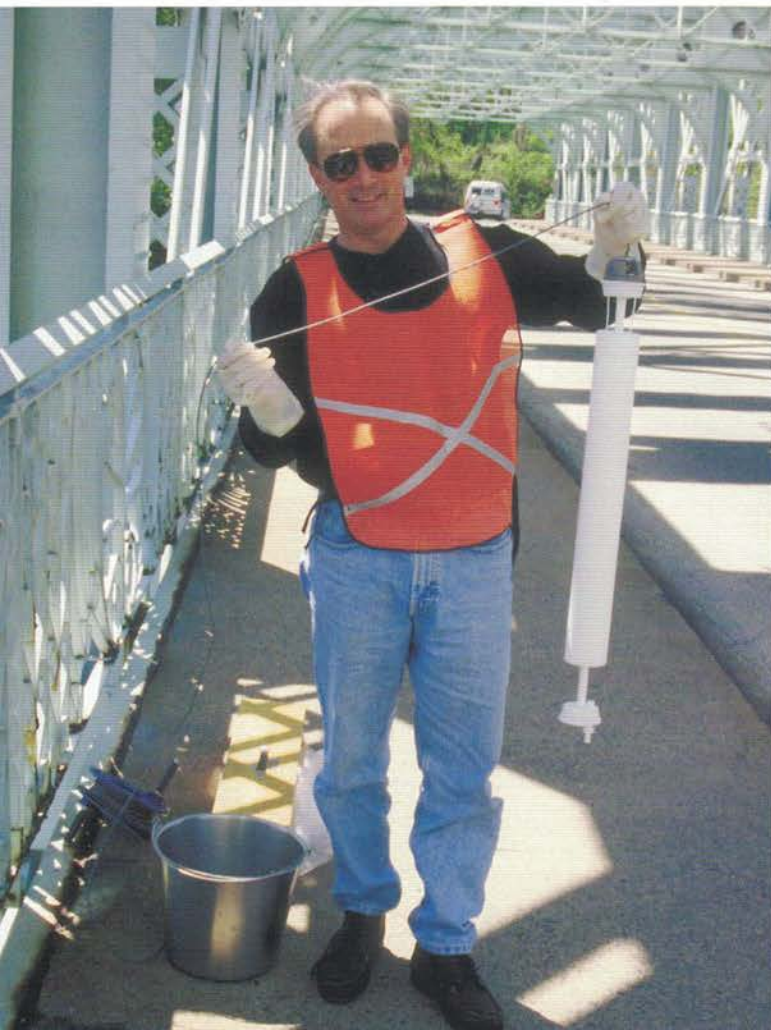
Fish tissue contamination by toxic pollutants has been highlighted in recent years by the issuance of fish consumption advisories. In the spring of 1994,

Delaware issued an advisory stating that consumption of recreational-size striped bass, channel catfish, white catfish, and white perch caught between the Chesapeake & Delaware Canal and the Pennsylvania–Delaware state line was not recommended due to elevated levels of polychlorinated biphenyls (PCBs) in their flesh. This advisory supplemented advisories previously issued by New Jersey and Pennsylvania for channel catfish, white perch, and the American eel from the Pennsylvania–Delaware state line upstream to Yardley, Pa., due to PCB and chlordane contamination.

The Commission's toxics management program previously had focused only on toxic pollutants found in point-source (end-of-pipe) discharges to the river from both industrial and municipal wastewater treatment plants.

The Commission embarked on the next phase of the program in 1996: to identify and control non-point sources of PCBs and chlorinated pesticides. A study of the loadings of

Thomas J. Fikslin, director of the Commission's Estuary Toxics Management Program, prepares to sample for trace amounts of toxic pollutants from the Falls Bridge spanning the Schuylkill River.  
*(Photo: Paul J. Scally)*



PCBs from ten Delaware River tributaries (plus six additional point sources) was initiated. Commission staff also is identifying other suspected non-point sources, including Superfund sites, landfills, and industrial and urban storm-water runoff.

### *Water Snapshot '96: Volunteerism at Its Best*

A unique water quality monitoring program was conducted throughout the Delaware River Basin in the spring of 1996—a program that partnered hi-tech science with youthful enthusiasm.

Water Snapshot '96 involved over 70 organizations in the first-ever basinwide assessment of the health of the watershed's waterways. School children, using simple water-testing kits, worked alongside highly trained government scientists using state-of-the-art equipment. Also involved in the sampling effort were private citizens, citizen groups, watershed associations, and private businesses.

Data were collected at 335 locations on 174 streams and rivers. The work took place between April 20 and April 28—the week that Earth Day celebrations focused attention on the environment.

Data were collected for water and air temperature, dissolved oxygen, pH, and nutrients. The information was sent to the Commission and compiled in a report entitled *Water Snapshot '96: An Earth Day Survey of the Delaware River and Its Tributaries*. The data, which are contained in four appendices attached to the report, also can be reviewed by visiting the Commission's home page (<http://www.state.nj.us/drbc/drbc.htm>). Click on "What We Do," then access the Water Snapshot '96 link.

Water Snapshot '96 was sponsored by the Commission, the Delaware Riverkeeper Network, the Delaware Department of Natural Resources and Environmental Control, the New Jersey Department of Environmental Protection, the New York Department of Environmental Conservation, the Pennsylvania Department of Conservation and Natural Resources, the Pennsylvania Department of Environmental Protection, and the U.S. Environmental Protection Agency.



Water Snapshot '96: Sneaking up on watery critters.

## *Juvenile Shad Run Breaks Record*

A record number of juvenile shad were netted in the Delaware River during 1996, a strong indication of exceptionally good spawning runs when these fish return to the river as adults.

The juvenile shad population monitoring program was conducted by New Jersey's Division of Fish, Game and Wildlife during August, September, and October at Trenton, Byram, and Phillipsburg, N.J.; the Delaware Water Gap, and Milford, Pa.

A total of 27,391 juvenile shad were collected in 60 seine hauls with an average catch of 456 shad per haul. This is more than double the 17-year average of 207 shad and exceeds the previous all-time average high of 363 fish in 1990. The peak of the juvenile shad migration occurred in August, with the largest number of sea-going fish collected at the Delaware Water Gap station.

The 1996 adult American shad run was monitored with hydroacoustic equipment mounted on the Interstate Route 202 bridge spanning New Jersey and Pennsylvania just north of Lambertville, N.J. Hydroacoustic equipment uses underwater transducers that emit a sound wave that counts fish as they migrate upstream.

From April 1 through May 31, a total of 792,000 adult shad were counted—

## **Wild and Wily Trout—And Not in Montana**



**S**ulfur dun, green drake, blue-winged olive, quill Gordon, woolly bugger. To the non-fishing eye they seem but tiny fluffs of hair wrapped around nasty little hooks, hardly deserving of their exotic names. Here on the Upper Delaware, however, in expert hands, these flies come to life as the highly skilled deceivers they are, luring onto their barbs some of the wildest, fightingest, most gorgeous trout anywhere.

