DELAWARE RIVER BASIN COMMISSION

Annual Report • 1985

The painting reproduced on the cover is an oil on canvas of Delaware Water Gap Village by Louis Michel Eilshemius, signed in 1895. The Metropolitan Museum of Art, Arthur Hoppock Hearn Fund, 1950. (50.125)

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Introduction

To Whom Does the River Belong...?

Turn of the century ice-cutters at work on the Big Eddy at Narrowsburg, N.Y.
(Photo courtesy of The River Reporter*)*

This report, respectfully submitted to the seven million residents of the Delaware River Basin and to their elected state and federal representatives, is being published on the eve of the DRBC's 25th birthday.

It is thus appropriate to look back and reflect, but also important to look ahead to new challenges.

The DRBC, with a life span of 100 years, was formed by compact on October 27, 1961, marking the first time in the nation's history that the federal government and a group of states (Delaware, New Jersey, New York and Pennsylvania) had joined together as equal operating partners in a river basin planning, development and regulatory agency.

The Commission is responsible for water resources management of the 13,000-square-mile river basin, stretching from the mouth of the Delaware Bay 330 miles north to above Hancock, N.Y. Its members are the governors of the four basin states and a federal representative, traditionally the Secretary of the Interior.

This report covers calendar year 1985.

The Commission concluded its first quarter century of work on the heels of a drought emergency, its third in 20 years and the first since the basin state governors and the mayor of New York City hammered out the 1983 "Good Faith" agreement, a blueprint for future water supply management in the basin.

The 1985 drought gave the Commission its first chance to plug in the "Good Faith" drought emergency response plan pertaining to out-of-basin diversions, reservoir releases and flow objectives for salinity control. The plan works, but needs some fine-tuning.

"Good Faith" grew in other areas, too, during 1985.

— Construction began on the Merrill Creek Reservoir, one of four water storage projects called for in the pact.

— Federal legislation providing broadened financial support for two other projects (enlargement of the F. E. Walter and Prompton reservoirs) was introduced in Congress.

— A consulting engineering firm concluded that the fourth project (enlargement of the Cannonsville Reservoir) was technically and environmentally feasible.

— A depletive water use budget, an intricate water-allocation equation being honed by computers from a sea of raw data, began to take shape. When completed, this program will become the yardstick with which to budget, or allocate, the basin's water resources, balancing existing, new, or expanded depletive uses with the storage capacity necessary to maintain minimum streamflow objectives.

A basinwide well registration program also was adopted and should generate the hydrogeologic data necessary for adequate ground-water protection programs. Underway at year's end was the development of a basinwide ground-water and water-use computer data bank.

Much has happened in the past 25 years. There have been some setbacks, but there has been a great deal of progress.

The Delaware is a much cleaner river today than it was when the compact was signed. The DRBC, through the adoption of innovative management techniques, has a much better handle on the resource it is mandated to manage. The "Good Faith" agreement documents the spirit of cooperation that, although at times fragile, has existed since the Commission's inception.

In the Commission's 1972 Annual Report, which summarized the DRBC's first decade, the question was asked whether any basin commission could ever really resolve the competition between industry and recreation, reservoirs and free-flowing streams, ground waters and septic tanks, canoes and motorboats.

It concluded that incompatibility of rival water uses and complexity of issues defy the absolute and permanent resolution that is so often demanded of a governmental body like the DRBC. Patient mediation and compromise, the report stated, may be the only prescription for fashioning that elusive narrow line that separates intelligent development from unreasonable exploitation.

Patient mediation and compromise. It can be tedious. But it also can be a remarkable remedy for some very vexing problems.

Like the one raised by the late Douglas Malloch in the ballad, "Uncle Sam's River":

The river belongs to the Nation,
The levee, they say, to the State;
The Government runs navigation,
The Commonwealth, though,
pays the freight.
Now, here is the problem,
that's heavy —
Please, which is the right
or the wrong —
When the water runs over the levee,
To whom does the river belong?

Executive Director's Report

The Compact and Section 15.1 To Be or Not To Be

By Gerald M. Hansler

Yes, that is the question. The answer will determine whether or not there will be the timely completion of two critical water supply storage projects in the Delaware River Basin.

The Commission has followed a logical course in arriving at the necessity to increase its water supply

Mr. Hansler

storage capability, taking into account increased depletive water use, a rising sea level, and a constant threat of salinity contamination of the Potomac-Raritan-Magothy Aquifer. Our planning process has led us from the Level B Study project recommendations, to the "Good Faith" agreement among the basin governors and the New York City mayor, to the DRBC Comprehensive Plan amendments which validated our water supply storage needs.

Four reservoir water supply storage projects were to be completed by 1995:

Merrill Creek	Dec. 31, 1986
Francis E. Walter	Dec. 31, 1990
Cannonsville	Dec. 31, 1990
Prompton	Dec. 31, 1995

A consortium of electric utilities is slated to pay for Merrill Creek; New York State is to pay for the Cannonsville project. The DRBC will serve as the non-federal sponsor for the two U.S. Army Corps of Engineers' projects — Francis E. Walter and Prompton.

The problem: How will the DRBC obtain the funds necessary to pay the non-federal share of construction costs for water supply storage in the F. E. Walter and Prompton projects? Historically, Corps of Engineers' projects were financed by the federal government over a fifty-year period at a very low interest rate — three to four percent. But, those days are gone forever because of the massive federal deficit.

The "Good Faith" Agreement called for the three down-basin states of Delaware, New Jersey and Pennsylvania to

> *"...negotiate arrangements to underwrite and finance non-federal cost-sharing obligations necessary to complete this project (F. E. Walter)..." prior to December 31, 1984.*

The three states have concluded that an up-front capital appropriation from each of their legislatures was not practical, and that a DRBC revenue acquisition program would be necessary to repay the project elements of interest and principal on DRBC bonds, operation and maintenance, and associated project costs. However, the estimated $140 million to $150 million price tag to the DRBC for F. E. Walter and Prompton could not practicably be borne by water users who came on line after the Delaware River Basin Compact became law in 1961 and who under the Compact can be charged for water withdrawals. Under the Federal Reservations of the Compact, Section 15.1(b), pre-

Compact water users, who likewise would benefit from the two projects, are exempted from paying:

> *"No provision of Section 3.7 of the Compact shall be deemed to authorize the commission to impose any charge for water withdrawals or diversions from the Basin if such withdrawals or diversions could lawfully have been made without charge on the effective date of the Compact..."*

The three down-basin states and the Commission members in general supported the concept of amending Section 15.1(b) to allow the Commission to charge pre-Compact water users for the costs of post-Compact projects to the extent such charges would be "fair and equitable." In August of 1985, the Commission passed DRBC Resolution No. 85-34 embodying that desire.

