



DELAWARE RIVER BASIN COMMISSION
Annual Report
1987

Front cover: The tunnel excavated through Scotts Mountain joining the newly-constructed Merrill Creek Reservoir near Phillipsburg, N.J. and the Delaware River. Water flowing to and from the river travels underground through a steel-welded pipeline that is 17,000 feet in length and 57 inches in diameter. The final 1,500 feet of pipeline is contained in the tunnel, which is about nine feet in diameter.

Facing page: A diver emerges from the Delaware River during construction at the pumphouse site at Merrill Creek Reservoir. Now completed, the structure houses three pumps driven by 8,000 horsepower motors which are used to draw water from the river to fill the impoundment. Fine mesh screens on the intake pipes protect the river's aquatic life.

Report designed by Odette P. Taft, DRBC graphic artist/illustrator

Photographs on pages 9-10 courtesy of Donald Miller and Cyndie Faunce



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Introduction

The Tug of a Distant River

Calendar Year 1987 closed on some encouraging notes.

Construction of Merrill Creek, a major water supply reservoir on the Delaware main stem, was completed.

The three down-basin state governors were supporting another much needed water storage project, enlargement of the F. E. Walter Reservoir on the Lehigh.

Two water conservation measures, aimed at harnessing increasing water demands, were adopted.

A third generation water pollution control program appeared on the horizon.

A shad fisherman traveled 700 miles to reach the Delaware.

* * *

Merrill Creek and the F. E. Walter modification project were among the

14 recommendations contained in the "Good Faith" agreement, a blueprint for future water supply management in the basin. The agreement was adopted in 1982 by the four basin state governors and the mayor of New York City.

Merrill Creek is located outside Phillipsburg, N.J. When filled, it will be used during low flow periods on the Delaware to compensate for depletive water use at the generating plants of seven electric utilities. The power companies paid \$217 million to build the impoundment.

F. E. Walter is a single purpose flood control reservoir located near White Haven, Pa. Plans to modify it for water storage (while retaining its flood control function) have been stalled by a lack of a viable funding base. At year's end, a financing package was being assembled that consisted of some up-front money from the three down-basin states and pro-



Shad fishermen at the confluence of the Lehigh and Delaware

jected revenue from expanded water-user fees.

Such structural solutions have worked well in the basin. Beltzville and Blue Marsh are good examples of conserving water in man-made structures. But because of sharply rising development costs, the Commission and other water resources agencies also have recognized the increasing need to look to other conservation programs to help meet demand — in both wet and dry years.

As DRBC Executive Director Gerald M. Hansler rightfully asks: "Why waste water before a drought?"

Consequently, the Commission during 1987 adopted two water conservation measures. The first requires large public water supply systems to initiate programs to monitor and control leakage.

The second requires major water purveyors to install (or have installed) water meters at the consumer end of the pipe. The goal? Charge customers for water actually used, instead of a flat rate for an unlimited and often wasteful supply. In the end, the customer should save water, as well as money on utility bills, while contributing to the public good.

Much work was done on pollution control during 1987. One study already has resulted in tentative recommendations for upgrading water quality standards in portions of the heavily-used Delaware River estuary. More work needs to be done, but the preliminary results are promising.

* * *

It is not known if the shad fisherman who traveled 700 miles to reach the Delaware caught a fish.

It is known, thanks to a creel survey, that he was joined by 65,689 other anglers who over a nine-week period landed over 56,000 Delaware shad on a 192-mile stretch of the river, and spent an estimated \$1.6 million in recreational dollars.

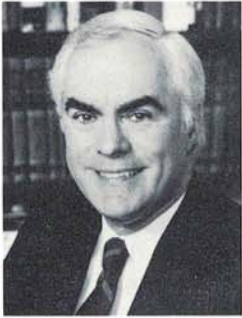
This report then is dedicated to the seven million basin residents whose daily lives are so heavily dependent on a safe and reliable water supply; who stand to benefit from such water storage projects as Merrill Creek and F. E. Walter, from the Commission's ongoing water conservation efforts, from a cleaner Delaware.

It is dedicated to the staffs of the DRBC, the signatory states, and the federal government who have worked so hard to meet these critical needs.

And it is dedicated to that fisherman who felt the tug of a distant river.

In 1987, we all came a long way.

The Commission • 1987



Governor Casey



Dr. Grace

Pennsylvania

Governor Robert P. Casey
Chairman

James R. Grace*
Alternate

William J. Marrazzo
Advisor



Mr. Hansler



Secretary Hodel



Mr. Kanuck

United States

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Project Review

Richard C. Tortoriello
Operations



Governor Castle



Mr. Ashbee

Delaware

Governor Michael N. Castle
Member

R. Wayne Ashbee****
Alternate

*John E. McSparran serves in
Dr. Grace's absence

**Irwin H. King serves in
Mr. Jorling's absence

***Dirk C. Hofman serves in
Mr. Catania's absence

****Gerard L. Esposito serves in
Mr. Ashbee's absence

Alternates Appointed from Pennsylvania and New York

Thomas C. Jorling, Commissioner of New York State's Department of Environmental Conservation (DEC), and James R. Grace, Deputy Secretary for Resources Management with the Pennsylvania Department of Environmental Resources (DER), were appointed alternate members to the Delaware River Basin Commission during 1987.

Mr. Jorling succeeds former DEC Commissioner Henry G. Williams, who recently was named Commissioner of New York State's Public Service Commission. Dr. Grace takes over from R. Timothy Weston, former DER Associate Deputy Secretary who served as Pennsylvania's alternate commissioner for seven years.

In other assignments, Lt. Col. G. William Quinby, who on July 20, 1987, became the 42nd Commander and District Engineer of the Army Corps of Engineers' Philadelphia District, is the new Federal advisor to the DRBC. He succeeds Lt. Col. Ralph V. Locurcio, who was selected for the Army War College, Carlisle, Pa.

Mr. Jorling was a professor of environmental studies at Williams College before being confirmed as DEC Commissioner in June of 1987. He has served in the environmental sector for more than 20 years as an attorney, educator and administrator.

As Assistant Administrator for Water and Hazardous Materials with the U.S. Environmental Protection Agency in the late 1970s, he was responsible for the implementation of the Clean Water Act, the Ocean Dumping Act, the Safe Drinking Water Act and the Resource

Conservation and Recovery Act.

Mr. Jorling is a graduate of the University of Notre Dame. He holds a law degree from Boston College and a master's degree in ecology from Washington State University.

Dr. Grace, who was appointed by newly-elected Gov. Robert P. Casey, joined the Pennsylvania Department of Environmental Resources in February of 1987 after serving as Coordinator of Penn State's Forest Resources Extension program.

A former vice-president of the Pennsylvania Forestry Association, Dr. Grace received a degree in forest management from the University of Vermont, a master of forestry degree from Yale University, and a doctorate in forest ecology from Penn State.

Prior to his work in Pennsylvania, he served as Assistant Professor in Forest Resources at Cook College, Rutgers University, where he received the "Professor of the Year" award in 1978.

Col. Quinby holds both bachelor's and master's degrees in mining engineering from the University of Alabama and a master's degree in management from the University of Southern California.

His military decorations include the Meritorious Service Medal (five awards) and the Army Commendation Medal (four awards).

He previously was assigned to Korea where he served as Chief, Leadership Division, 8th U.S. Army, and later as

Deputy Commander, 2nd Engineer Group, also 8th Army.

A native of Alabama, Col. Quinby is a registered professional engineer in the state of Virginia and a member of the Society of American Military Engineers.

Two second alternate commissioners also were appointed during 1987.

John E. McSparran, Director of the Bureau of Water Resources Manage-



Mr. McSparran

ment, Pennsylvania Department of Environmental Resources, was named by Gov. Casey to be a voting member for the Commonwealth in Dr. Grace's absence.

Gerard L. Esposito, Deputy Director of the Division of Water Resources, Delaware Department of Natural



Mr. Esposito

Resources and Environmental Control (DNREC), was appointed by Gov. Michael N. Castle to serve in the absence of R. Wayne Ashbee, Delaware's alternate member. Mr. Esposito succeeds Robert J. Touhey, who resigned from DNREC to take a job in private industry.

Chief Administrative Officer Named

Richard C. Gore, former Director of Finance in Bucks County, Pennsylvania, has been named the DRBC's Chief Administrative Officer. He succeeds John F. Glowacki, who resigned to take a position with the Atlantic City Housing and Redevelopment Authority.

Mr. Gore is a graduate of the Community College of Philadelphia and holds a bachelor's degree in business



Mr. Gore

administration from Pennsylvania State University.

Prior to accepting the cabinet level position in Bucks County in 1984, he was a Senior Budget Analyst with the Southeastern Pennsylvania Transportation Authority (1980-84), Budget Director of Bucks County (1972-80) and a Financial Analyst with the City of Philadelphia (1969-72).

Water Quality

Focus on a Cleaner Estuary

Significant progress was made during the year on a study which already has generated recommendations for upgrading water quality standards in portions of the Delaware River estuary.

Known as the Delaware Estuary Use Attainability (or DEL USA) Project, it began in early 1986 with a final report expected in 1988.

Use attainability refers to the attainment of water quality that protects fish, shellfish and wildlife (including propagation) and provides for recreation in and on the water, the so-called "fishable" and "swimmable" federal water quality goals.

Federal regulations require use attainability studies to be conducted on those bodies of water where the designated uses and corollary water quality standards do not meet the federal objectives.

In the 85 mile-long Delaware estuary, approximately 40 miles have designated uses less than "fishable," and 58 miles have designated uses less than "swimmable." The estuary is the tidal portion of the river between Trenton, N.J. and the Delaware Bay.

The studies are to assess what constraints, if any, prevent the attainment of fishable and swimmable water quality standards and to recommend pollution control programs needed to attain those standards.

To meet these objectives, technical studies have focused on bacterial concentrations, water and sediment toxics, fish health and toxics, sediment oxygen demand, combined sewer overflow impacts and other related matters. Project personnel also are using a sophisticated two-dimensional computer model of the

estuary to predict dissolved oxygen levels that might be attainable if various levels of additional pollution controls are instituted.