Dry fly fishing—where the fly is cast

upon the surface to tempt the trout—first took hold in the U.S. on these celebrated Catskill waters, and no wonder. On a recent Sunday morning, a bright

sun rising behind our tents, I and my trusty fishing crony, Jimbo, eased into the West Branch, near Deposit, N.Y.

Although the river was high and fast, we waded for hours, seeing no one, casting long and upstream, as we explored among the channels and the islands. We caught just two brown trout each, and not very big ones either. However, two browns here are worth eight anywhere else.

This is wild-trout country. When fly fishermen talk about smart, it's usually about the trout in their lives. And they're talking natives, trout born of eggs in such rivers as these, grown to size against disease and predators, and

a lot smarter for it. You can fool these trout onto your line, but you have to know the insects of the river as they hatch, and you have to cast the right fly just ahead of where you think you saw that trout rise last. Miss and you may spook him. That makes these wild trout distinctly unlike most fished in America these days: the stocked ones raised in state hatcheries and dumped in local streams. They're bred pampered, not smart, and they'll go chasing after everything—worms, lures, even gum wrappers—until they're fished out or die.

True wild-trout waters are scarce, especially near urban areas, and that's part of what makes the Upper Delaware unique. It's two hours northwest of New York City, convenient to Philadelphia and even Boston. Yet fishing it, you would think you were in Montana.



the third highest number since shad population studies began in 1975. Shad passage was highest during April 27–29 with over 400,000 fish counted, but still was occurring at low levels through May 31.

Flows on the Delaware River were generally high throughout the study period, with three peaks of very high flows followed by periods of relatively lower flows. Shad passage counts were greatest during these lower-flow periods.

### *Cannonsville Release Valves Installed*

Two new release valves that have been installed at a major water supply reservoir in the upper Delaware River Basin will help protect the cold-water fishery along the river's West Branch.

The valves, which became operational in November 1996 at New York City's Cannonsville Reservoir, are capable of handling reservoir releases in a range from zero cubic feet per second (cfs) to 375 cfs. Prior to their installation, releases could only be made between six and 45 cfs and greater than 325 cfs. This inability to make mid-range releases sometimes created flow conditions that were not always compatible with the needs of downstream aquatic life.

The region spans hundreds of square miles and includes 100-plus miles of wide, fishable rivers. From Deposit, the West Branch flows south and east to Hancock, N.Y., where it meets the East Branch, which has merged to the east with the famed Beaverkill, and the two branches together tumble into the Main Branch, flowing 75 miles to Port Jervis. The rivers remain cool, ideal for browns and rainbows through the hot summer months. Fishing remains good through the fall, and well-bundled diehards even fish in the winter.

### **Bulked Up**

The fishing is always serious. The trout here have the brawn of their Western cousins, growing to 27 inches long on the Main Branch, but they're considered brainier, harder to catch,

and certainly harder to keep on the line. "The Delaware River rainbow has equal stamina to any native-born Western rainbow in Montana, Wyoming, and Colorado," says John Houghtaling, owner of Fly Fishing Plus in Riverdale, N.J. "They'll clean a reel in a second."

Jimbo and I fished on our own, but it makes sense for anyone new to the rivers to hire a guide, either for wading or floating in a drift boat. A guide will know what's hatching and what flies are working. A guided wading day for two runs \$225 at the West Branch Angler & Sportman's Resort (607 467-5525) and the Delaware River Club (717 635-5880), the two best-known resorts. Float trips run a bit more.

### **No Loose Lips**

Lodging is surprisingly cheap. The most expensive cabin at the West Branch

Angler goes for \$300 a night, but it sleeps up to five. We paid \$15 apiece to camp at a private grounds, but nearby there's Oquaga State Park at \$14 for up to six people, with hot-water showers, yet (800 456-CAMP.) A handy listing of area hotels, fly shops and streamside resorts can be found in the Mid-Atlantic Fly Fishing Guide, available at fly shops from Virginia to Connecticut. Or try the Chambers of Commerce in Hancock (800 668-7624), Deposit (607 467-2556), or Livingston Manor (914 439-4859).

If you do come, though, don't tell a lot of people. Big as it is, old as it is, the Upper Delaware is still kind of a secret. Let the others go to Montana. We'd rather fish these legendary waters any day.

– E.S. Ely

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# The DRBC

## *Celebrating a Storied Past*

### *Happy 35th*

The Commission celebrated its 35th birthday along the banks of the Delaware, a river that reflects the progress made over three-and-a-half decades.

"Dramatic improvements in water quality have occurred along the Delaware and on other rivers and streams in the Delaware River Basin," noted Delaware Governor Thomas R. Carper at a commemorative 35th anniversary meeting on September 19, 1996, at the Independence Seaport Museum in Philadelphia. "In fact, the cleanup of the Delaware River has been heralded as one of the world's top water quality success stories."

Governor Carper, the Commission chair, stated that one of the DRBC's unique strengths is that it recognizes the basin's waters and related resources are regional assets vested with local, state, and national interests for which there is a joint responsibility.

"The Commission, which pioneered the concept of partnerships, has the tools through its organizational structure to oversee a unified approach to the development and control of the river system without regard to political boundaries," he said.

As an example, he cited a study to develop a management plan to protect the waters of the Christina River Basin, a fragile watershed that straddles Delaware and Pennsylvania. "It was the DRBC that got things moving,"





said the governor. "This study, designed to take a whole-basin approach in assessing and controlling the water quality within the watershed, recognizes the many benefits gained by setting aside home-turf diplomacy. And I say this recognizing I'm the downstream governor, and when you're downstream, you constantly worry about what's headed for the border."

Pennsylvania Governor Tom Ridge, the Commission's second vice chair, was unable to attend the meeting, but he sent his best wishes: "Our great Commonwealth was founded by the spirit of community and will continue to grow and prosper as we look to dedicated organizations, such as yours, for guidance, information, and protection," he said. "Your efforts to promote interstate comity and to remove the causes of controversy among the states in the uses of water resources are unquestionably worthy of honor."

Also addressing the crowd of well-wishers were Vincent P. D'Anna, the alternate federal commissioner to the DRBC; James Seif, secretary of the Pennsylvania Department of Environmental Protection; N.G. Kaul, New York State's alternate DRBC commissioner; and Robert C. Shinn, Jr., the alternate DRBC commissioner from New Jersey.