U.S. Senator Bill Bradley and U.S. Congressman William Hughes introduced S. 1807 and H.R. 3895 in October and December, 1985, which, if enacted, would amend Section 15.1(b) and allow the Commission to charge pre-Compact water users for benefits received from DRBC-sponsored water supply projects.

The Commission, also in August 1985, resolved to pursue two other tactics which would lead to a fair and equitable charging system, assuming Section 15.1(b) would be amended. First, a committee would be appointed by the Commission chairman to advise the Commission on a "fair and equitable" charging system. It would be composed of members representing a balance of water users in the basin. Second, an independent consultant would be retained to develop a comprehensive analysis of the type and distribution of benefits provided by storage in water projects sponsored by the Commission, and to provide the Commission with alternatives for fair and equitable schedules of water charges to recover the cost of the projects.

The three efforts — amendment of 15.1(b), the advisory committee deliberations, and the consultant's efforts are to proceed on parallel tracks. This was deemed necessary to avoid delays in seeking initial agreement with the Corps of Engineers to proceed with construction of the F. E. Walter project. Without the ability to raise revenues up-front to cover construction costs of the non-federal aspects of the F. E. Walter modification, an agreement with the Corps cannot be finalized.

Based upon recommendations of the advisory committee and the consultant's report, the Commission will *propose* a new fair and equitable charging system to recover project costs. Such a proposal, under the DRBC Rules of Practice and Procedure, must then undergo the public notice/public hearing process before the Commission members finally adopt a new fair and equitable charging system.

However, amendment of Section 15.1(b) is crucial to the promulgation of any such new system. Without such an amendment, the two additional projects of F. E. Walter and Prompton, and the Commission's ability to implement its Comprehensive Plan requirement to provide "... for the immediate and long-range development and uses of the water resources of the basin" will surely be jeopardized.

The Commission • 1985

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Mr. Touhey

Governor Thornburgh

Mr. Weston

Secretary Hodel

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Richard C. Tortoriello
Operations

*Dirk C. Hofman serves as Alternate in Dr. Dewling's absence.

**Irwin H. King serves as Alternate in Mr. Williams' absence.

DRBC Gets New Alternate From Delaware

R. Wayne Ashbee, director of the Division of Water Resources of the Delaware Department of Natural Resources and Environmental Control, was named Delaware's alternate member to the Delaware River Basin Commission in December of 1985. The appointment, by Governor Michael N. Castle, became effective on January 1, 1986. Mr. Ashbee replaces Robert J. Touhey, who recently was named director of the DNREC's Division of Air and Waste Management. Mr. Touhey will serve as Delaware's alternate member in Mr. Ashbee's absence.

Mr. Ashbee worked for the Du Pont Co. for 33 years, retiring on April 30, 1985, as product coordinator in the firm's Chemicals and Pigments Department. In addition to his post

Mr. Ashbee

with the DNREC, Mr. Ashbee serves as director of the Delaware Solid Waste Authority.

Harvey W. Schultz, commissioner of New York City's Department of Environmental Protection, was appointed in January of 1986 by New York City Mayor Edward I. Koch as the city's advisor to the DRBC. He replaces Joseph T. McGough Jr.

Mr. Schultz, as DEP commissioner, has responsibility for management of New York City's water supply and

Mr. Schultz

sewer systems, as well as overseeing such environmental areas as air quality. He directs a staff of some 5,000 employees.

New Jersey Gov. Thomas H. Kean served as chairman of the DRBC during the fiscal year ended June 30, 1986, succeeding Mario M. Cuomo, governor of New York. Under the DRBC's rotating chairmanship policy, Gov. Castle of Delaware is Gov. Kean's successor.

Two veteran DRBC staff members, Dawes Thompson and Cecil H. J. (Jack) Hull, retired in early 1986 after 47 combined years of valued service that spanned three decades.

Dr. Hull joined the staff in 1963 and organized and headed the Planning Branch until 1970 when he was named the DRBC's Staff Engineer. He directed and participated in many of the Commission's comprehensive planning and project review activities and spearheaded significant research into the effects of

sea level rise and flow-regulating reservoirs on salinity in the Delaware estuary.

Dr. Hull

Mr. Thompson joined the DRBC staff in 1962 as the Commission's first Public Information Officer after a distinguished newspaper career; his last post was Statehouse Bureau Chief of the former Newark News. His ability to unravel technical and often complex issues without compromising accuracy proved a valuable asset to the Commission in its

Mr. Thompson

dissemination of information about DRBC activities and the basin in general.

Mr. Thompson is succeeded by Christopher M. Roberts, a former Associated Press correspondent who prior to joining the DRBC served for four years as communications director of the Pennsylvania Crime Commission. Mr. Roberts was employed by AP for 18 years, working in bureaus in New Orleans,

Mr. Roberts

Des Moines, Cleveland and Philadelphia. He is a 1964 graduate of Wake Forest University.

John F. Glowacki, former Comptroller for the Philadelphia Housing Authority, has been named the DRBC's Chief Administrative Officer. He succeeds Raymond J. DiFrancesco, who resigned to become Executive Director of the Ewing-Lawrence Sewerage Authority in Lawrenceville, New Jersey.

Mr. Glowacki, a certified public accountant, served as Comptroller for the Philadelphia Housing Authority from 1969 until early 1986, when he joined the DRBC. Prior to that, he was Assistant Director for Administration with the Atlantic City Housing and Redevelopment Authority. He is a 1963 graduate of Temple University's School of Business.

Mr. Glowacki

David P. Pollison, a member of the DRBC staff for over 20 years, has been named Head of the DRBC's Planning Branch, succeeding Seymour D. (Sy) Selzer who retired early in 1985. Mr. Pollison joined the DRBC in July of 1963 as a member of the Water Quality Branch, later transferring to the Planning Branch. Key assignments have included the management of a DRBC study to develop environmentally acceptable facilities to recycle, treat and dispose of hazardous waste materials throughout the basin.