The DEL USA project has been conducted with extensive cooperation and participation by environmental and fisheries agencies of the basin states, the federal government, and the Commission's Water Quality Advisory Committee.

These findings had evolved from the project at year's end:

- Thirty-four of the 58 miles of the estuary that have less than swimmable water quality standards (from Chester, Pa. to below Wilmington, Del.) can be upgraded to primary-contact recreation levels based on existing water quality conditions. These conditions reflect lower bacterial concentrations due to the recent completion of wastewater treatment plant upgrading programs. Upgrading standards in the remaining reach of the river, from Northeast Philadelphia to Chester, Pa., will be contingent on reducing the potential public health threat posed by combined sewer overflows in Philadelphia and Camden County.
- Modeling studies indicate that the 20-mile reach of the estuary from the Pennsylvania-Delaware state line to below Wilmington, Del. is a candidate for upgrading dissolved oxygen standards without the imposition of higher treatment plant discharge requirements. In the most polluted reach of the estuary, the Philadelphia-Camden area, the attainment of fishable water quality via higher dissolved oxygen levels will require increased treatment levels.

— DEL USA studies have identified various toxicants in the estuary's water, sediments and fish. A study of fish contamination suggests that some of these toxicants may be affecting fish health and, certainly, the edibility of some fish. Findings, however, do not suggest that toxics will prevent fish populations from increasing if adverse environmental conditions such as low dissolved oxygen levels are alleviated. It is envisioned that reductions in the amount of toxics reaching the estuary may be obtainable simultaneously with measures to reduce fecal bacteria and oxygen-demanding wastes.

If the DEL USA recommendations are implemented, a third-generation pollution control program will have been launched. The first two generations saw water quality improve from the all-time poor quality conditions of World War II to the water quality of today which supports year-round fish populations in the entire Delaware estuary. (Some of the estuary's most polluted reaches, however, fall short of meeting the federal "fishable" goal because fish populations are marginal in these areas and propagation of many species is uncertain.)

The following DEL USA reports were published in 1987:

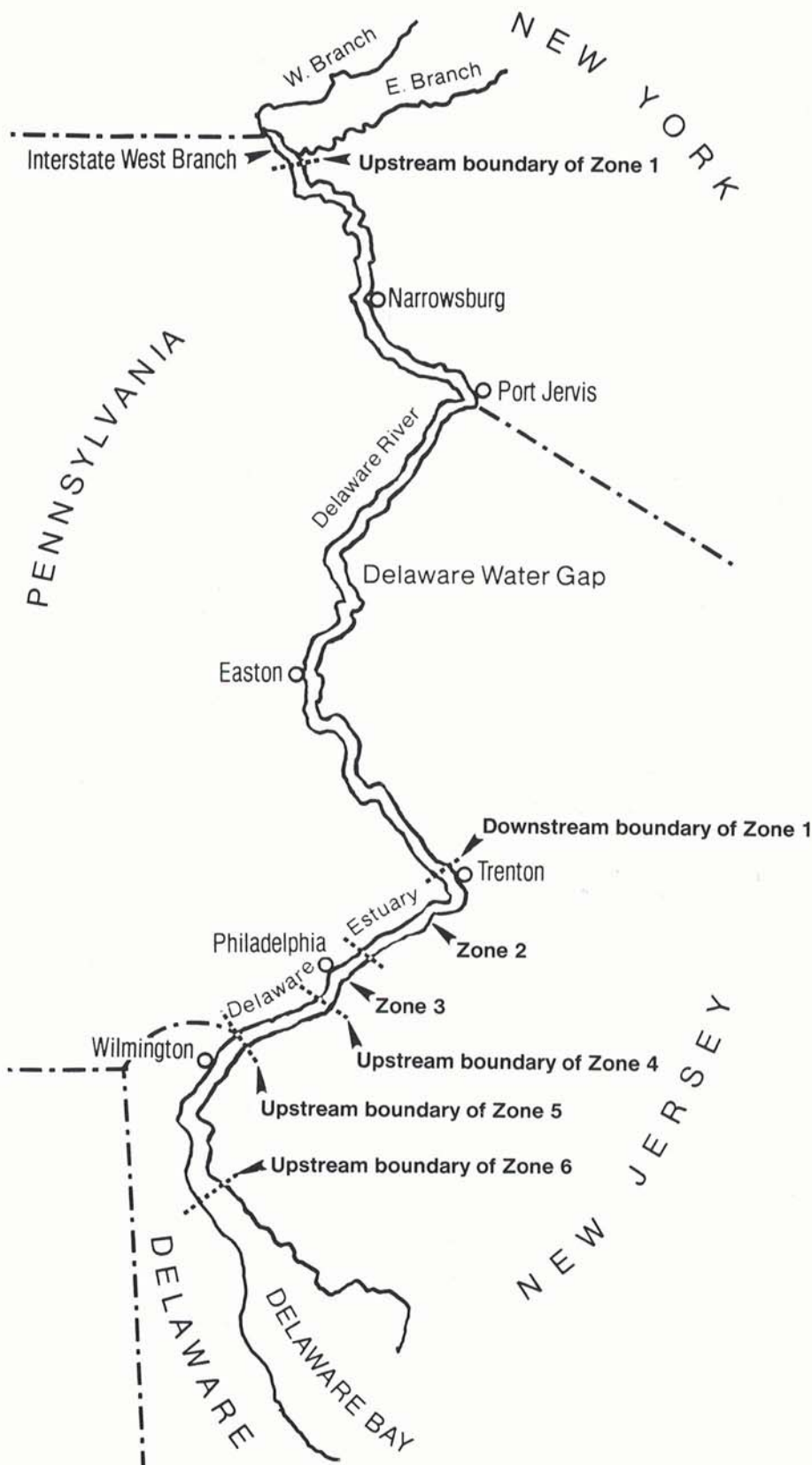
- "Chronic Toxicity Bioassay Report": Describes results conducted on water obtained from four estuary locations. No adverse impacts were observed on the test organisms.
- "Fish Population Study": Describes the results of Pennsylvania Fish Commission surveys conducted in the summers of 1984-85-86 which led to the find-

ing that fish currently inhabit on a year-round basis the entire estuary.

- "Sediment Oxygen Demand Study": Presents the results of the DEL USA surveys conducted in 1986 and other related information. Prior to these surveys, sediment oxygen demand (SOD) was seen as a potential major impediment to raising oxygen standards.
- "Zone 2 and Upper Zone 3 Bacterial Study": Describes the findings of DRBC studies conducted in 1986. Based on the data collected, upgrading fecal bacterial standards and designated uses in the lower section of Zone 2 have been recommended.
- "Toxics Review of the Delaware Estuary": Presents results of the DEL USA water and sediment toxics surveys plus other information on the existence and location of toxics in the estuary environment.
- "Recalibration/Certification of the Dynamic Estuary Model": Presents a modeling study that readied the estuary model for subsequent work.
- "Report on the Lower Zone 4 and Upper Zone 5 Bacterial Study": Describes bacterial studies conducted in 1987. Based on these data, upgrading fecal bacterial standards and designated uses have been recommended for the reach of the estuary from Chester, Pa. to below Wilmington, Del.

It should be noted that any proposed changes in DRBC water quality standards to reflect the DEL USA findings would be subject to public hearing and review followed by official action by the Commission.

It also should be emphasized that "swimmable" designations relate



Delaware River Water Quality Zones

only to the river's water quality. In some stretches of the estuary, swimming or other primary water contact sports can prove risky due to tricky tidal currents, floating debris, and commercial shipping.

Scenic Rivers Monitoring Program

The DRBC-National Park Service (NPS) scenic rivers water quality monitoring program was conducted during the summer of 1987, with program personnel taking samples in

the Delaware River and tributaries between Hancock, N.Y. and the Delaware Water Gap. The program operated for the first time out of a new National Park Service laboratory in the historic Pierce House near Milford, Pa.

The DRBC-NPS screening of water quality in the scenic rivers area augments similar efforts of state and local agencies. Annual reports on each year's sampling are prepared and distributed to governmental departments, the news media, and other interested parties.

During the summer of 1987, program personnel collected approximately 340 samples from over 70 locations in the Upper Delaware Scenic and Recreational River area, the Delaware Water Gap National Recreational Area and the intervening reach of the river. Fecal bacteria, dissolved oxygen, water temperature, pH, conductivity and benthic (river bed) organisms were routinely monitored.

In the May-July period, special emphasis was placed on finding the source(s) of pollution observed at the Port Jervis, N.Y. municipal beach in 1986. Four agencies participated in this activity: the Commission, the National Park Service, the New York Department of Environmental Conservation and the City of Port Jervis. By the end of July, data suggested



Sediment is spooned from the river bed, then placed in a sieve which screens out smaller particles for analysis.

that it was safe to reopen the beach for bathing.

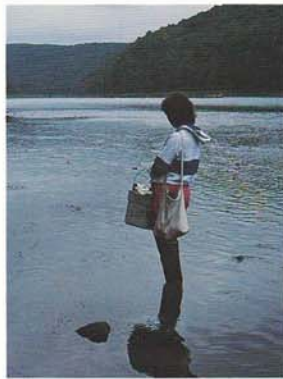
In August, a special sediment toxics survey was conducted. The survey had originally been suggested at a 1985 scenic rivers monitoring workshop by U.S. Geological Survey personnel who later helped with the design of the 1987 effort. Sediment samples, collected by special sieving devices, were analyzed for nutrients, 15 heavy metals, various pesticides, phenols, PCBs and almost four dozen organic compounds.

Fifteen river and two tributary locations were sampled with analyses performed by a private laboratory. The results of these analyses suggested that several locations were contaminated with one or more toxicants. In November, therefore, several sites were resampled and analyzed by the private laboratory and the National Park Service Water Resources Laboratory in Colorado.

As 1987 closed, the DRBC was awaiting the final results of the sediment sampling and initiating the preparation of a report on the 1987 findings of the scenic rivers program.