The commemorative meeting was set for September 19—not October 27, the Commission's actual 35th birthday—to coincide with the signing of the Management Plan for the Delaware Estuary by the governors of Delaware, Pennsylvania, and New Jersey. The plan, a product of the Delaware Estuary Program, provides a framework and new focus for effective integration of ongoing management activities within the estuary—the tidal portion of the Delaware River and the Delaware Bay.

William Palmer, executive director of the Water Resources Association of the Delaware River Basin, visits with other attendees at the DRBC's 35th anniversary luncheon September 19 in Philadelphia. Seated clockwise from Mr. Palmer are Stephen Runkle and William Gast of Pennsylvania's Department of Environmental Protection; Kim Sparber, New York City Department of Environmental Protection (NYCDEP); D. Muralidhar, New York State Department of Environmental Conservation; DRBC staffer Richard Fromuth; Robert Mayer, NYCDEP; Deputy Delaware River Master William Harkness; and Kevin Cloonan, NYCDEP. (Photo: Neil Benson)



## How It Began

It was back in 1955 that the vision of a regional water resources agency was born—weeks before a record flood underscored the necessity for such an agency.

In July of that year the governors of Pennsylvania, New York, Delaware, and New Jersey and the mayors of Philadelphia and New York agreed to map out a unified plan for managing the Delaware River Basin's waters. This pact resulted in the formation of the Delaware River Basin Advisory Committee, with one member each appointed by the two mayors and the four basin state governors.

The basin's worst flood struck the weekend of August 19, 1955, claiming 99 lives and inflicting \$100 million in property damage. In its wake came a public clamor reflected by Congress' quick action in directing the U.S. Army Corps of Engineers, in cooperation with 18 other federal agencies, to fashion a comprehensive physical plan to develop and control the Delaware Basin's water resources.

On July 10, 1958, the two mayors and the four governors met at Washington Crossing, Pa., in the first of a series of "summit" meetings to hear a progress report on the activities of the advisory committee and the Corps. By this time, another study into the type of governmental organization that should be created as a permanent basinwide water resources management, planning, and regulatory agency was underway at the Maxwell Graduate School of Syracuse University.

A second summit meeting was held in Philadelphia on September 30, 1959, at which time the chief executives received the Syracuse report, *River Basin Administration and the Delaware*, and accepted a recommendation for a joint federal-state commission to be created by compact among the states and the federal government. The governors and mayors then directed the advisory committee to draft the necessary legislation.

In December 1960 the Corps completed its report. This massive 11-volume document advocated a 50-year development program of 58 water control projects at a cost of \$591 million to reduce flood damage, to augment stream flows and increase water supplies, to provide 41,000 acres of additional recreational waters, and to produce millions of kilowatt-hours annually in conventional hydroelectric power.

Within three months after the Corps' report was released, the advisory committee unveiled its draft compact at a third summit meeting, held on February 1, 1961. This document was officially received and endorsed by the governors and mayors, and by nightfall had already been introduced into the legislature of one state, New York. Before the summer months had passed, the compact had won the approval of both houses of the legislative branches of all four states and Congress and had been signed by the four governors.

On September 27, 1961, President Kennedy added his signature to the congressional action. Thirty days later, on October 27, 1961, the Delaware River Basin Compact became law, creating the Commission and marking the first time in the nation's history that the federal government and a group of states had joined as equal operating partners in a river basin planning, development, and regulatory agency.

**"The cleanup of the Delaware River has been heralded as one of the world's top water quality success stories."**

*– Gov. Thomas R. Carper,  
September 1996*



# Hydrologic Report

## *When the River Runs High*

### *Reservoirs Reduce Impact of Flooding*


**H**heavy rains, balmy temperatures, and rapid snowmelt resulted in serious flooding in the Delaware River Basin during January 1996, with flows on the Delaware River the highest since the record flood of 1955.

Nine persons died and there was extensive property damage, especially in areas of the upper basin located above large reservoirs, which captured billions of gallons in runoff from the freak meltdown. Without these impoundments, flooding would have been greater along the Delaware main stem and on major tributaries like the Lehigh and Schuylkill.

The U.S. Army Corps of Engineers estimated that its flood control and multi-purpose reservoirs prevented some \$55 million in damage during the storm, which occurred January 20–21, and during less serious flooding later in the month.

When the record flood struck in 1955, many of the basin's reservoirs now in operation had not been built. The flood-reduction capability of these new impoundments during the January 20–21 deluge was impressive:

- Three New York City water supply reservoirs located in the Catskill Mountains (Pepacton, Neversink, and Cannonsville) stored 45 billion gallons of runoff.
- F.E. Walter and the Beltzville Reservoirs located near the headwaters of the Lehigh River captured 17 billion gallons, reducing flood peaks at Lehighton, Walnutport, and Bethlehem.
- Blue Marsh Reservoir in the Schuylkill Basin received some five billion gallons of runoff, reducing downstream flows at Reading, Pottstown, and Philadelphia, where the Schuylkill empties into the Delaware.



The Delaware crested at Trenton, N.J., at 22.20 feet on January 21—2.20 feet above the official flood stage of 20 feet. During the 1955 flood the river rose 8.60 feet above flood stage.

At Margaretville, N.Y., a four-inch rain and melting snow pushed the East Branch of the Delaware to a record crest of 14.89 feet, more than a foot higher than the previous record of 13.84 feet notched on November 25, 1950, during the so-called "Rainmaker's Flood."

U.S. Geological Survey (USGS) gauging stations recorded the third highest flood peak in 34 years on Tobyhanna Creek near Blakeslee, Pa.; the sixth highest peak in 54 years on the Lehigh River at Bethlehem, and the highest peak on the Schuylkill River at Philadelphia since Tropical Storm Agnes in 1972.

As the floodwaters surged downstream, an ice jam in the Delaware near the Delaware Water Gap broke up, causing rapid rises in water levels downstream of Stroudsburg, Pa. At Belevidere, N.J., some ten miles below the Gap, the river rose over six feet in less than 30 minutes.

Water levels exceeded flood stage by nearly seven feet at Riegelsville, N.J., and over five feet at Yardley, Pa. Evacuations and road closings occurred along the Delaware and many of its tributaries.

The National Weather Service's River Forecast Center in State College, Pa., used its flood forecasting model to predict river stages on the Delaware main stem and major tributaries during the storm. This information was relayed through the Weather Service's regional office in Mt. Holly, N.J., to emergency management officials.

### Damage Severe

In New York State's Schoharie County, located above the New York City reservoirs, about 30 homes were destroyed and some 60 heavily damaged by the January 20–21 flood. Employees of *The Reporter* newspaper in Walton, N.Y., had to be evacuated from their flooded building in a front-end loader.

The January 20–21 flood deposited large ice cakes in Yardley, Pa., where water levels exceeded flood stage by over five feet. (Photo: Richard C. Tortoriello)





In southeastern Pennsylvania, which also experienced serious flooding in June and September, more than 500 families were affected by the January storm. Seven Red Cross shelters housed over 300 people in Chester, Bucks, and Philadelphia counties. In Bucks County, three homes were destroyed and 43 sustained major damage, according to the Red Cross.