Mr. Pollison

A Drought Emergency

The Third In Twenty Years

The Delaware River at the height of the 1985 drought. (Bucks County Courier Times)

The Delaware River Basin Comission on May 13, 1985, declared a drought emergency, its third in 20 years, and called on the four basin states to initiate programs to restrict the use of freshwater.

Three days later, New Jersey Gov. Thomas H. Kean ordered restrictions for 122 in-basin communities.

In Pennsylvania, Gov. Dick Thornburgh already had declared an emergency, imposing water-use bans on April 26 in 16 basin counties, including Philadelphia.

Mayor Edward I. Koch called for mandatory cutbacks the same day in New York City, which lies 100 miles outside the basin but is the biggest single user of Delaware River water. New Yorkers had been placed under a drought watch on February 25, their third in six years.

In the state of Delaware, Gov. Michael N. Castle had declared a drought warning on May 9, asking that non-essential uses of water be curbed on a voluntary basis. Delaware officials noted that their state's large ground-water supplies tended to offset the shortages occurring in upstream reservoirs.

In all, nearly three-fourths of the 13,000-square-mile Delaware River Basin, which supports 15 million people, was brought under non-essential water-use restrictions to help ease a worsening water short-

age which stretched back to August of 1984 and which by May, 1985, had notched precipitation deficits of over a foot.

On Jan. 23, 1985, the DRBC, for the fourth time in five years, had declared a drought warning as the water levels in New York City's three upriver Catskill Mountain reservoirs — Pepacton, Cannonsville and Neversink — hovered at about 50 percent of capacity.

This warning triggered the drought emergency response plan formulated in the "Good Faith Agreement on Interstate Water Management" between the states of New Jersey, Delaware and New York, the Commonwealth of Pennsylvania, and New York City, pertaining to out-of-basin diversions, reservoir releases and flow objectives for salinity control.

As a result, the Delaware River water export allowance to New York City was cut by 15 percent, dropping from 800 million gallons a day (mgd) to 680 mgd. The city normally draws about half of its water from the Delaware. (New Jersey's export allowance, normally 100 mgd, likewise was cut, on paper at least, by 15 percent: Maintenance dredging on the Delaware and Raritan Canal prevented the diversion of Delaware River water to New Jersey during 1985.)

Also cut back, under terms of the "Good Faith" agreement, was the Delaware River's minimum flow target at Montague, N.J., being reduced from 1,750 cubic feet per second (cfs) to 1,655 cfs.

The Montague flow is controlled by releases from the three New York City reservoirs. It was established by a 1954 U.S. Supreme Court decree that apportioned the waters of the Delaware in an effort to assure, among other things, adequate streamflows downriver.

The "Good Faith" agreement, finalized in 1983, made mid-course corrections to that decree based on updated water shortage information generated by the basin drought of the mid-1960s, the most severe on record. The previous drought of record had occurred during the 1930s, and was relied on by the Supreme Court in drawing up its 1954 water-sharing formula, one that, as we have seen, nature proved as being far too generous.

When the Jan. 23, 1985, drought warning was imposed, the Delaware's flow at Trenton, N.J., where the tidal river ends, was running about 4,000 cfs, or about 38 percent of normal flow for that time of year. Streamflows in the Delaware's two largest tributaries, the Schuylkill and Lehigh rivers, were running about two-thirds below normal.

On Feb. 8, 1985, the DRBC announced phase two of its drought warning. New York City's export allowance was cut another 15 percent to 560 million gallons a day and a second reduction at Montague dropped the flow target to 1,550 cfs.

Later curtailments, as outlined in the "Good Faith" pact, lowered the figures even further — 540 mgd for the city and 1,500 cfs as the downstream flow minimum. In all, 26 billion gallons of water were saved as a result of the cutbacks that were in effect between Jan. 23, the start of the drought warning, and May 13, when the drought emergency was declared.

By April — the driest one on record in the basin and the eighth consecutive month of below-average precipitation in the basin's upper reaches — combined storage in New York City's three reservoirs, which account for 90 percent of the total surface water storage in the basin, stood at only 158 billion gallons, or 58 percent of their 271 billion gallon capacity. Normally, the three impoundments are more than 90 percent full by this time of year and overflow by June 1.

Another record was set at Trenton, where April flows in the Delaware River were lower than any previous April flows on record.

Ground-water levels also were stressed. Chester County (Pa.) reported that 12 of 14 wells with drought indices were below drought levels by the end of April. Bucks County (Pa.) reported that four of its six monitor wells had set new record lows for the month.

Under the DRBC drought emergency declared May 13, 1985, self-supplied water users (with the exception of those in Cumberland and Cape May counties in New Jersey and those located below the Chesapeake and Delaware Canal in Delaware) that were drawing more than one million gallons per day were directed to submit detailed water-use information and drought contingency plans to their respective states or, in Delaware's case, to the DRBC. The plans would have gone into effect had the states ordered them to cut back on depletive water consumption during the drought.

These self-supplied users, mostly industries not connected to public water systems, were also asked to estimate the financial impact that various levels of ordered cutbacks would have on company operations, including employment.

In order to conserve resources as the traditionally dry summer months approached, the DRBC arranged for water to be stored for standby flow-augmentation in five public and private reservoirs in Pennsylvania (Blue Marsh in Berks County, Nockamixon in Bucks, Beltzville in Carbon, Francis E. Walter in Luzerne and Lake Wallenpaupack in Pike and Wayne) and one reservoir system in New York state — the Mongaup impoundments in Sullivan County.

Releases were later made from Blue Marsh, Walter, Wallenpaupack and the Mongaup system to supplement drawdowns from New York City's three upstream reservoirs in a successful effort to hold back the stubborn salt line, which had crept as far north as River Mile 79, at the Pennsylvania-Delaware state line, about five miles further upstream than in normal years.

Thermal stress releases to protect the cold water fisheries in the upper Delaware and its major tributaries also were made from the New York City reservoirs between July 5 and August 12, when the "thermal emergency bank" was exhausted.

The New York State Department of Environmental Conservation

A Mansfield, N.J. farmer raises a cloud of dust from his dry fields as he plows under the remnants of his 1984 corn crop. The photo was taken in April of 1985. (Ken White/The Express)

requested additional storage in order to continue the releases, a move supported by the DRBC. However, the New York State Disaster Preparedness Commission and New York City opposed the action and on Aug. 15-16 a significant trout fish kill was reported on the Delaware's West Branch below Hale Eddy and on the main stem between Hancock and Lordville.