In addition, preparations were being made for sampling in 1988 to be performed in conjunction with a DRBC-NPS water quality management planning effort which was initiated in 1987. This effort is examining growth and development and potential future sources of pollution discharges to the Delaware Water Gap National Recreation Area in order to determine if any special protection policies are warranted.

DRBC and NPS staffs also were working on a special water quality monitoring and management workshop,



DRBC summer employees Cyndie Faunce and Donald Miller conduct sediment sampling work on the Delaware River near Narrowsburg, N.Y.

set for March of 1988. Various local, state and federal agencies and citizens groups were expected to participate.

Water Gap to Trenton Survey

During the summer of 1987, Commission personnel conducted a bacterial water quality monitoring program of the Delaware River from the Delaware Water Gap downstream to Trenton, N.J. This region is intensively used for canoeing and tubing, as well as other water-related recreational activities.

The study area contains over 40 named tributaries and 75 miles of the Delaware River. Approximately 250 samples were taken from over 85 locations. Fecal coliform and escherichia coli (e. coli) bacteria, dissolved oxygen, water temperature, pH and conductivity were routinely monitored.

Two locations were found to exhibit bacteria levels in excess of DRBC standards for primary contact recreation. These were the Wy-Hit-Tuk access area below Easton, Pa. and the Kingwood access area below Frenchtown, N.J. The New Jersey Department of Environmental Protection and the Pennsylvania Department of Environmental Resources were requested to conduct follow-up sampling prior to and during the 1988 recreational season.

With the exception of the problems noted, the Delaware River in general exhibited good water quality. However, data collected from numerous tributaries indicated problems in those watersheds.

As 1987 ended, a report on the findings of the sampling program was being prepared.

DRBC Launches Chlorination Study

The Commission has begun a study to determine whether the current amount of toxic chlorine compounds being discharged into a segment of the Delaware River can be reduced without impacting on human health or on the shellfish beds in the upper Delaware Bay.

These toxic compounds are a by-product of wastewater disinfection, achieved through chlorination. This process virtually eliminates fecal coliform bacteria not removed by secondary waste treatment plants, which kill up to 98 percent of these human waste-indicator organisms.

But there's a downside. While chlorine and its by-products can provide human health safeguards, they also can be harmful to fish and other aquatic life.

Data collection in the two-year study began in July of 1987. On Oct. 1, 1987, chlorination was suspended at 25 wastewater treatment plants discharging to the Delaware River between Trenton, N.J. and Marcus Hook, Pa. All other treatment requirements had to be maintained. Chlorination was resumed in the spring with the return of recreational activity on the river.

To provide comparison data, chlorination will continue throughout the second year and will be required on a year-round basis thereafter pending review of the data.

Any permanent change in standards would require public notice and public hearing.

A twice monthly monitoring program of the tidal Delaware River and upper Delaware Bay at 100 locations is being conducted for the Commission by the New Jersey Department of Environmental Protection (NJDEP) and the Delaware Department of Natural Resources and Environmental Control (DNREC).

NJDEP collects samples from 60 locations in the upper Delaware Bay and analyzes them at its Leeds Point laboratory near Atlantic City, N.J. DNREC collects samples from 40 locations between the upper bay and the Delaware River above Philadelphia and analyzes them at its laboratory at Dover, Del.

The sampling results under the two conditions (seasonal versus year-round disinfection) will be compared to answer such questions as: How much did bacterial levels in the Delaware River change with changes in disinfection practices? If disinfection is permanently curtailed during the winter months in the Trenton to

Marcus Hook reach (reducing the use of toxic chlorine and the generation of undesirable chlorination by-products), would the shellfishing areas be adequately protected?

It should be noted that available pre-study monitoring data did not indicate a relationship between bacterial levels in these shellfish areas and the levels of treatment at the plants that temporarily suspended chlorination, probably because the bacteria either die off naturally or are consumed by predators before reaching the bay (see accompanying chart). However, because the pre-study data were from warm-weather months, sampling of the upper bay continued over the winter in an effort to learn more about water conditions when shellfishing is being practiced.

The study has been endorsed by the Pennsylvania Fish Commission and approved by the U.S. Environmental Protection Agency, the U.S.

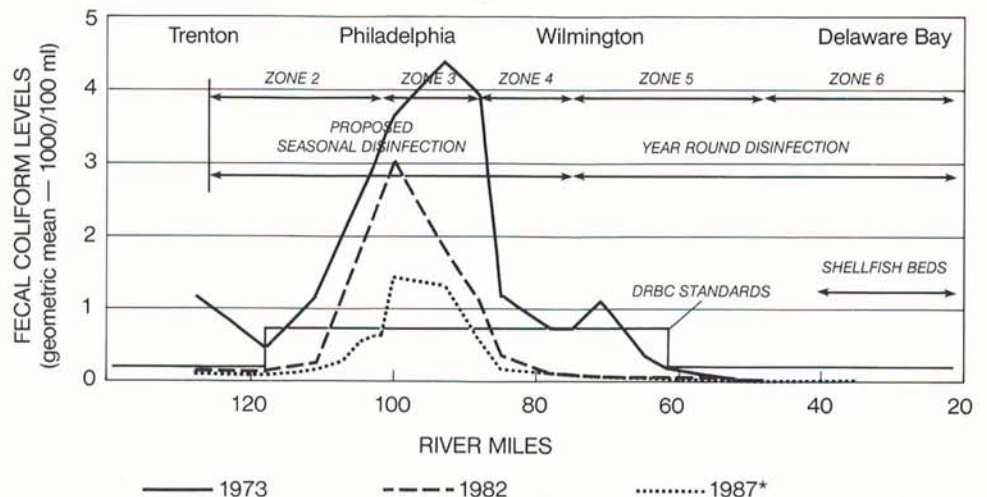
Food and Drug Administration, the Pennsylvania Department of Environmental Resources, the New Jersey Department of Environmental Protection and by shellfish regulators in both New Jersey and Delaware.

A total of \$399,250 has been committed to fund the project, \$200,000 from a National Oceanic and Atmospheric Administration grant and \$199,250 to be contributed by municipalities in the study area. Municipal contributions totaled \$49,250 at year's end.

Public input was sought and received before the study was approved.

The DRBC conducted a public hearing on July 30, 1986, and the NJDEP held a public hearing on August 5, 1986. In addition, the Commonwealth of Pennsylvania published public notices in the Pennsylvania Bulletin and recent DRBC Annual Reports outlined the project prior to its inception.

Decrease in Coliform Levels With Increased Sewage Treatment Delaware Estuary



*Jan.-Sept.

Conservation

DRBC Approves Water-Saving Measures

The Delaware River Basin Commission adopted two water conservation regulations during 1987 dealing with leakage and metered usage and held a public hearing on a third water-saving proposal in an ongoing effort to reduce demands on a vital but limited resource.

The first regulation requires owners of in-basin, public water supply systems that distribute in excess of 100,000 gallons per day (gpd) during any 30-day period to initiate a systematic program to monitor and control leakage.

Each purveyor's program is subject to review and approval by the respective basin state regulatory agencies: the Delaware Department of Natural Resources and Environmental Control, the New Jersey Department of Environmental Protection, the New York Department of Environmental Conservation, and the Pennsylvania Department of Environmental Resources.

The regulation is designed to reduce "unaccounted-for water"—water that is distributed by a purveyor but not accounted-for as being delivered to customers. It includes distribution system losses through inaccurate meters, unauthorized use, and leakage.

The Commission's staff estimates that such unaccounted-for water in the basin amounted to some 240 million gallons a day in 1985. Annual treatment and delivery costs for that water were estimated at between \$75 million and \$80 million.

The second regulation, service metering, requires purveyors that distribute in excess of 100,000 gpd during any 30-day period to install, or require to be installed, water meters at the

consumer end of the pipe. The regulation applies to all public water supply systems in the basin, old and new, with a ten-year grace period for retroactive installations at existing connections.

Both regulations were adopted April 22, 1987.

The Commission also requires (as of January 1, 1987) source metering, or measuring and recording of large amounts of water that are withdrawn from in-basin surface or groundwater sources. Requiring both types of metering (service and source) generates the data needed to effectively monitor and measure the total water resource.

Service metering also is underway in New York City, which lies 100 miles outside the basin but is the biggest single user of Delaware River surface water. In the fall of 1987, the city initiated an independent, ten-year program to install 630,000 water meters in all residential buildings at an expected cost of \$290 million. As the meters are installed, the city plans to gradually phase out the flat rates building owners now pay for water.

City officials project that residents will use from ten percent to 30 percent less water with the meters, resulting in a savings of 300 million gallons of water a day.

In addition, New York initiated a leak detection program in 1980 to locate breaks in the 6,300 miles of pipe that tunnel beneath the city.

Saving on Interior Water Use

In October of 1987, the Commission held a public hearing on the third water-saving proposal — a regula-

tion to set water conservation performance standards for plumbing fixtures and fittings. (It was adopted Jan. 13, 1988.)

The fixtures and fittings affected by the new regulation include faucets, shower heads, urinals, and toilets. About two-thirds of interior residential water use is for bathing and toilet flushing. In many cases water-saving fixtures and fittings can cut this use in half.