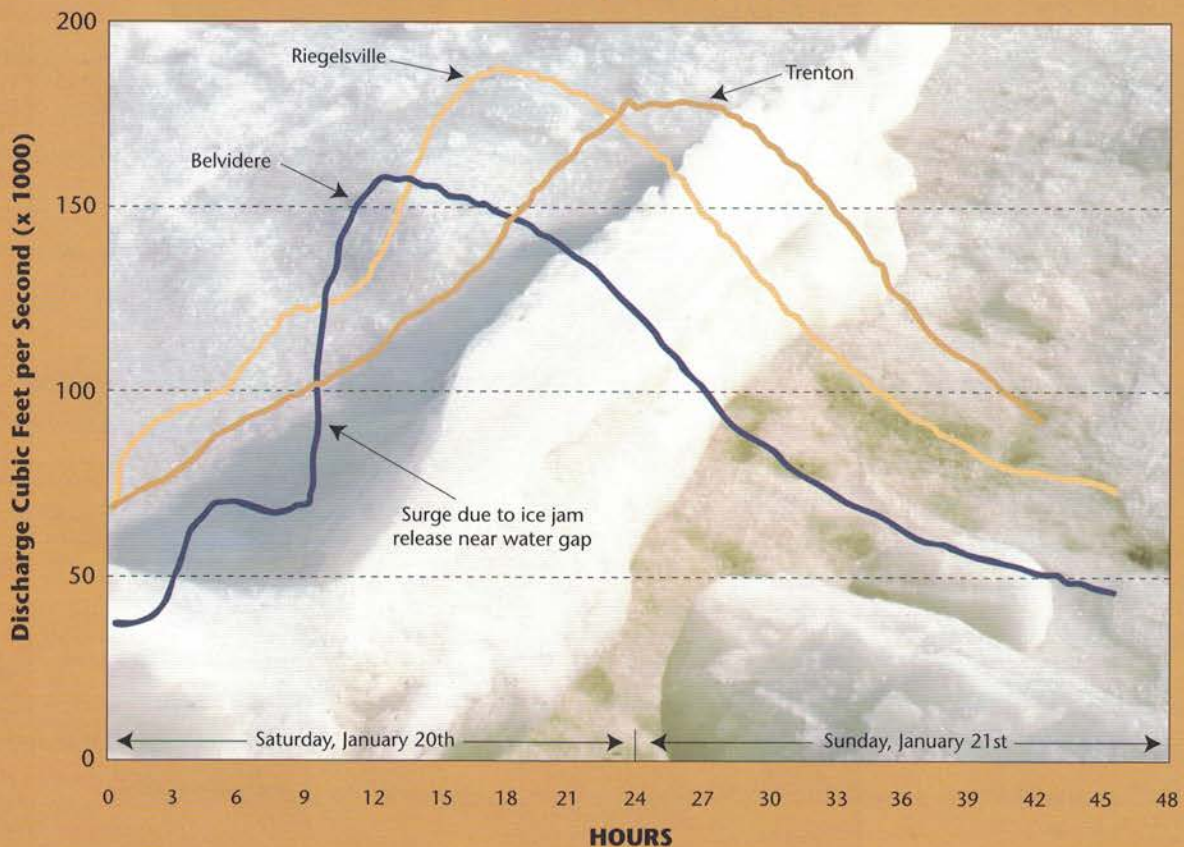
The June storm claimed two lives and caused extensive damage in lower Bucks County. Three months later, Hurricane Fran helped spawn yet another torrent, which again caused serious flood damage to homes and businesses in the area. In adjoining Montgomery County, ten inches of rain fell over the town of Abington during a three-hour period—about one-fourth the amount of precipitation the region usually receives in an entire year!

**In New York State's Schoharie County, located above the New York City reservoirs, about 30 homes were destroyed and some 60 heavily damaged.**

### *Plugging the Holes*

The flooding of January 1996 demonstrated that although accurate river-stage forecasts were prepared by the National Weather Service, officials in many communities were either unaware they existed or uncertain how to interpret them. This proved a serious problem for local emergency personnel.

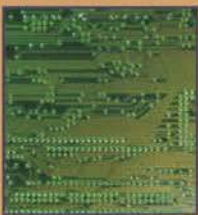
**Delaware River  
Flood of January 20–21, 1996**



A month later, the Commission hosted a meeting of local, state, and federal agencies to discuss roles and experiences during the flood. The group of over 40 attendees identified the following problems:

- Due to terrain and lack of transmitters, broadcasts from NOAA Weather Radio do not reach all areas in the Delaware River Basin.
- During the January 20–21 flooding, there were unfounded rumors of “dam breaks” and a “20-foot wall of water” surging down the Delaware main stem. It was obvious the warning system broke down in some instances because of too many unofficial information sources.
- There is a widespread lack of understanding of the existing flood-warning system and flood-crest forecasts. There also is limited use of historic high-water marks.
- Many eligible persons do not purchase flood insurance for their dwellings.
- Flood-stage forecast mapping is insufficient in its coverage area and, where available, is not generally used at the municipal level.
- There are differences in the frequency of monitoring and reporting of snowpack by New York City, the U.S. Army Corps of Engineers, and the

## Easy Access to Flood Information



The Commission’s Web Page offers a wide variety of information on flood events, including flood stages and crest forecasts for many of the basin’s rivers and streams. It also contains information on flood preparedness and provides details on how to obtain flood insurance maps.

Come visit us, rain or shine, at: (<http://www.state.nj.us/drbc/drbc.htm>). Once accessed, click on “Hydrologic Conditions,” then, if the creek is rising, “Flood Information:” This menu will appear:

- River Statements for Upper Basin (from Water Gap—North)
- River Statements for Lower Basin (from Water Gap—South)
- River Stage Forecasting Explained by the National Weather Service
- Flash Flood Guidance Text and Graphics
- Flash Flood Warnings Nationwide
- Flood Warnings Nationwide
- Hydrometeorological Discussion from the National Weather Service
- Mid-Atlantic River Forecast Center Home Page
- Historical Flood Information from the Mid-Atlantic River Forecast Center
- Flood Tips from the Federal Emergency Management Agency (FEMA)
- Order FEMA Flood Insurance Maps
- Red Cross Emergency Services Overview

Access to this information should prove helpful if flooding occurs in your area. Also, make sure you have a NOAA Weather Radio handy (with fresh batteries) and knowledge of any community flood evacuation plans. Remember that NOAA Weather Radio and media broadcasts should be your primary source of flood information.