The repulsion of the salt front (250 milligrams per liter chloride) prevented possible contamination of drinking and industrial water supplies in the Camden-Philadelphia area. Wells supplying Camden and other municipal and industrial users in southern New Jersey, southeastern Pennsylvania and northern Delaware are partially recharged by the Delaware River, and excessive concentration of chloride in the river presents a substantial risk of salt water intrusion of the underground aquifer system.

During the 1984-1985 drought, two DRBC advisory committees continued work on long-term conservation issues involved with water management policies and on operating rules for a lower basin drought.

The DRBC Water Conservation Advisory Committee, established in early 1984, had completed two tasks by year's end — reviews of state drought contingency plans, and of DRBC drought policies and regulations that had been applied in past droughts. The committee continued work on the development of long-range water conservation measures for different water-use categories.

In addition, the committee identified the non-essential water uses to be restricted by the four basin states, and served as a valuable forum for exchanging drought-related information and as a sounding board for new approaches.

The second group, the Flow Management Technical Advisory Committee, worked during 1985 on defining the concept of a lower basin drought and establishing operating rules for the basinwide reservoir system, including New York City's three Catskill impoundments, in the event of such a shortage. Mathematical modeling studies were utilized to assess the impact of reservoir operations and out-of-state water diversions on storage, river flows, and salinity in the Delaware estuary.

The committee compiled a preliminary document during 1985 entitled, "Draft Report on Alternative Lower Basin Drought Warning and Drought Operating Plans." A final report is to follow.

The drought's end did not officially come until Dec. 19, 1985, helped by a September hurricane and a soggy November.

If anything, the 1984-85 drought proved out the hydrological bromide that normal weather is a fictional statistic; that normals are merely averages that encompass all weather extremes.

Consider that the first seven months of 1984 were so wet that there were three flood threats on the Delaware main stem. New York City's three Catskill reservoirs were overflowing in mid-April, weeks ahead of time.

Consider that these seven wet months were followed by seven months so dry that by the following April the Delaware River was flowing at record low levels.

Then Hurricane Gloria spun up the New Jersey and New York coasts on Sept. 27, 1985, dumping up to nine inches of rain and swelling the Delaware from a drought-level 2,820 cfs at Trenton to a peak of 86,700 cfs, or 16.64 feet above the streambed which is less than four feet below flood stage. The storm also pushed the salt line in the Delaware downstream 25 miles from near Philadelphia's Walt Whitman Bridge to Wilmington, Del., 72 miles from the ocean, and increased storage by ten percent in New York's three reservoirs.

The hurricane resulted in mandatory water-use restrictions being lifted in the affected basin states. New York City lifted its mandatory bans on Nov. 27.

Two other drought emergencies have occurred in the basin since the DRBC Compact was signed in 1961. There was, as previously mentioned, the mid-1960s drought of record. The next shortage, sparking a drought warning, developed in 1980, worsening into a DRBC drought emergency early in 1981. Heavy precipitation that February eased the drought conditions, but only marginally. It was not until April 1982 that the emergency was officially terminated.

A partially husked ear of corn lays on the parched field of a farm in Franklin Township, Warren County, N.J. (Ken White/The Express)

Another DRBC drought warning developed in mid-November of 1982, persisting until March 28, 1983. On Nov. 9, 1983, yet another warning was declared, but it lasted only about six weeks, ending Dec. 20, 1983.

Good Faith

A Progress Report

"Good Faith" At-A-Glance

Recommendation 1:

Revise the Delaware River estuary salinity objective. No deadline imposed.

Completed on June 29, 1983, by adoption of Resolution No. 83-11 amending the DRBC Comprehensive Plan and Water Quality Regulations by establishing maximum sodium and chloride concentrations.

Recommendation 2:

The drought of record (1961-1967) should be used as the basis for determining water supply planning. No deadline.

Completed on June 29, 1983, by adoption of Resolution No. 83-12 amending the Comprehensive Plan and Water Code.

Recommendation 3:

Adopt a schedule of phased reductions in diversions, releases, and flow objectives for drought management. No deadline.

Completed on June 29, 1983, by adoption of Resolution No. 83-13 amending the Comprehensive Plan and Water Code.

Recommendation 4:

Develop a lower basin reservoir operating plan criteria for defining lower basin drought conditions. Deadline July 1, 1983.

A lower basin operating plan was developed for basinwide drought conditions and adopted as Resolution No. 84-7 on April 25, 1984. Negotiations underway regarding criteria for defining lower basin drought periods and the extent to

Significant progress was made during 1985 towards achieving goals contained in the 1983 "Good Faith" agreement — the blueprint for future water supply management in the basin.

Construction began on Merrill Creek Reservoir, a water storage project being built in New Jersey by seven utility companies.

Headway also was made on the depletive water use budget. DRBC staff, in cooperation with state regulatory agencies, assembled and analyzed updated information on in-basin consumption, and a series of model simulations were designed showing the relationships between reservoir operations, streamflows, depletive use and estuarine salinity.

Gov. Thomas H. Kean of New Jersey, second from right, heads up the Merrill Creek groundbreaking ceremonies on September 23, 1985. Also digging in are, left to right, Robert J. Touhey, DRBC Commissioner from Delaware; R. Timothy Weston, DRBC Commissioner from Pennsylvania; DRBC Executive Director Gerald M. Hansler; and Dirk C. Hofman, DRBC Commissioner from New Jersey.

Public briefings were held throughout the basin on plans for two additional water storage projects — enlargement of the Francis E. Walter and Prompton reservoirs. And a fourth reservoir enlargement project (Cannonsville) took a step towards completion when a consulting engineering firm concluded in an interim report that the work was both technically and environmentally feasible.

A project team studying ground-water shortages in southern New Jersey identified seven possible solutions to the problem during 1985 and by year's end was concentrating on four alternative ways to supply the region with adequate amounts of water.

The "Good Faith" agreement, formally titled "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," was signed in late 1982 and early 1983 by the governors of Delaware, New Jersey, New York and Pennsylvania, and by the mayor of New York City.

It contains 14 recommendations for upgrading water resources management in the basin, focusing on conservation as it relates to droughts, water storage capacity, and the encroaching salt line.