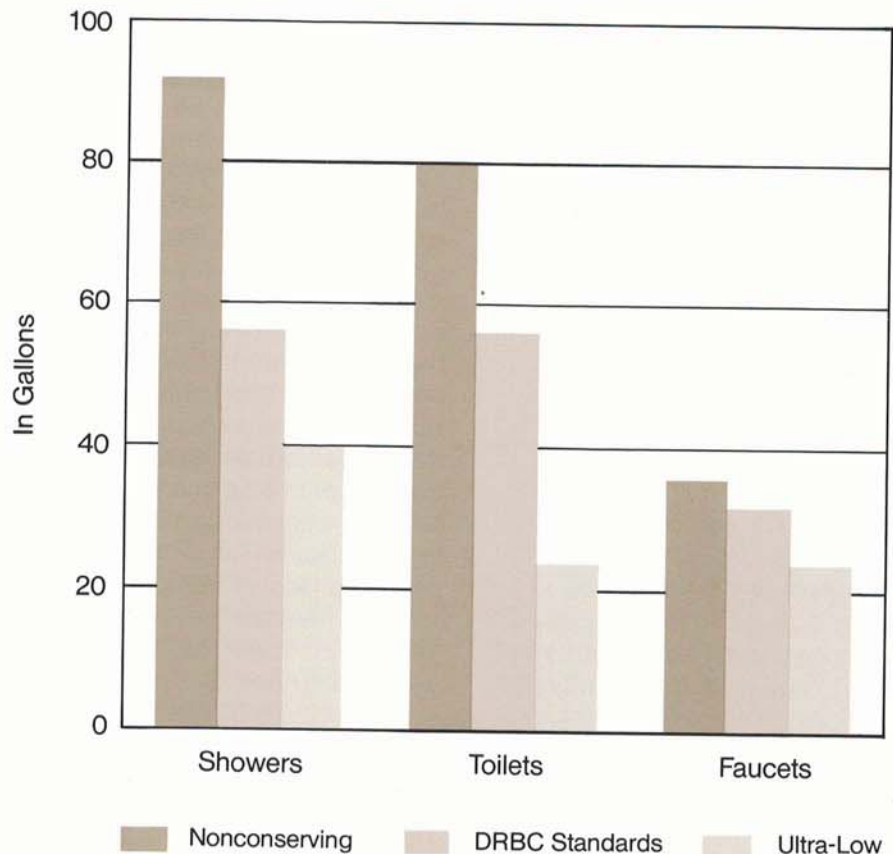
The regulation stipulates that all water conservation performance standards for plumbing fixtures and fittings adopted by any signatory state (Delaware, New York, New Jersey, and Pennsylvania) or political sub-

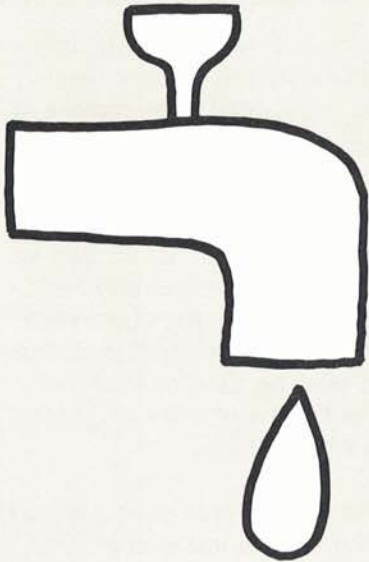
division within the basin shall comply with the following minimum standards:

- Maximum flow for sink and lavatory faucets and shower heads shall not exceed three gallons of water per minute.
- Maximum flow for water closets (toilets) and associated flushing mechanisms shall not exceed an average of three and one-half gallons of water per flush; maximum flow for urinals and associated flushing devices shall not exceed one and one-half gallons of water per flush.

The performance standards apply to plumbing fixtures installed in new

AVERAGE DAILY WATER USE Family of Four/Residential Interior





Water is so beautiful
and life-giving too.
But everyone is wasting it
and that includes you.
We need it to drink,
we need it to clean,
we need it to simply live.
But if everyone keeps wasting it,
there'll be none left to give.

Patrick Farley
5th Grade
Bronx

* * *

The reservoirs are all filled up,
But not if everyone wastes a cup.
So just be careful please you see,
And leave some for my dog and me.

Melanie Hynes
5th Grade
Queens

construction and, where provided in state or local regulations, in existing structures undergoing renovations involving the installation of new plumbing fixtures. Regulations now in effect that contain performance standards that do not comply with the DRBC standards must be revised to meet compliance by Jan. 1, 1990.

Under the DRBC regulation, manufacturers supplying the low-flow plumbing equipment must certify through independent testing that they meet the Commission's standards, which do not apply to such specialized plumbing devices as emergency workplace showers, aspirator faucets or blowout fixtures.

Currently, Delaware and New Jersey have statewide plumbing codes which meet the DRBC standards. New York also has a statewide law that sets water conservation performance standards that are in compliance with the DRBC regulation with one exception — a provision relating to plumbing fixture testing. The New York law was strengthened in 1987 to cover drinking fountains and to require self-closing faucets on lavatories in public places.

Pennsylvania, which makes up one-half of the basin in land area, does not have a statewide plumbing code. However, some municipalities in Pennsylvania have independently adopted plumbing codes. The DRBC regulation encourages Pennsylvania to adopt statewide standards for plumbing fixtures that comply with the Commission regulation by Jan. 1, 1989. In the absence of such a statewide code, Pennsylvania municipalities that lie within the basin are required to meet the Jan. 1, 1990 deadline.

The DRBC regulation will be reviewed

periodically in light of ongoing advances in plumbing technology. An initial review, to be completed within one year, will consider revising the regulation to require that effective Jan. 1, 1990, maximum volume for toilets shall not exceed 1.6 gallons per flushing cycle.

The Delaware River Basin has experienced two droughts in the past seven years — one in 1980-81 and another in 1985. Because of sharply rising water development costs, the Commission and other water regulatory agencies have recognized the increased need to implement water conservation programs to help harness water demands.

Such conservation not only saves water, it saves consumers money on both water and energy bills. And it can reduce the amount of sewage produced with the potential to extend the capacity of treatment plants and in some cases eliminate the need to construct new ones.

For instance, just 15 years ago a conventional toilet averaged 5-6 gallons per flush. In the 1970's, "water saver" toilets, using about 3.5 gallons per cycle, were introduced. Today, "ultra-low" flush toilets, some using as little as one gallon per flush, are on the market.

Per capita water use in older homes (ones with conventional toilets and other non-conserving plumbing fixtures) is estimated to be 84 gallons daily.

Per capita use in homes with water conserving plumbing fixtures meeting the new DRBC performance standards is estimated to be 66 gallons daily.

Use of the "ultra-low" plumbing fixtures, along with other water-conserving appliances such as

clothes and dishwashers, can cut estimated per capita use to 47 gallons a day.

The three regulations adopted by the Commission were drafted by the DRBC's Water Conservation Advisory Committee, created in 1984. Committee members represent the four basin states, the federal government, the cities of New York and Philadelphia, as well as industry, water purveyors, electric utilities, agriculture and environmental and civic groups. Bruce Stewart, executive director of the Water Resources Association of the Delaware River Basin, serves as committee chairman. Joseph Miri of New Jersey's Department of Environmental Protection serves as vice-chairman.

In 1988, the committee will be looking into two other areas to encourage water conservation — technology transfer sessions and public information and education.

To encourage water conservation in the industrial sector, the committee has recommended that the Commission sponsor technology transfer sessions with major industrial groups. Such a session was scheduled for early 1988 with representatives of the pulp and paper industry to provide information on savings that can be achieved by that industry through water conservation. Additional sessions were planned with representatives of other industries.

The committee also will be looking into ways of promoting water conservation through public information and education. Improving public awareness of the unique management challenges of the Delaware River Basin and the need to conserve water will be a major goal of the program.

Rain fills our streams, our rivers
and our lakes,

But sometimes water is wasted
by silly stupid mistakes.

So every day if we all help out,
and turn the handle on that
drippy spout.

If we do our best, then without
a doubt,

I know that we can prevent
a drought!

Erin Ford
6th Grade
Staten Island

* * *

Did you ever stop and think
How precious our water is to drink
Close those drips, don't spoil
our streams
So on the lakes our children
can dream.

Tricia Bonamo
6th Grade
Staten Island

The above poems are among winners of a contest held to encourage permanent water conservation education programs in New York City schools. These and other winning poems are contained in a "Water Watcher Calendar" produced by the New York City Department of Environmental Protection.

Good Faith

Basin Gets Additional Storage

Federal and state officials toured the Merrill Creek facility on Sept. 21, 1987. Left to right: Charles Sapp of the U.S. Environmental Protection Agency; Gerard Esposito, DRBC alternate commissioner from Delaware; John McSparran, recently named DRBC alternate commissioner from Pennsylvania; R. Wayne Ashbee, DRBC's Delaware commissioner; Dirk Hofman, New Jersey's alternate commissioner; and Harold Budka of New York State's Department of Environmental Conservation.



Major construction work at Merrill Creek Reservoir was completed in late December of 1987 with filling of the 650-acre, man-made lake expected to begin in February.

When filled, a process which will take months, the dam and three smaller dikes will impound 15 billion gallons of water.

The reservoir is located on Merrill Creek approximately five miles northeast of Phillipsburg, N.J., and about three miles from the Delaware River.

Water will be released into the Delaware during low flow periods to compensate for depletive water use at electric generating plants owned by seven utilities: Atlantic City Electric Co., Delmarva Power & Light Co., Jersey Central Power & Light Co., Metropolitan Edison Co., Pennsylvania Power & Light Co., Philadelphia Electric Co., and Public Service Electric & Gas Co. The seven utilities shared in the project's costs.

It was in 1976 that the Delaware River Basin Commission first directed the utilities to provide supplemental water supply storage. The Merrill Creek project was among the 14 recommen-

dations contained in the 1982 "Good Faith" agreement, signed by the governors of the four basin states and the mayor of New York City.

The "Good Faith" pact provided a plan for future water supply management, taking into account not only recent droughts but decisions to put Tocks Island Dam on hold and the scrubbing of several other reservoir projects.

While major construction of the Merrill Creek reservoir and dam is complete, there is still work to be done on developing environmental and recreational uses at the site.

Planned are a visitors center and an environmental preserve expected to attract and sustain such endangered species as bald eagles, osprey, great blue herons and bog turtles. Both the center and preserve are expected to be open for public use in 1989. Nature trails, a boat launching site, shoreline fishing areas, and controlled-access hunting and fishing areas are being designed.

In addition, the Warren County Vocational-Technical School has applied to the New Jersey Department of Education for a \$22,500 grant for a teaching facility for students of agricultural science from five area high schools. In response, the Merrill Creek Owners Group, consisting of the seven utilities, has approved a plan to make land available to the school for a pilot program.