National Weather Service. The existing New York City snowpack survey frequently is not adequate to monitor changing conditions. New York City data are not reported to all appropriate National Weather Service offices.

- State and federal budget problems threaten the continued operation and maintenance of the existing USGS stream-gauging network. There also is a lack of automated data collection platforms (DCPs) for use as flood forecast points within the basin, a lack of telephone access to gauges, and a need for alarm gauges.
- The National Weather Service needs available data on ice jam locations. Currently, this information is not collected and transmitted in a comprehensive fashion.
- There is an insufficient number of automated radio reporting rain gauges for rainfall observations. If water supply and power company reservoirs had been full or even at normal levels, the flooding of January 20–21 would have been significantly worse.

To those attending the February 15 meeting, it was obvious the communication gap among local emergency management officials and state and federal flood-preparedness agencies was a major issue that needed to be addressed.

On March 6, the National Weather Service held a meeting at its Mount Holly, N.J., forecasting center to discuss ways to expedite the exchange of information with the emergency management community. State and county emergency managers attended the meeting, as did DRBC personnel. Weather Service officials explained how to access and interpret flood forecasts and answered numerous questions about the overall flood-warning system. They also distributed diagrams for all flood forecast points in their coverage area in the basin. The diagrams depict gauge readings for significant historic floods.

Also, since the flood:

- The USGS distributed fact sheets on stream gauging and flood forecasting as a public education tool. The public also can obtain copies from the Commission.
- The Commission has developed a comprehensive “Flood Information” site on its Web Page, with hot links to National Weather Service forecasting centers and other agencies involved with flood preparedness. (See Easy Access to Flood Information on page 24.)
- The Commission, in cooperation with the USGS and the Delaware State Geological Survey, has assembled an inventory of all continuous-recording stream gauges in the Delaware River Basin and has prepared a map

**State and federal budget problems threaten the continued operation and maintenance of the existing USGS stream-gauging network.**

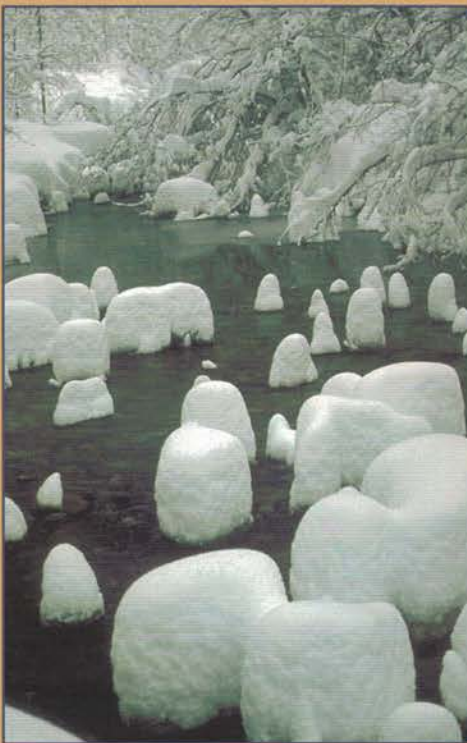
showing the telemetry at each of the gauges.

- Commission staff attended a meeting in April 1996 in Port Jervis, N.Y., to review events of the January flooding and recommend ways to improve interagency coordination.
- Commission staff has worked with citizens of a flood-prone area in Trenton, N.J., to develop a flood-warning system based in part on flood-stage forecast maps produced by the Commission and the Army Corps of Engineers.
- The USGS's New York, Pennsylvania, and New Jersey districts have established Internet Web sites for real-time stream-flow data at all gauging stations equipped with satellite telemetry.
- The Commission took action to temporarily lower levels in New York City's Pepacton Reservoir to create five billion gallons of capacity for flood-water storage. New York City officials concurred with the decision.

### *An Outpouring of Good Faith*

While flooding caused problems for basin residents during 1996, one area of the watershed received additional water that for many came as a welcome relief.

## Reservoirs Reach Record Levels



**T**here was so much rain and snow during 1996 that by August storage levels in the three major water supply reservoirs at the headwaters of the Delaware River were at a record high.

Never before had the reservoirs held so much water that far into the summer. Two of the impoundments, Neversink and Pepacton, became operational in 1955; the third, Cannonsville, was completed during the mid-1960s. They are owned by New York City.

For the month of July, precipitation in the basin above Trenton, N.J., averaged 7.66 inches—3.67 inches above normal. For the year, 62.04 inches of precipitation were recorded above Trenton, compared to a normal 44.23 inches for a 17.81-inch surplus.

As of August 9, 1996, combined storage in the three New York City impoundments was 267 billion gallons, or 98 percent of their total 271-billion-gallon capacity. That's a surplus of 86 billion gallons of water compared to August 9, 1995, levels and 39 billion gallons above normal for that time of year.

The Tri-County Water Supply Project, triggered by the Commission's basin-wide ground-water study and spurred by the "Good Faith" agreement, was placed in operation in 1996, making available much-needed surface water to portions of southern New Jersey.

Built by New Jersey-American Water Co., the project serves areas of Burlington, Camden, and Gloucester counties through an extensive pipeline system fed by the Delaware River. This surface water is treated at a state-of-the-art filter plant in Delran, N.J.

Much of the tri-county area historically has depended on ground water from the heavily stressed Potomac-Raritan-Magothy (PRM) aquifer. Over the years, pumping of the aquifer has lowered water levels as much as 100 feet.

A project team studying ground-water shortages in southern New Jersey in 1984 identified four alternatives for supplying the region with adequate amounts of water:

- a pipeline from Philadelphia to the region,
- a surface-water intake at Delran,
- additional wells in the PRM aquifer, or
- a combination of new wells in the PRM aquifer and in the adjacent Cohansey aquifer.


The surface-water intake was selected based on environmental, financial, and legal factors.

The water supply problems in southern New Jersey were addressed in the Good Faith agreement, a blueprint for future water supply management in the Delaware River Basin. The pact's formal title is "Interstate Water Management Recommendations of the Parties to the U.S. Supreme Court Decree of 1954 to the Delaware River Basin Commission Pursuant to Commission Resolution 78-20."

The agreement was signed in late 1982 and early 1983 by the governors of Delaware, New York, New Jersey, and Pennsylvania and by the mayor of New York City. It contains 14 recommendations for upgrading water resource management in the basin, including increased water-storage capacity and the implementation of water-conservation programs.

Recommendation No. 7 states: "New Jersey will undertake a study to examine potential solutions to the Camden metropolitan area water supply problems and the related overpumping of the Potomac-Raritan-Magothy aquifer."

The New Jersey-American project that was selected by the state is designed to eventually supply a new source of water to more than 55 communities in the tri-county area. It went on line April 1, 1996.