Eight of the recommendations have been adopted. The following is a "Good Faith" progress report for 1985:

Merrill Creek

Construction of the Merrill Creek Reservoir began on Sept. 23, 1985, with New Jersey Gov. Thomas H. Kean, then the DRBC chairman, heading up the ground-breaking ceremonies.

This pumped-storage, off-river impoundment located in northwestern New Jersey will be used during low flow periods on the Delaware to compensate for depletive water use at the generating plants of seven electric utilities that will share in the project's benefits and costs: 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.

Releases from the impoundment, scheduled for completion in 1988, will enable, without curtailment, the operation of the utilities' electric generating stations during low flow periods.

It was by resolution in 1976 that the Commission originally directed the utilities to provide supplemental water supply storage. The DRBC unanimously approved construction of the $217 million Merrill Creek project on Oct. 24, 1984, and was the principal regulatory agency involved in the technical and environmental reviews. The Merrill Creek Owners Group, consisting of the seven utilities, acquired the necessary local, state and federal permits.

When completed, the reservoir will consist of a 650-acre, man-made lake that will occupy an area of roughly one square mile with an average depth of 65 feet. It will be able to store 15 billion gallons of water, capable of being released into the Delaware at a continuous rate of 162 cubic feet per second (cfs), or more than 105 million gallons per day. Releases will be called for whenever the Delaware River's flow falls below 3,000 cfs at Trenton.

The reservoir will be located on Merrill Creek, a tributary of Pohatcong Creek in Harmony Township, Warren County, approximately five miles northeast of Phillipsburg, N.J.

Because natural runoff from Merrill Creek is inadequate to refill the reservoir (drainage area is only 3.2 square miles), a pumping station on the Delaware will be used to transfer river water to the impoundment when flows are high, generally in late winter and early spring. The river and reservoir, located about three-and-a-half miles apart, will be linked by a 17,000-foot-long underground pipeline.

The earth and rockfill embankment dam will be about 260 feet high and 2,800 feet long. It will impound the water contained in the reservoir with the help of three small "saddle dikes" to seal off low-lying areas on the lake's perimeter. The dam, which will be anchored with concrete grouting to solid bedrock, will have a core of waterproof materials (like clay) surrounded by zones of nearly impervious earth. Outer "shells" of crushed rock (riprap) will provide protection against weathering. A recreation area is planned for the reservoir's northeast flank.

An inlet/outlet tower, approximately 300 feet long, will contain multiple ports at varied water levels so that reservoir releases can be matched up with the temperature and quality of the river water — an important factor in the preservation of aquatic life.

which New York City's three Catskill reservoirs will be used to supplement lower basin reservoir releases during such periods. No final Comprehensive Plan action taken.

Recommendation 5 (a):

Adopt an updated description of the Francis E. Walter Reservoir enlargement project. No deadline.

Completed Nov. 30, 1983, by adoption of Resolution No. 83-24 amending the Comprehensive Plan.

Support completion of Corps of Engineers' design studies and federal appropriation of funds for design and construction. No deadline.

Detailed design studies completed by Corps and $3 million included in FY 1987 federal budget for start-up costs.

Pennsylvania, New Jersey and Delaware negotiate financing of the F. E. Walter enlargement project. Deadline Dec. 31, 1984.

Methods of financing and proportionate share allocations are pending the results of a consultant's study on equitable water user fees as well as the outcome of federal legislation to permit the DRBC to charge pre-Compact users for designated water storage projects, including F. E. Walter.

Pennsylvania, New Jersey and Delaware negotiate and present for Commission approval a plan for utilization of the additional F. E. Walter storage. Deadline Dec. 31, 1984.

Several options considered, but no final plans submitted to the Commission.

Recommendation 5 (b):

Adopt updated description of the Prompton Reservoir enlargement project, incorporating operating policy. No deadline.

Completed on Nov. 30, 1983, by adoption of Resolution No. 83-25 amending the Comprehensive Plan.

Support completion of Corps of Engineers' design studies and federal appropriation of funds for Prompton. No deadline.

Design studies scheduled to begin in FY 1987.

Pennsylvania, New Jersey and Delaware will negotiate financing of Prompton. Deadline Dec. 31, 1986.

Methods of financing pending outcome of consultant's study on water user fees as well as outcome of federal legislation to permit DRBC to charge pre-Compact users for designated water storage projects, including Prompton.

Pennsylvania, New Jersey and Delaware negotiate and present for Commission approval a plan for utilizing the additional Prompton storage. Deadline Dec. 31, 1986.

Plan not submitted.

Recommendation 5 (c):

If found practicable and environmentally sound, add construction of Merrill Creek Reservoir to the Comprehensive Plan for development by the Merrill Creek Owners Group. Target date for completion Dec. 31, 1986.

A public hearing was held on Aug. 23, 1984, and the Commission approved the project and placed it in the Comprehensive Plan on Oct. 24, 1984. Construction began Sept. 23, 1985.

Recommendation 6:

Adopt updated description of the Cannonsville Reservoir enlargement project. No deadline.

Completed on Nov. 30, 1983, by adoption of Resolution No. 83-26 amending the Comprehensive Plan.

If found practicable and environmentally sound, New York is to complete construction by 1990.

New York has awarded a contract to Ebasco Services, Inc. to conduct

Walter/Prompton

Under the "Good Faith" agreement, the DRBC committed itself to early action on two additional water storage projects — enlargement of the Francis E. Walter Reservoir on the Lehigh River near White Haven, Pa., and the Prompton Reservoir in the Lackawaxen River Valley near Honesdale, Pa.

These modification projects would create combined additional storage of 100,400 acre-feet of water for flow augmentation necessary to control salinity intrusion during droughts, protect public water supplies and provide modest additional capacity for future growth in consumptive water use within the basin. Non-federal construction costs for the Walter modification project (slated for completion in 1990) are estimated at $100 million and for Prompton (1995) $40 million.

Under the "Good Faith" pact, Delaware, Pennsylvania and New Jersey agreed to negotiate on the underwriting and financing of the non-federal, cost-sharing obligation necessary to complete the two projects. In the past, the non-federal sponsors of water resources projects could repay the federal government in annual payments over a period of 50 years. Current policy, however, requires payment over the period of actual construction for all project costs associated with water supply development.

The DRBC already is repaying the non- federal cost shares of two other reservoirs, Beltzville and Blue Marsh (which are covered by the 50-year repayment contracts), by charging post-DRBC Compact (1961), in-basin surface water users for both consumptive and non-consumptive water use. Fees total about $800,000 annually — a small fraction of the Walter-Prompton price tag.