The 165-foot high inlet/outlet tower controls Delaware River flows into and out of the reservoir. During high flow periods, water will be pumped from the river to augment storage. During low flows, it will be released to replace water used by the power plants. Ports spaced along the tower's 13 stories are designed to match the temperature of the released water with the temperature of the river water to prevent stress on aquatic life.

F. E. Walter

An independent consultant and a DRBC advisory committee released final reports during 1987, completing important steps in establishing a water charging program to finance another "Good Faith" project, modification of the F. E. Walter Reservoir in Pennsylvania's Pocono Mountains.

Under the 1982 agreement, the single purpose, flood control reservoir is to be enlarged to create additional water storage in the basin and pro-



A heated dome was erected at the Merrill Creek construction site on Jan. 9, 1987 to enable work to continue on the \$217 million project over the winter. The flexible, plastic-like structure covered about 53,000 square feet of the valley floor.

vide added salinity control in the Delaware River estuary.

By year's end, the governors of the three down basin states (Delaware, Pennsylvania and New Jersey) had written letters to the U.S. Army Corps of Engineers supporting the project. In addition, a request had been sent to Congress to re-introduce legislation to amend a section of the Delaware River Basin Compact that prohibits charging pre-Compact (1961) users for water withdrawals or out-of-basin diversions. Similar legislation had been introduced in the 99th Congress but was not voted on.

In its final report released Oct. 5, 1987, the Water Project Financing and Water Charges Advisory Committee stated that additional water storage is needed in the basin, adding that certain policies should govern methods of funding.

Among its recommendations:

- States should fund "public good" benefits such as enhanced recreation and improvements in water quality and fisheries.
- User charges should be based on a "benefit analysis" rather than a uniform rate for all users.



Air inside the dome was heated to 45 degrees making it possible to work with concrete and complete other tasks held up by inclement weather the previous year. The dome, which cost about \$600,000 to erect, was removed in March of 1987.

- Credits should be given to users who have their own water supplies and who make releases during low-flow periods as directed by an appropriate regulatory agency.

Attached to the report was a letter from a Bethlehem Steel Corp. official, a committee member, stating that he had serious objections to some of the report's contents, including the implication "that there was total agreement on the committee relative to the amendment of (the Delaware River Basin Compact)."

The advisory committee, created by the DRBC, met ten times from May of 1986 through July of 1987. Its members were drawn from throughout the basin and represented a balance of water users — local government agencies, water purveyors, electric utilities, industrial and commercial users, public interest groups, farmers and conservationists.

The consultant, Black & Veatch, released its final report in the spring of 1987, summarizing benefits that would be derived from enlargement of a reservoir like F. E. Walter. The advisory committee worked with the Black & Veatch staff in formulating its policies.

It is anticipated that the final financing package for the Walter expansion will consist of some up-front money from the three down-basin states, with the rest being generated by user fees. Details were being worked on at year's end.

The Walter impoundment was completed in 1961. The dam is located on the Lehigh River near Lock Haven, Pa., some 77 miles above the Lehigh's confluence with the Delaware River.

The dam controls 288 square miles of drainage area.

The proposed modification calls for the spillway to be raised 31 feet. The reservoir would have a maximum depth of 185 feet and extend about seven miles up the Lehigh and about four miles up Bear Creek. Flood reduction benefits would not be affected by the modification.

Camden Metro Study

A study of alternative methods of providing water to the Camden metropolitan area to satisfy future demands and solve current water supply problems was completed during the year.

The "Good Faith" agreement called for New Jersey to examine potential solutions to water shortages in the Camden area, focusing on the over-pumping of the Potomac-Raritan-Magothy (PRM) aquifer.

The engineering firm of Camp Dresser & McKee, Inc. conducted the study for the state, issuing its Final Report in September of 1987.

Water supply alternatives evaluated during the study included:

- Piping water across the Delaware River from Philadelphia.
- Constructing a surface water intake on the New Jersey side of the river.
- Developing the PRM aquifer in the outcrop area in Burlington County.
- Developing the Cohansey Sand and Mount Laurel-Wenonah aquifers in the southern and eastern portions of the study area to satisfy a portion of the study area's needs.

The Final Report noted that the two surface water alternatives (piping water from Philadelphia/constructing a New Jersey intake) offered greater reliability in terms of decreased susceptibility to long term organic contamination, as well as environmental advantages and greater opportunities for future expansion.

It also noted that the treatment systems of the surface water alternatives could better cope with contamination incidents should they occur. However, the report states that the surface water options are subject to "contamination" problems of longer duration should brackish water in the Delaware migrate upstream during droughts.

David C. Noonan, the study's project manager, stated that the release of the Final Report was "but the first step in the process to develop a regional water source in the area."

He noted that other issues still had to be addressed, including the cost of purchasing water from Philadelphia and changes in federal and state water quality standards.

The PRM aquifer not only is experiencing severe water level declines due to overpumping, but water quality degradation caused by such factors as salt-water intrusion and the introduction of hazardous wastes from surface sources. Over the years, pumping of the aquifer has lowered water levels in wells as much as 100 feet.

Cannonsville Reservoir

New York State officials concluded during 1987 that enlargement of the

Cannonsville Reservoir was not economically feasible after reviewing environmental studies and cost/benefit ratios worked up by an engineering consultant.

However, the state does plan to pursue the modification of outflow valves at a cost of \$546,000 to improve the reservoir's release capabilities and thus benefit downstream fisheries.

On March 23, 1987, New York Gov. Mario M. Cuomo, in a letter to Delaware Gov. Michael N. Castle, stated that staff review of both feasibility and environmental studies and comments received from involved parties had led him to conclude "that the Cannonsville enlargement project is not practicably feasible from New York State's perspective and will not be pursued." Gov. Castle was DRBC Chairman at the time.

The other basin states were reviewing the feasibility study at year's end.

Estimated cost of the enlargement was \$17 million.

The proposed Cannonsville modification was among the recommendations contained in the "Good Faith" agreement. Recommendation No. 6 stated that the enlargement should be completed "if determined to be practicable by feasibility and environmental studies."

Cannonsville Reservoir, part of New York City's water supply system, is located on the West Branch of the Delaware River about four miles upstream from the village of Deposit. It was financed and constructed by New York City and placed in operation in 1967.

Hydrologic Report — 1987

Reservoirs Play Vital Role

Special reservoir release programs were utilized during the year to enhance water quality in the Schuylkill River and to protect the cold water fishery in the upper basin.

Schuylkill flows dropped below normal during August because of little rain and unseasonable hot weather in much of the Schuylkill watershed. To augment the flows in the river's lower reaches, the Delaware River Basin Commission requested

releases from the U.S. Army Corps of Engineers' Blue Marsh Reservoir. Discharges totalling 1.5 billion gallons of water were made from the federal impoundment between mid-August and the first week in September.

Normally, conservation releases of 26 million gallons a day (mgd) are made from Blue Marsh, located on Tulpehocken Creek just west of Reading, Pa. Another 5.8 mgd are



Blue Marsh Reservoir

released for use by the Western Berks Water Authority for water supply.

It was the third time in three years that the Blue Marsh facility was used for special augmentation flow releases to protect the Schuylkill's water quality.

In September of 1986, the Corps, again at the request of the DRBC, released 904 million gallons into the river. Special releases also were made from Blue Marsh during the 1985 drought. And in September of 1980, a year in which a drought warning had been declared, 130 million gallons a day of water were released from the reservoir to help repel the salt front, which had crept 93 miles up the Delaware estuary to the Schuylkill's mouth.

The Blue Marsh release program was an important function authorized by Congress for this multi-purpose project, which in addition provides recreation and flood control.

The DRBC also increased by almost two billion gallons the amount of water allocated in reservoir storage for special summer releases to protect the upper basin's cold water fishery.

Unusually hot weather had placed high demands on that storage, known as the "Thermal Stress Release Bank." Releases from the bank are used to cool the trout-rich waters of the East and West branches of the Delaware River below Pepacton and Cannonsville Reservoirs, the Neversink River below the Neversink Reservoir, and upper reaches of the Delaware main stem. The three water supply impound-

ments are located in New York State's Catskill Mountains and are owned by New York City.

As of early August, approximately 67 percent of the available water in the bank had been released, raising concerns that continued hot weather during the latter part of the month and into early fall could deplete the remaining supply.

As a result, the DRBC, at an Aug. 5 meeting in Albany, N.Y., adopted a resolution temporarily increasing the thermal bank from the normal 3.9 billion gallons to 5.8 billion gallons until Sept. 30, 1987.

The action received the consent of the five parties to the 1954 U.S. Supreme Court decree apportioning the waters of the Delaware. Those parties are the states of Delaware, New Jersey, New York and Pennsylvania and New York City, which draws about half of its water from the three impoundments.

Under the decree, releases must be made from the reservoirs to maintain a minimum flow at Montague, N.J. Normally, those releases help to maintain a healthy cold water fishery in much of the upper basin. But when the releases are withheld because they are not necessary to augment natural flows, downstream tributaries and upper reaches of the Delaware main stem tend to warm up during hot summer months, placing trout and other cold water species under life-threatening thermal stress.

Consequently, the parties to the decree, along with the DRBC, created the thermal stress bank. Releases are made at the direction

of the New York Department of Environmental Conservation.

* * *

Hydrologically, 1987 had its extremes, prompting two basin state governors to seek federal disaster relief, but for different reasons.

Tropical Storm Cindy brought heavy rains during the second week of September, causing severe flooding in the Lehigh and Schuylkill River basins. A twenty-four-hour rainfall of up to 10 inches was recorded in Berks County. Damage estimates were \$10 million in Lehigh County and \$5 million in Berks County. Pennsylvania Gov. Robert P. Casey declared these counties disaster areas and requested federal disaster assistance.

To the south, the state of Delaware experienced a different problem: heat and a lack of rainfall scorched farmlands. On Aug. 19, Delaware Gov. Michael N. Castle requested that farmers statewide be declared eligible for federal Drought Emergency Assistance because of extensive crop losses. Damage was set at nearly \$30 million, marking the second summer in a row that dry, hot weather had dealt a financial blow to the state's agriculture.