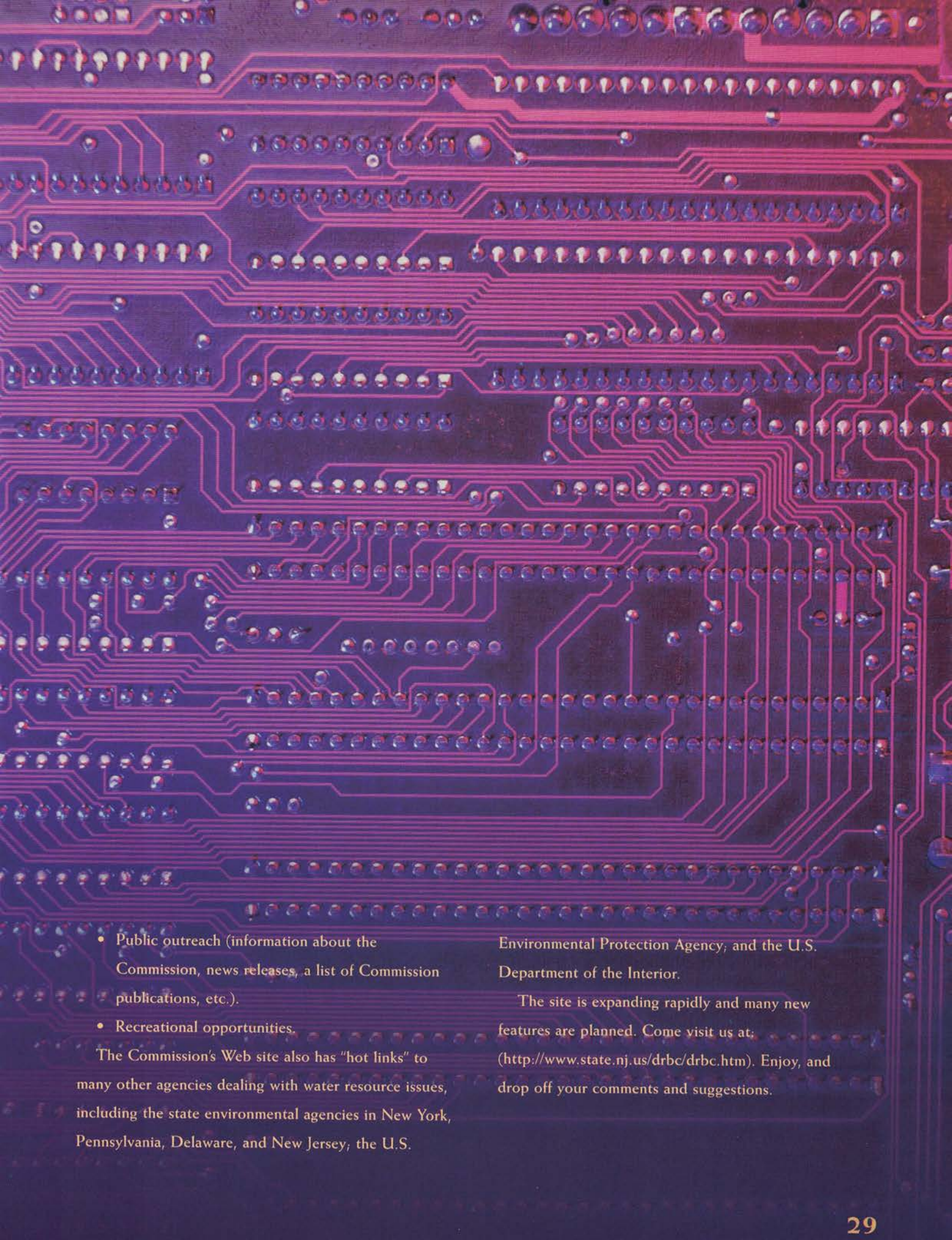
# The DRBC... *Where It's @*

## *Launched into Cyberspace*

The Commission's computer system underwent a major upgrade in 1996 and now features a geographic information system (GIS), an Internet Web site, and e-mail capability for all staff.

The web site features a wide array of information on water-related issues, ranging from detailed hydrologic data to recreational opportunities on the basin's waterways. Features at year's end included:

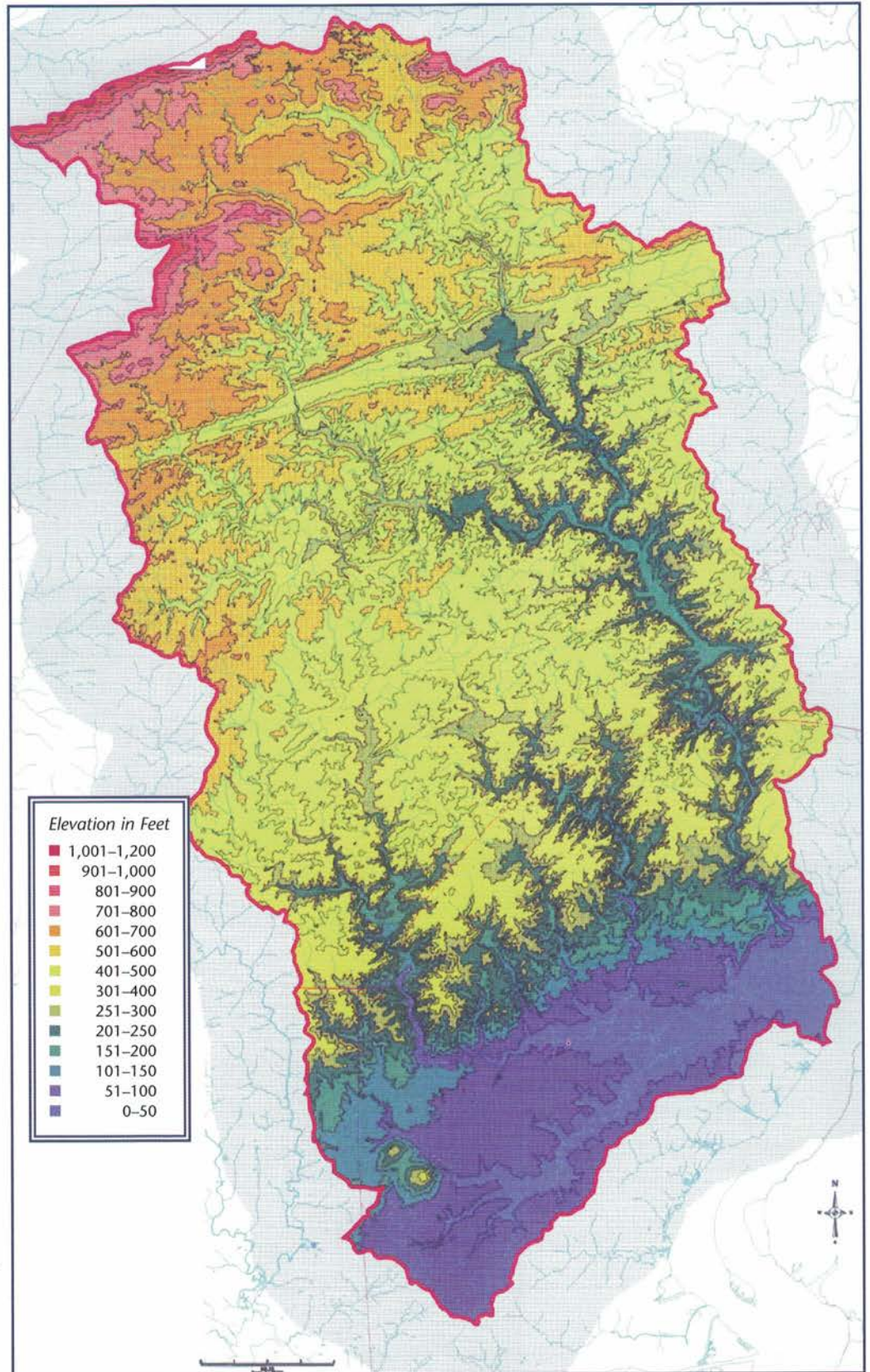
- A list of upcoming Commission meetings and other related events.
- Minutes from Commission meetings.
- Detailed hydrologic data (stream flows, flood and drought information, precipitation figures, reservoir storage, weather forecasts, etc.).
- A list of Commission regulations.
- Water quality information.