In ratifying the DRBC Compact, Congress asserted certain Federal Reservations in Section 15.1(b) which prohibit the Commission from imposing any charges for water withdrawals or diversions from the basin if they lawfully could have been made without charge on the effective date of the compact — Oct. 27, 1961. In other words, the DRBC cannot charge pre-compact water users — who make up the vast majority of water users in the basin — for these critically needed new water storage projects.

Consequently, the Commission is seeking a congressional amendment to 15.1(b) which would expand its revenue-producing authority to pre-compact users. Enabling legislation (H.R.3895 and S.1807) has been introduced in both houses of Congress. The thrust of the legislation is to allow the charging of pre-compact water users to the extent they benefit from post-compact projects.

A "white paper" on the financing of basin water projects, including the potential modification of Section 15.1(b), was distributed to the public by the DRBC in March of 1985 and public briefings were held in each basin state. On Aug. 7, 1985, Gerald M. Hansler, the DRBC's executive director, called for the need to establish a fair and equitable plan for sharing future costs of in-basin water storage projects in testimony before the U.S. Senate Committee on Energy and Natural Resources, Subcommittee on Water and Power.

The Francis E. Walter Reservoir was completed in 1961 as a single purpose flood control project with incidental recreational use. The earth and rock fill dam is located on the Lehigh River 77 miles above its confluence with the Delaware River, controlling 288 square miles of drainage area.

The modified dam will rise about 263 feet above the stream bed and have a length of some 3,500 feet. The spillway will be raised 31 feet. The reservoir will have a maximum depth of 185 feet and will extend about seven miles up the Lehigh River and about four miles up Bear Creek.

The modified project will augment the flow of the Delaware River at

Trenton by 290 cfs on the basis of complete and uniform drawdown of total augmentation storage (69,500 acre feet) over a 120-day period. The flood control storage (108,000 acre feet) will be preserved and flood reduction benefits will be unaffected by the modifications.

Development of recreational sites is planned.

The Prompton Reservoir, also a single purpose flood control project with incidental recreational use, was completed in 1960. The dam is located about one half mile upstream from the confluence of Waymart Branch with the Lackawaxen River, and about four miles west of Honesdale. The present dam controls 60 square miles of drainage area, and is about 1,300 feet long and 140 feet high. The modified project will extend the reservoir about 4.4 miles upstream of the dam.

When completed, the project will augment the flow of the Delaware River at Trenton by 130 cfs on the basis of complete and uniform drawdown of total augmentation storage (30,900 acre feet) over a 120-day period.

As with Walter, the flood control function of Prompton will be preserved, and perhaps improved, during flash-flooding periods.

Cannonsville

With an eye toward additional reservoir storage and water conservation, the authors of the "Good Faith" agreement recommended that the state of New York enlarge the Cannonsville Reservoir pending the outcome of feasibility and environmental impact studies.

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

The dam is approximately 2,800 feet long (at the top) with a maximum height of about 175 feet above the original river channel. The reservoir impounds runoff from a watershed of some 450 square miles.

Modification of Cannonsville would add approximately 13 billion gallons additional storage capacity. The additional yield would be used to maintain conservation releases and to support flow objectives and diversions to New York City within the limits set by the 1954 U.S. Supreme Court decree which apportioned the waters of the Delaware.

In September of 1985, Ebasco Services Inc., an engineering firm hired by the New York State Department of Environmental Conservation to conduct a feasibility study and prepare a draft environmental impact statement for the proposed modification, issued an interim report in which it concluded that "based on review of pertinent literature and the studies made, the enlargement of the Cannonsville Reservoir is technically and environmentally feasible." A final report was pending at year's end.

Camden Metro Area Study

Recommendation 7 of the "Good Faith" agreement calls for the state of New Jersey to examine potential solutions to water supply problems in the Camden metropolitan area, focusing on the overpumping of the Potomac-Raritan-Magothy (PRM) aquifer.

The New Jersey Department of Environmental Protection (NJDEP) selected the engineering firm of Camp Dresser & McKee, Inc. to conduct the study which is concentrating on three counties (Camden, Gloucester and Burlington), 66 communities, and 28 water purveyors. The approximate boundaries of the study area are Rancocas Creek to the north, the Mantua Creek area to the south, the Delaware River to the west, and the Pinelands National Reserve to the east.

the feasibility study. An interim report issued by Ebasco in September of 1985 concluded that enlargement is "technically and environmentally feasible."

Recommendation 7:

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. Study to be completed and alternative(s) selected by Dec. 31, 1985 and implemented by Dec. 31, 1990.

Consultant selected on Oct. 25, 1983. Study underway.

Recommendation 8:

DRBC evaluate consultants' recommendation for field demonstration of glacial alluvium pumping to supplement flow augmentation capacity during droughts.
For possible action after the year 2000. No deadline.

Action deferred.

Recommendation 9:

Adopt updated description of the Tocks Island project. Place in reserve for development if needed for water supply after the year 2000. No deadline.

Completed on Nov. 30, 1983, by adoption of Resolution No. 83-27 amending the Comprehensive Plan.

Recommendation 10:

Adopt drought trigger policy for mandatory conservation measures based on specified storage conditions in New York City's three Catskill reservoirs. No deadline.

Completed on June 29, 1983, by adoption of Resolution No. 83-13 amending the Comprehensive Plan and Water Code to provide criteria for defining drought warning and drought conditions and provide a schedule of phased reductions in diversions, releases and flow objectives during drought periods.

Recommendation 11:

Adopt a policy of 15 percent fresh water depletive use reduction during drought periods. No deadline.

Completed on June 29, 1983, by adoption of Resolution No. 83-14 amending the Comprehensive Plan and Water Code.

Recommendation 12:

New York, New Jersey, Delaware and Pennsylvania will prepare drought contingency plans to achieve a 15 percent depletive use reduction at drought stage for coordination with DRBC drought actions.

Reports submitted to the DRBC by the deadline, Dec. 31, 1983.

Recommendation 13:

Develop a regulatory program to limit future depletive water use, balancing existing, new or expanded depletive use with the available storage capacity required to meet salinity objectives. Depletive water use budget to be adopted and implemented by Dec. 31, 1985.