For the second consecutive year, average annual precipitation in the basin above Trenton was above normal, despite below-average rainfall and runoff during the first three months of 1987. By the end of March there was a 3.5 inch precipitation deficit. Thirty days later the

deficit was gone, washed away by April showers totaling 6.2 inches. Average precipitation above Trenton for the year amounted to 45.49 inches, 1.26 inches above the normal annual amount of 44.23 inches.

Average annual flow in the Delaware River at Trenton also was above normal for the second straight year, measuring 11,600 cubic feet per second (cfs) or 111 percent of the normal mean flow of 10,490 cfs. The flow at Montague, N.J. averaged 5,220 cfs or 99 percent of normal (5,290 cfs). Peak flow at Trenton was on April 6 with a stage of 17.43 feet or 90,700 cfs, about 2.6 feet below flood stage.

Storage in the major upstream water supply reservoirs remained well above the drought warning zone for the entire year and above normal the last four months. Storage at the end of November of 230 billion gallons was the highest November storage since 1979.

Ground water levels in reported observation wells in the basin fluctuated seasonally during 1987 and generally remained near or above normal and higher than levels of the preceding year.

Salt water intrusion in the estuary was normal to below normal the entire year. Maximum intrusion of the salt front (7-day average 250 ppm isochlor) occurred early in September when it reached River Mile 83. This is about 10 miles below the mouth of the Schuylkill River. Normal salt water intrusion at this time of year extends to River Mile 89, adjacent to Philadelphia International Airport.

Delaware Shad:

A \$1.6 Million Catch

A recent study shows that since the late 1970s the recreational shad fishery in the Delaware has increased dramatically with the gradual recovery of annual spawning runs, generating a substantial economic investment in the basin.

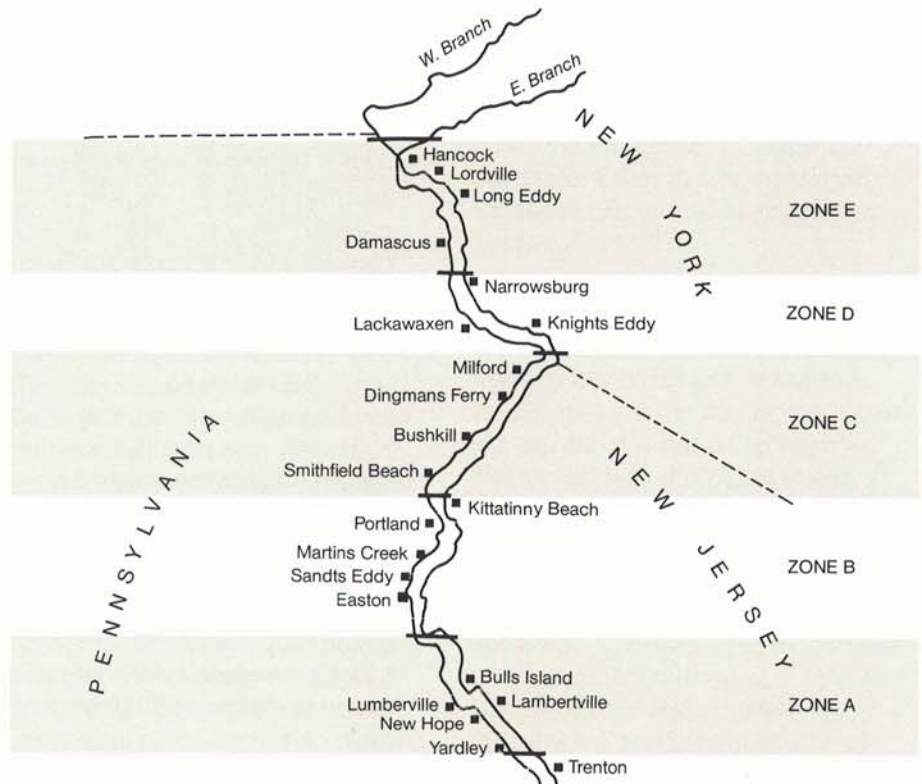
The survey, funded by the Delaware River Shad Fishermens Association, was released in May of 1987. The survey area on the Delaware main stem covered 192 miles from Yardley, Pa., to Hancock, N.Y. It was conducted during the nine-week period from April 5 to June 2, 1986.

Creel survey agents interviewed shad anglers at randomly selected access points within the study area and also distributed questionnaires. In addition, aircraft overflights were carried out in conjunction with the ground surveys in an effort to determine the total number of shad anglers.

Tagged shad also were counted to aid a fish population study being conducted by the New Jersey Division of Fish, Game and Wildlife and to assist in migration studies by the Canadian Department of Fisheries and Oceans.

Among the findings of the Delaware River study:

- During the nine-week period, 65,690 anglers spent 299,597 hours fishing for shad in the survey area. Of these, 21,118 fished from shore, 44,502 from boats.
- The anglers caught 56,320 shad during the nine-week period at a rate of .19 shad per hour. (A 1965 Delaware River shad creel census



Designated Zones and Survey Interview Sites for the Delaware River American Shad Angler Survey

	Number of Anglers	Number of Fish Caught	Number of Fish Harvested	Harvest Rate (% of Catch)
Zone A				
Shore	2,156	329	0	0
Boat	7,124	5,095	2,955	0.58
Zone B				
Shore	8,480	11,703	4,681	0.40
Boat	16,357	14,682	8,516	0.58
Zone C				
Shore	7,994	5,422	2,711	0.50
Boat	18,089	16,821	7,233	0.43
Zone D				
Shore	2,224	629	472	0.75
Boat	2,391	432	285	0.66
Zone E				
Shore	334	435	139	0.32
Boat	541	772	479	0.62
Shore	21,188	18,518	8,003	0.43
Boat	44,502	37,802	19,468	0.52
TOTALS	65,690	56,320	27,471	0.49

put the total catch at 5,318; a 1971 census at 25,000.) The number of fish harvested (kept by the anglers) in 1986 was 27,471, or 49 percent of the total catch. This means that for approximately every two shad caught, one was returned to the river.

- Slightly more than one-third of 1,481 anglers interviewed caught shad; nearly 20 percent caught two or more shad; 3.7 percent caught six or more shad.
- Based on 516 questionnaires that were returned, 63 anglers (12.2 percent) reported they had purchased a fishing license only to fish for shad.
- The average distance traveled by Delaware River shad anglers was 69 miles, ranging from one mile to 700 miles. The number of days reported fishing for shad ranged from one to 80 with a seasonal average of 11.8 days.
- Shad anglers in the study area stated they spent an average of \$25.40 per trip on such items as gasoline, food, lodging, and fishing tackle. Expanding this average trip expenditure by the number of angler trips indicates that Delaware shad anglers spent \$1.6 million during the nine-week period.

Anglers also were asked to place a monetary value on a day of shad fishing on the Delaware. Fifteen fishermen said a million bucks, with the most frequent response 50 dollars-a-day.

Agencies participating with the Delaware River Shad Fishermens Association in the survey included the U.S. Fish and Wildlife Service, the New Jersey Division of Fish, Game and Wildlife, and the Delaware River Basin Commission.

The survey report, entitled "Angler Utilization and Economic Survey of the American Shad Fishery in the Delaware River," was authored by Joseph P. Miller of the U.S. Fish and Wildlife Service and Arthur J. Lupine

of New Jersey's Division of Fish, Game and Wildlife.

Information gathered during the survey is being used to assist the Delaware Basin Fish and Wildlife Management Cooperative in managing the shad fishery. In addition, data gathered on shad spawning runs serve as excellent indicators of changing environmental conditions in the Delaware River Basin.

Shellfish Increasing in Estuary

Crabs and clams have been appearing in such large numbers in the Delaware estuary over the past year that the Pennsylvania Fish Commission has imposed regulations on the number and size harvested in an effort to protect the resource.

O. Lee Tilton, a Waterways Conservation Officer with the Fish Commission, reported in the February 1987 edition of the Pennsylvania Coastal Zone Management Newsletter that although crabs and clams have always been present in the river's tidal portion, they have not appeared in such large numbers since around the turn of the century. He attributed the increase mainly to improved water quality.

Tilton said the shellfish are concentrated along Philadelphia's waterfront and off Delaware County, although some have been caught as far upriver as Bristol Borough in Bucks County.

The Fish Commission regulations limit the number of crabs caught to one bushel per day. Hard shell crabs must measure at least four inches from point to point, soft shell crabs at least 3½ inches. Clams must be at least one inch thick. The clam regulations took effect Jan. 1, 1987, the regulations for crabs Jan. 1, 1988.

(It should be noted that while the number of crabs and clams is increasing in the estuary, oysters in the Delaware Bay have declined in number over the past 30 years due to a parasitic disease known as MSX.)

Other Basin Highlights

Well Registrations Rise

With DRBC well registration and source metering regulations in place, the basin states were busy during 1987 collecting and storing ground water and water-use data in computer banks with the goal of creating a regional, uniform pool of information on this important resource.

By the end of the year, approximately 8,500 wells withdrawing 10,000 gallons per day (gpd) or more had been registered in the basin under programs administered by the Delaware Department of Natural Resources and Environmental Control, the New Jersey Department of Environmental Protection, the Pennsylvania Department of Environmental Resources, and the New York Department of Environmental Conservation.

Data from the source metering regulation were less well developed at year's end because the regulation did not take effect until Jan. 1, 1987. The well registration regulation was adopted May 29, 1985. Both regulations were drafted by the Commission's Ground Water Advisory Committee.

Data on the number and location of wells operating in the basin are being stored in state databases and in the Ground Water Site Inventory or GWSI Database operated by the U.S. Geological Survey (USGS). This effort is being assisted through funding from the U.S. Environmental Protection Agency (EPA).

The metering data will be stored in the USGS's State Water Use Data System or SWUDS Database as well as in state databases.