- 
- Public outreach (information about the Commission, news releases, a list of Commission publications, etc.).
  - Recreational opportunities.

The Commission's Web site also has "hot links" to many other agencies dealing with water resource issues, including the state environmental agencies in New York, Pennsylvania, Delaware, and New Jersey; the U.S.

Environmental Protection Agency; and the U.S. Department of the Interior.

The site is expanding rapidly and many new features are planned. Come visit us at; (<http://www.state.nj.us/drbc/drbc.htm>). Enjoy, and drop off your comments and suggestions.



The Water Resources Agency for New Castle County, a pioneer in the use of GIS in resource management, developed this map in December 1996 as part of a study of non-point pollution in the Christina River Basin. The agency began using a GIS grid system in 1975, converting to Arc/Info software in 1988.



## *Layering the Basin with GIS*

The geographic information system (GIS), installed in November, consists of two Sun Microsystem computers (a work station and a server), a high-capacity plotter to produce maps, external 8.4 gigabytes of hard drive storage, and two external tape drives for backup.

An Arc/Info software license was purchased along with Arc/View software to ensure compatibility with the signatory parties and other typical GIS users. The Arc/View software permits relatively simple access to the layers of data in the GIS and allows users to create GIS views and map displays from a personal computer.

Working through contracts with the U.S. Geological Survey, DRBC staffers have completed data layers for the Neshaminy Creek Watershed. Work in the remainder of the Southeastern Pennsylvania Ground Water Protected Area, in which the Neshaminy is located, is expected to be completed by the end of 1997.

Staff also has inventoried the GIS data currently available within the entire Delaware River Basin and has identified data gaps. Efforts are underway to find funding sources to help in obtaining the missing data, a venture to be carried out with the cooperation of other agencies and municipalities in the basin.

With the acquisition of the new computer system, each of the Commission's 38 employees now has a personal computer, linked to an internal network. Initially, 24 personal Pentium-level computers were purchased with the Windows 95 operating system. The existing Pentiums and a few of the 486-level computers were retained. However, those that could not be upgraded with Windows 95 due to limited storage capacity were replaced during the year with new, more powerful models.

The Commission's Internet access is hosted by the State of New Jersey through its Office of Telecommunications and Information Systems (OTIS). This connection permits the entire DRBC staff to use the Internet for information searches, data transfer, and external e-mail and access to other Web sites. With individual e-mail addresses, all staffers can be reached via e-mail both within and from outside the Commission's offices. (See page 8 for employee e-mail addresses.)



**Financial Summary**  
*Federal Government  
Withdraws Funding*

## *A \$427,000 Shortfall*

**T**he Commission historically has received the bulk of its funding from the five signatory parties—the states of Delaware, New Jersey, and New York; the Commonwealth of Pennsylvania; and the United States Government.

However, a recently enacted federal Energy and Water Appropriations Bill eliminated federal funding for the Commission for the federal fiscal year 1997 (October 1,

1996, through September 30, 1997), creating a \$427,000 shortfall. Efforts are underway to restore this and future DRBC funding by the federal government.

The Commission also generates revenue through project review fees, fines and assessments, a water-charging program and other activities. Federal grant money often is used to help bolster water resources management programs, especially in the pollution abatement field.

## Statement of Revenues & Expenditures—General Fund

Year Ended June 30, 1996	Budget	Actual
<b>Revenues</b>		
Signatory parties:		
Delaware	\$344,000	\$344,000
New Jersey	688,000	620,000
New York	481,500	481,500
Pennsylvania	688,000	688,000
United States	551,000	440,500
Water Quality Pollution Control Grant	240,000	240,000
Sale of Publications & Sundry	6,000	5,030
Project Review Fees	100,000	103,510
Reimbursement of Overhead-Agency Fund	55,000	55,000
Fines, Assessments & Other Income	19,000	5,754
Interest	94,000	153,458
<b>TOTAL REVENUES</b>	<b>\$3,266,500</b>	<b>\$3,136,752</b>
<b>Expenditures</b>		
Personnel Services	\$1,902,000	\$1,770,346
Special & Contractual Services	288,000	277,297
Other Services	109,000	95,584
Supplies & Materials	73,000	66,883
Space	218,100	147,222
Communications	52,000	38,982
Travel	31,000	36,419
Maintenance, Replacements & Acquisitions	310,000	178,834
Fringe Benefits	559,500	408,932
<b>TOTAL EXPENDITURES</b>	<b>\$3,542,600</b>	<b>\$3,020,499</b>
Excess of Revenues Over (Under) Expenditures	(\$276,100)	\$116,253
Other Financing Sources:		
Operating Transfers In	\$0	\$560,195
Operating Transfers Out	0	(33,625)
Net Transfers In	\$0	\$526,570
<b>EXCESS OF REVENUES OVER (UNDER) EXPENDITURES AND OTHER FINANCING SOURCES*</b>	<b>(\$276,100)</b>	<b>\$642,823</b>

\* General Fund Equity was authorized to be used to finance equipment acquisition and building renovations in the amount of \$276,100.