In March of 1985, DRBC staff, in cooperation with state regulatory agencies, began assembling and analyzing updated data on depletive water use within the basin. Several model simulations, designed to show the relationship among reservoir operations, streamflows, depletive use and estuarine salinity, were completed during 1985. The first depletive water use budget is planned for implementation in late 1986 or early 1987.

Recommendation 14:

Amend Docket No. D-77-20 to authorize on a permanent basis augmented conservation releases from New York City's three Catskill reservoirs. No deadline.

Completed on Nov. 30, 1983, by amending Docket No. D-77-20 CP (Revised).

The PRM aquifer is experiencing severe water level declines and water quality degradation caused by a number of factors, including the intrusion of salt water and the introduction of hazardous wastes from surface sources.

Over the years, pumping of the aquifer has lowered water levels as much as 100 feet. This has caused Delaware River water to flow to the aquifer instead of flowing from it to the river as it did back in 1890 when the first well was drilled. During droughts, Delaware River water flows into the aquifer, carrying with it salts and pollutants.

The lowered water levels also mean that the aquifer's fresh water has less force to hold back a large body of underground salt water which is believed by some geologists to be in hydraulic linkage with the Atlantic Ocean and which is creeping toward the Delaware River.

Currently, about 17 million gallons a day (mgd) of fresh water is affected by this subterranean salinity intrusion, according to findings of the project team. Increased pumping in this part of the aquifer (the Glassboro, Pitman, Clayton area) will only accelerate the movement of this deep salt pool, the study notes in preliminary findings. Under these conditions, it is estimated that by the year 2020 as much as 34 million gallons of fresh water a day could potentially be tainted by this subsurface salt.

To alleviate these conditions and retard the salt's movement, the project team recommends that no more than 20 mgd to 30 mgd of water should be withdrawn from that part of the PRM aquifer that is not significantly replenished by the Delaware River. Present pumping in this area is about double the recommended amount, or about 50 mgd.

The PRM aquifer consists of interbedded sand, silt and clay and underlies the entire coastal plain portion of the basin. It is the principal source of public and industrial ground-water supply for the heavily developed corridor stretching along the river's estuary from Trenton, N.J., to Wilmington, Del.

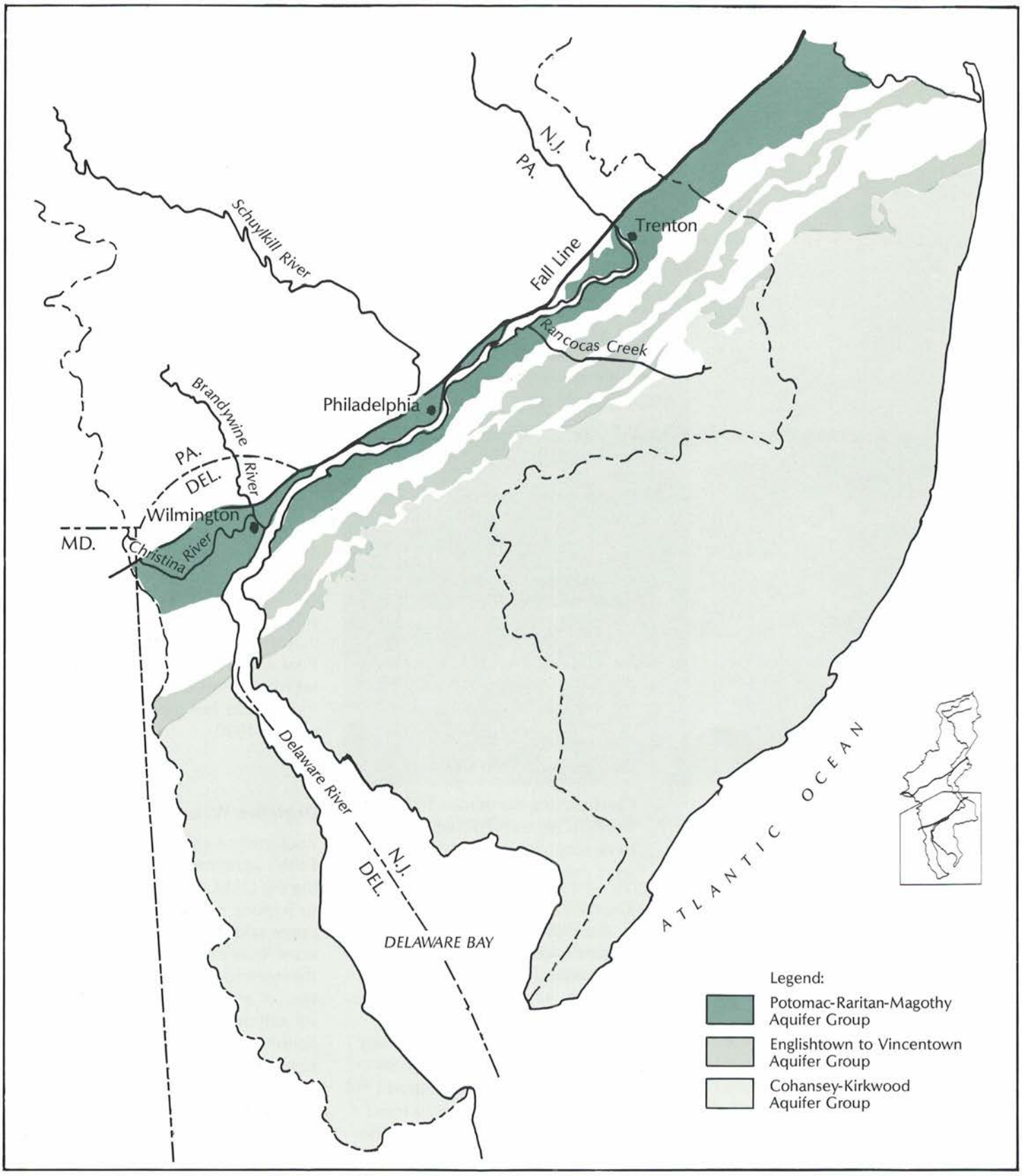
Numerous hazardous waste sites are located on the PRM's outcrop, a particularly sensitive area because leaking contaminants enter the aquifer directly. According to a NJDEP/Camp Dresser & McKee newsletter published in September of 1985, there were at least 23 locations in the Camden metropolitan area where hazardous waste sites and accidental spills had contaminated ground-water supplies. The newsletter stated that 21 wells in the PRM (representing about 10 mgd of production) had been affected.