It is the Commission's intent to even-

tually transfer selected data on water use and well operations from the GWSI, SWUDS, and state databases to a DRBC computer. To house the data, the Commission plans to purchase a new minicomputer and Relational Database Management System (RDMS).

The well registration regulation requires owners of new and existing wells in the basin that withdraw 10,000 gallons per day or more during any 30-day period to register their wells with the basin states in which they operate.

Tracking well operations is important because the over-pumping of ground water can accelerate the movement of contaminants, draw poor quality surface water into aquifers used for drinking supplies, and dry up perennial streams.

The source metering regulation requires the metering of all surface and ground water withdrawals in the basin exceeding 100,000 gpd during any 30-day period. In the heavily-stressed Ground Water Protected Area of Southeastern Pennsylvania, the metering trigger for ground water is 10,000 gpd. A few water uses, which are mostly seasonal like agricultural irrigation, are exempt from metering, but subject to other recording and reporting requirements based on such conditions as pumping rates and elapsed hours of operation.

The information obtained through source metering will enable the DRBC to maintain a permanent and accurate running measurement of the volume of water being withdrawn in the basin — a necessary tool in managing the resource.

DRBC Accepts Park Plan

The DRBC on Oct. 28, 1987 voted to add to its Comprehensive Plan the General Management Plan for the Delaware Water Gap National Recreation Area (DWGNRA).

The plan was developed and approved by the National Park Service (NPS) under a 1965 legislative mandate which transferred all reservoir lands, as well as land acquisition authority within the DWGNRA, from the U.S. Army Corps of Engineers to the NPS.

The intent of the plan is to guide the overall management and use of the area's resources over a ten-year period, which commenced May 8, 1987.

The plan addresses such subjects as outdoor recreation and the preservation of scenic, scientific and historic features. It also takes into consideration the fact that Tocks Island Reservoir, once planned for the area, has been placed in reserve for development only if needed for water supply after the year 2000. (The Tocks project actually could be deauthorized within two years under provisions of the Water Resources Development Act of 1986 because of a lack of federal funding activity.)

The Delaware Water Gap National Recreation Area is located in New Jersey and Pennsylvania along the Delaware River and covers some 69,629 acres. The northern, or upstream park boundary, is located just south of Port Jervis, N.Y. The downstream boundary is located just south of the Gap, near Stroudsburg, Pa. The project area includes portions of Pike and Monroe Counties in Pennsylvania and Sussex and Warren Counties in New Jersey.

The main stem Delaware River, from shore to shore within the DWGNRA, has been designated a Scenic and Recreational River under the National Wild and Scenic Rivers Act.

Island Study

A team of planners, organized by the National Park Service (NPS), conducted a survey of more than 52 Delaware River islands during 1987 to identify opportunities to maximize their varied resources.

The islands or island groups are located between Easton, Pa. and the river's mouth. They comprise a total of over 5,000 acres. Many support rare or endangered fish, wildlife and plants.

The study was requested by U.S. Rep. Peter J. Kostmayer of Bucks County, Pennsylvania. It is being conducted by the Park Service under the National Wild and Scenic Rivers Act, which authorizes the NPS to assist various interest groups in developing river conservation plans.

The planning team includes representatives from both the private and public sectors, including the Delaware River Basin Commission, the Delaware River Port Authority, the Philadelphia Port Corporation, the Philadelphia Maritime Exchange, the Delaware Valley Regional Planning Commission, the Nature Conservancy, the Delaware Department of Natural Resources and Environmental Control, the New Jersey Department of Environmental Protection, the Pennsylvania Department of Environmental Resources and the Division of Park and Resource Planning of the NPS's Mid-Atlantic Regional Office.

The team, in conducting the survey, gathered information on current land use and ownership, development status, zoning, geologic and archeological significance, recreational potential, fisheries and wildlife habitat and other related matters.

A draft report of the findings was scheduled for release in the spring of 1988 with final recommendations expected later in the year.

Scenic River Plan Approved

The Management Plan for the Upper Delaware Scenic and Recreational River was approved by Secretary of Interior Donald P. Hodel on Sept. 29, 1987, then submitted to Congress for review.

At year's end, five of the 15 towns and townships along the Delaware River between Hancock, N.Y. and Matamoras, Pa. had indicated their intent to participate as members of the Upper Delaware Council, which will help oversee the plan's implementation. Other voting members include the states of New York and Pennsylvania. The Delaware River Basin Commission will be represented on the council as a non-voting advisory member and the National Park Service (NPS) will participate as a working partner, also without a vote.

The 15 towns and townships which flank the scenic river corridor were members of the Conference of Upper Delaware Towns and Townships (COUP), formed in 1981 in response to local concerns over the impact the scenic river designation would have on river bank communities. COUP offered to develop a revised

management plan after plans drawn up by the NPS and the states met strong opposition from local interests.

The river corridor boundary in the final plan, which was submitted to the DRBC in November of 1987 for review, comprises some 55,000 acres. Within that area, the plan calls for NPS purchase of no more than 124 acres from willing sellers, primarily for river access and visitor facilities.

The National Wild and Scenic Rivers System legislation states that the designated stretch of the river must be protected in its free-flowing state and must be managed for the benefit and enjoyment of present and future generations.

Flood Insurance Studies

During 1987, the Philadelphia District of the U.S. Army Corps of Engineers contracted with the DRBC to perform computer modeling for an eight-part Limited Detail Flood Insurance Study in Schuylkill and Carbon Counties, Pennsylvania. The study is under the direction of the Federal Emergency Management Agency (FEMA) and is part of the National Flood Insurance Program.

The work includes computation of the 100-year water surface profile for approximately 72 miles of stream in 16 communities in the two counties. The profiles will provide the basis for developing 100-year flood boundary maps for the communities. Completion of the stream computer modeling by the DRBC was scheduled for early 1988.

Also during 1987, results of previ-

ously completed flood insurance studies for four communities in Pennsylvania were presented to community officials. The studies were for Hatfield Township in Montgomery County, Chalfont Borough and New Britain Township in Bucks County, and Smithfield Township in Monroe County.

They have been reviewed by FEMA and will be used as the basis to qualify properties within the communities for maximum coverage under the National Flood Insurance Program.

The DRBC will continue to assist when requested in the preparation of technical evaluations used for flood insurance studies. In the future, the DRBC's flood loss reduction program will include evaluation and possible implementation of a basin-wide flood loss reduction program as well as assisting communities with improving their early flood warning capabilities.

Ice Jam Project

Project design, plans and specifications for construction of a proposed channel clearing to reduce ice jam flooding in the Port Jervis, N.Y. area of the Delaware River have been completed by the U.S. Army Corps of Engineers, Philadelphia District. The local cooperation agreement between the Corps and DRBC was under review at year's end due to a request by DRBC to have the Corps finance for up to one year any cost overruns once construction begins.

Draft agreements between the DRBC and the states of New York and

Pennsylvania and the municipalities in Pennsylvania were close to being signed.

The project, which is estimated to cost \$999,000, will be paid for on a cost-sharing basis: 25 percent by the states and municipalities and up to 75 percent by the Corps.

Acquisition of required easements for the project by the New Jersey Department of Environmental Protection's Green Acres Program was scheduled to begin once all agreements are in place. It is expected that acquisition of the easements, which are located in New Jersey, and project construction will take approximately one year from the date of contract signing.

In 1982, the DRBC, through Congress, requested that the Corps conduct a study of the ice jam flooding problem which a year earlier had caused an estimated \$14 million in property damage in the Port Jervis, N.Y., Matamoras, Pa., and Westfall Township, Pa., area.

The Corps issued a Final Detailed Project Study Report in April 1986 that indicated it would be economically feasible to construct a diversion channel, 200 feet wide and 13,000 feet long, along nearby Mashipacong Island. The channel would provide a passageway for ice-clogged river water.

On April 29, 1986, the DRBC adopted Resolution No. 86-7, agreeing to act as the project's local non-federal sponsor. By the following October, the Corps had received authorization from Congress to prepare project plans and specifications.

Project Review

In fiscal year 1987, the DRBC processed 114 applications under its Project Review branch, nine more than the previous year.

There were 94 projects approved under Section 3.8 of the Delaware River Basin Compact. Of those, 61 were concurrently added to the DRBC's Comprehensive Plan (CP) and 16 were ground water renewal projects.

A breakdown of the remaining applications:

— Projects Exempt	17
— Projects Approved for revision of the CP only	2
— Applications withdrawn	1
— Applications denied	0