## Statement of Revenues & Expenditures—Capital Projects

<b>Revenues</b>		
Commonwealth of Pennsylvania	\$25,000	\$25,000
State of New Jersey	2,000	2,000
Water Charges	1,640,000	1,735,001
Western Berks	20,500	21,261
Interest Income	250,000	412,963
<b>TOTAL REVENUES</b>	<b>\$1,937,500</b>	<b>\$2,196,225</b>
<b>Expenditures</b>		
Debt Service on Projects	\$862,000	\$861,142
Operation & Maintenance Cost on Projects	397,000	151,869
Administrative Cost	678,500	661,454
<b>TOTAL EXPENDITURES</b>	<b>\$1,937,500</b>	<b>\$1,674,465</b>
<b>EXCESS OF REVENUES OVER EXPENDITURES</b>	<b>\$0</b>	<b>\$521,760</b>

Note: Debt services and operating and maintenance costs are for the Beltzville and Blue Marsh Reservoir Projects. Payments are made to the United States Army Corps of Engineers.

### Schedule of Changes in Special Projects Advance/(Receivable) Balance—by Project

Project	Advance Balances July 1, 1995	Cash Receipts (A)	Transfers	Expenditures (B)	Balances at June 30, 1996
<b>Advances</b>					
USGS Monitors	\$24,428	\$91,430	\$56,650	(\$144,017)	\$28,491
Groundwater—PA Protected Area	26,791	198,750	(75,964)	(81,052)	68,525
Upper Delaware Ice Jam Project	201,698	4,593	2,231	(17,938)	190,584
Delaware Estuary Project—PA	117,249	(10,116)	–	(88,887)	18,246
Delaware Estuary Project—DE	10,012	87,792	–	(97,804)	–
<b>Subtotal Advances</b>	<b>\$380,178</b>	<b>\$372,449</b>	<b>(\$17,083)</b>	<b>(\$429,698)</b>	<b>\$305,846</b>
<b>Accounts Receivable</b>					
Delaware Estuary Project—EPA	(\$125,918)	\$277,831	\$7,931	(\$177,482)	(\$17,638)
Delaware Estuary (RIMS)—EPA	(12,657)	67,613	1,999	(59,956)	(3,001)
Comprehensive CSO Assessment	–	–	13	(13)	–
Toxics Study—PA	(19,717)	29,591	(2,930)	(6,944)	–
Toxics Study—NJ	(50,530)	62,842	(842)	(11,470)	–
Estuary Salinity Model	(4,974)	–	–	–	(4,974)
Groundwater - PA Protected Area	–	–	–	(66,250)	(66,250)
Delaware Estuary Project—DE	–	–	–	(10,707)	(10,707)
National Pollution Discharge Study	–	73,520	–	(112,653)	(39,133)
<b>Subtotal Accounts Receivable</b>	<b>(\$213,796)</b>	<b>\$511,397</b>	<b>\$6,171</b>	<b>(\$445,475)</b>	<b>(\$141,703)</b>
<b>TOTALS</b>	<b>\$166,382</b>	<b>\$883,846</b>	<b>(\$10,912)</b>	<b>(\$875,173)</b>	<b>\$164,143</b>

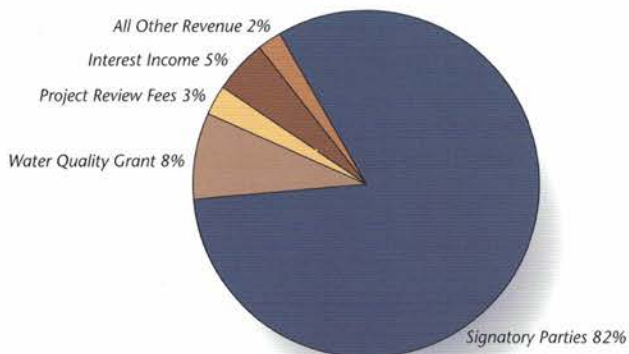
**(A) Cash receipts were derived from:**

United States Government	\$418,964
Commonwealth of Pennsylvania	218,225
State of New Jersey	62,842
State of Delaware	87,792
Interest	4,593
Third party fees for services	91,430
<b>TOTAL</b>	<b>\$883,846</b>

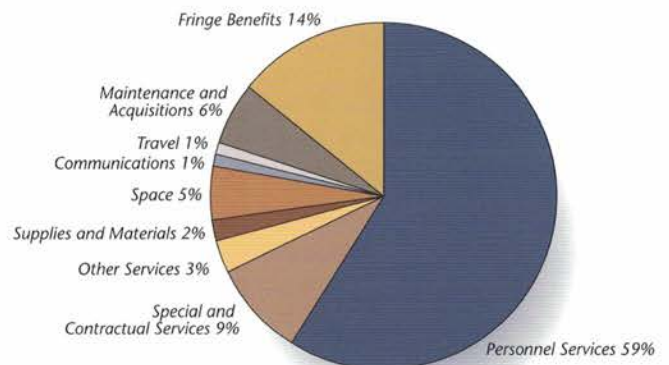
**(B) Expenditures were primarily for payroll costs and contractual services.**

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

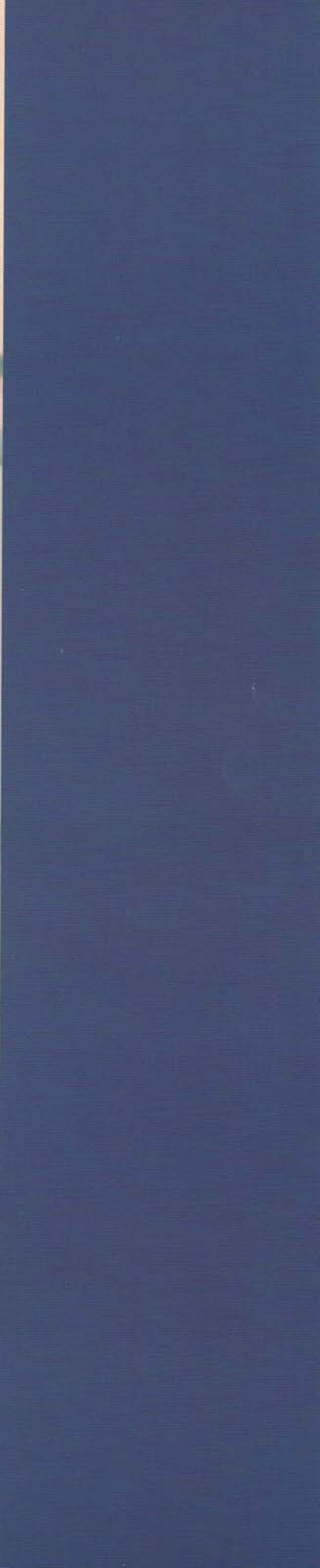
**DRBC FY96 Revenues**



**DRBC FY96 Expenses**









Delaware River Basin Commission  
P.O. Box 7360  
West Trenton, NJ 08628  
Tel. (609) 883-9500  
FAX (609) 883-9522