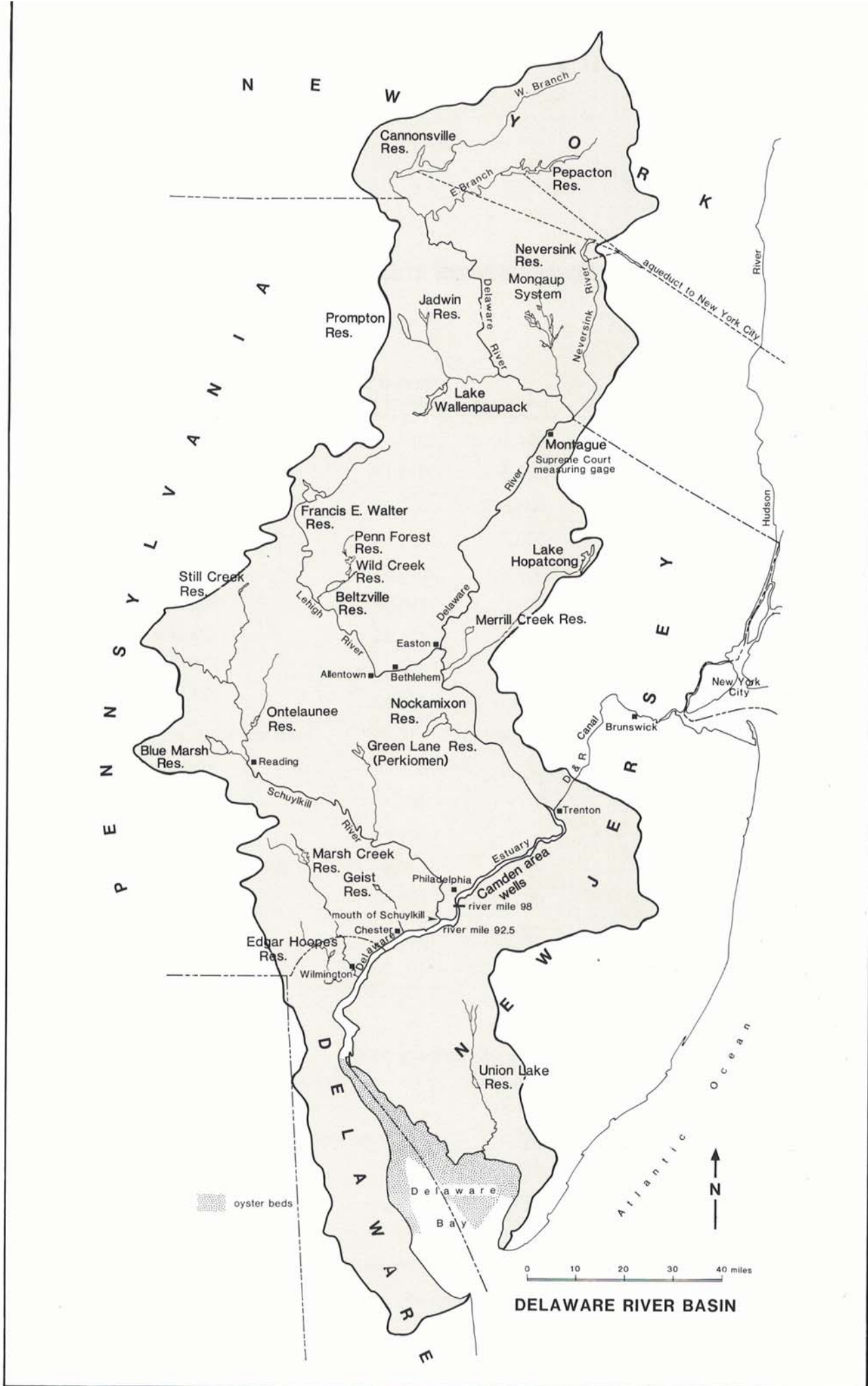
During 1988, 17 ground water withdrawal permits will expire and must be reviewed by the Commission.

Hydroelectric Power

A decision whether to proceed with financing and construction of a hydroelectric power project at Blue Marsh Reservoir on Tulpehocken Creek in Berks County, Pennsylvania, was put on hold because of cost factors.

At year's end, both power and financing rates raised doubts as to the economic soundness of the project, which was envisioned at a time when high oil prices made hydro power an attractive alternative.

The Federal Energy Regulation Commission license held by the DRBC was set to expire in April 1988 unless construction was underway by then.



Financial Summary

Statement of Revenues and Expenditures — General Fund

Year Ended June 30, 1987

REVENUES	<u>Budget</u>	<u>Actual</u>
Signatory parties:		
Delaware	\$ 184,000	\$ 184,000
New Jersey	497,000	497,000
New York	269,600	269,600
Pennsylvania	571,000	571,000
United States	200,000	215,750
Water Quality Pollution Control Grant	240,000	240,000
Reimbursement of Overhead — Agency Fund	28,000	28,000
Sale of publications and sundry	5,000	3,237
Project review fees and other income	134,000	79,567
Interest income	0	90,845
Fines and assessments	0	48,000
Fund balance	32,400	0
TOTAL REVENUES	<u>\$2,161,000</u>	<u>\$2,226,999</u>
EXPENDITURES		
Personal services	\$1,302,000	\$1,284,766
Special and contractual services	177,000	174,921
Other services	38,600	38,502
Supplies and materials	46,000	45,160
Space (including \$53,425 of principal payments on mortgage note)	186,400	186,353
Communications	53,000	52,987
Travel	27,000	21,668
Maintenance, replacements, and acquisitions	45,000	44,922
Equipment rental	28,000	24,279
Fringe benefits and other	258,000	256,555
TOTAL EXPENDITURES	<u>\$2,161,000</u>	<u>\$2,130,113</u>
EXCESS OF REVENUE OVER EXPENDITURES (BUDGETARY BASIS)	0	96,886
Reconciliation to GAAP basis of reporting — encumbrances	0	14,506
EXCESS OF REVENUES OVER EXPENDITURES	<u>\$ 0</u>	<u>\$ 111,392</u>

Statement of Changes in Special Projects Fund Balances

	Fund Balances July 1, 1986	Revenues	Transfers	Expenditures	Fund Balances June 30, 1987
Well Registration – EPA and PA	(\$ 10)	\$104,194	\$ 0	\$102,125	\$ 2,059
2 D Model	1,610	5,500	0	7,100	10
USGS Monitors	14,285	130,806	75,000	177,306	42,785
Delaware Estuary	0	18,000	0	18,000	0
Blue Marsh – Prompton Dam	(28,000)	0	0	0	(28,000)
Study of Exotic Wastes – Phase II	46,047	0	0	0	46,047
Ground Water	76,441	0	(75,000)	0	1,441
Merrill Creek	12,590	0	0	0	12,590
Blue Marsh	54,230	0	0	54,180	50
Ground Water – Pennsylvania Protected Area	270,317	146,000	0	117,989	298,328
Flood Study – Corps of Engineers	0	3,213	0	3,213	0
Ground Water – Withdrawal Fees	1,135	0	0	0	1,135
Computer	44,563	0	0	0	44,563
Flood Plain Contract – Pennsylvania State	8,043	14,849	0	22,891	1
Disinfection Study	4,850	13,900	0	0	18,750
Delaware Fish Study	0	38,000	0	38,000	0
	<u>\$506,101</u>	<u>\$474,462 (A)</u>	<u>\$ 0</u>	<u>\$540,804</u>	<u>\$439,759</u>

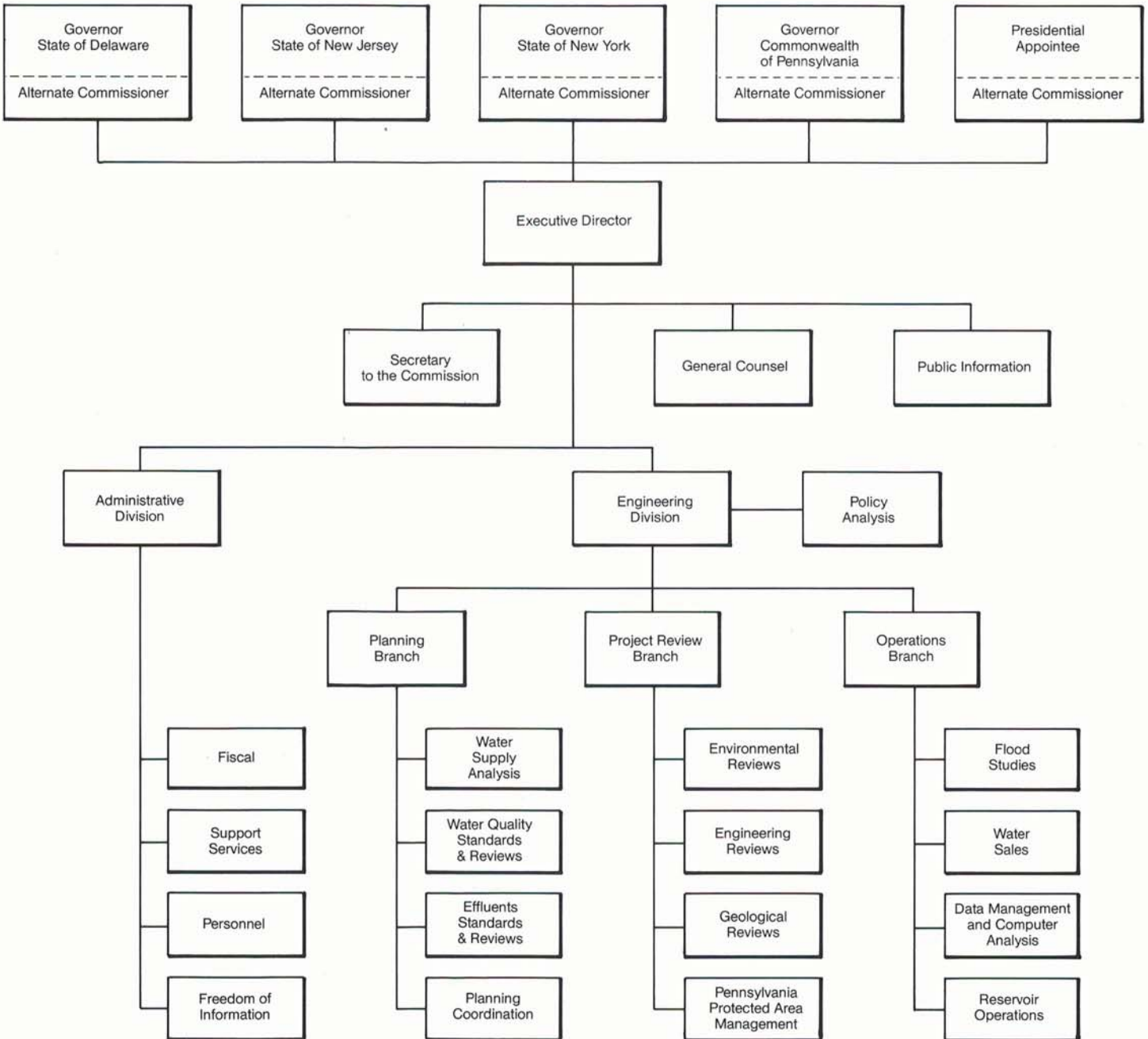
(A) Revenues were derived from:

United States grants:

Federal Emergency Management Agency	\$ 14,849
Environmental Protection Agency	62,434
Pennsylvania Department of Environmental Resources	210,760
Corporate and other grants and fees	186,419
	<u>\$474,462</u>

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

DELAWARE RIVER BASIN COMMISSION





**Delaware River Basin Commission
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