If the Camden metropolitan area's total water demand for the year 2020 is met by withdrawing from the PRM aquifer at present locations, then the Camp Dresser & McKee project team estimates that as much as 20 mgd of production (double the present amount) could be affected by the existing waste plumes. In most cases, treatment could remove contamination, but at additional cost, according to the study.

During 1985, the project team released a task report on "Population and Water Demand Projections" for the study area. It found that the area's population of 756,000 is expected to increase to 1,030,000 by the year 2020, with most of the rise occurring in the inland communities of Deptford, West Deptford, Washington, Gloucester, Voorhees, Cherry Hill, Evesham, Mount Laurel and Mantua.

An additional 28 million gallons of water will be needed to meet this population hike on a typical winter day and up to 35 million gallons on an average summer day, according to the task report.

The project team also predicted dramatic demand increases for public purveyors in the study area who now account for 82% of all water used. On the other hand, water demands of self-supplied users (users not connected to public



The Atlantic Coastal Plain:
Major Aquifer Groups

water systems) are not expected to increase significantly.

Camp Dresser & McKee, which is being assisted by two other engineering firms, identified seven possible solutions to the water supply problem:

— Piping water across the Delaware from Philadelphia.

— Constructing another intake on the New Jersey side of the river at Delanco.

— Using smaller surface streams in conjunction with ground-water resources.

— Developing the Cohansey Sand Aquifer in the eastern portion of the study area.

— Developing the PRM in the outcrop of Burlington County.

— Constructing numerous interconnections between purveyors who have surplus water and those who need it.

— Redistributing present pumping in the PRM aquifer so that the decline of the piezometric (pressurized) surface is not as great.

By year's end, the project team had come up with 21 possible combinations to supply the estimated 50 mgd to 60 mgd needed to meet the study area's water needs by the year 2020. This includes the increased volume to offset the projected population increase and takes into consideration cutbacks that are expected once a "critical area" is established in the region pursuant to New Jersey's Water Supply Management Rules and Regulations. The project team stated that a reasonable but preliminary estimate of "critical area" cutback would be from 20 mgd to 30 mgd.

Of the 21 possible combinations, four were selected for additional evaluation based on cost effectiveness: the Philadelphia pipeline, the Delanco intake, new PRM wells, and a combination of new PRM and new Cohansey wells. Each alternative would meet all of the study area's 2020 water needs.

The project team noted, however, that factors other than cost, including legal and environmental considerations, would probably play a major role in the selection of a final alternative which, under the terms of the "Good Faith" agreement, is to be implemented by the end of 1990.

Depletive Water Use Budget

Recommendation 1 of the "Good Faith" agreement called for amending the DRBC's Comprehensive Plan to include revised interim and long-range salinity objectives in the Delaware River estuary. It also recognized the need to use new reservoir facilities for additional water storage and for salinity protection. The "Good Faith" authors proposed that as each new unit comes on line, the operating salinity objective should be revised until an objective for the year 2000 is reached — a maximum 30-day average chloride concentration of 150 mg/l and a maximum 30-day average sodium concentration of 83 mg/l at River Mile 98 (one mile upstream of the Walt Whitman Bridge).

Simultaneously, a series of depletive water use allocation budgets should

be adopted at each stage and a regulatory program instituted to assure that future depletive use is balanced with existing storage capacity necessary for effective salinity control, according to the agreement.

In March of 1985, the DRBC staff, in cooperation with state regulatory agencies, began assembling and analyzing updated data on depletive water use in the basin.

Streamflows of the 1960s drought, the worst on record, were modified to reflect post-1965 changes in reservoir regulation, inter-basin diversions, and increases in consumptive water use.

A series of model simulations were designed to show the relationships among reservoir operations, streamflows, depletive water use and estuarine salinity. These simulations, several of which were completed during 1985, focus on whether reservoir storage capacity available for regulating low streamflows will be adequate to offset depletive water use in a given drought year and prevent violations of the salinity control objectives for the estuary.

Lists of water supply projects approved by the DRBC and completed since 1965 have been compiled by sub-basins for community and self-supplied industrial water systems, as well as for farm irrigation systems. They reflect the approved maximum monthly rate of water withdrawal and the estimated maximum monthly rate of depletive use. These rates are sub-totalled for each sub-basin, and each facility is located by county.

At the DRBC's request, the Delaware River Basin Electric Utilities Group (DRBEUG) has updated consumptive water use for each in-basin generating unit. The data show consumptive use for 1965, and provide projections for 1986 and 1994.

Underway at year's end was an inventory of water use by 225 golf courses within the basin. Information requested included the source of water used and the acreage in tees, greens and fairways.

Data also are being compiled on sub-basin populations, contrasting rural areas with areas served by community water systems.

Other water users also must be counted in balancing water supply and demand, including restaurants, hotels, resorts, hospitals, campgrounds et cetera. Collectively, they account for a significant amount of consumptive use. Estimates of post-1965 increases in such use will be made for each sub-basin and subtracted, along with post-1965 increments for other consumptive uses, from corresponding streamflows.

For modeling salinity, depletive uses are being regionalized for each of 16 sub-basins. This represents an improvement over the 13 sub-basins used in the Level B Study (the forerunner of the "Good Faith" agreement) and should increase the accuracy of modeling the location-dependent effects of consumptive use on the salt line.

The first depletive water use budget is planned for implementation in late 1986 or early 1987. As soon as that budget is developed, efforts will be directed toward a budget for 1989, which follows by one year the scheduled completion of the Merrill Creek Reservoir project.

Delaware River Water Quality

The Delaware River Basin Commission and the National Park Service conducted a cooperative water quality monitoring program in the upper reaches of the Delaware River during the summer of 1985. The program focused on the two stretches of the Delaware that have been included in the National Scenic Rivers system.

Between May and September, 88 locations along Delaware tributaries and the main stem were sampled.

The program is designed to complement existing state monitoring efforts with the results being forwarded to the respective basin states for follow-up action on detected water quality problems.

Prior to the sampling, the DRBC hosted an inter-agency conference to stimulate an exchange of ideas on water quality monitoring and to encourage coordination among various local, state and federal agencies. The conference was attended by representatives from New York, Pennsylvania and New Jersey, as well as from such agencies as the National Park Service, the U.S. Geological Survey, and the U.S. Environmental Protection Agency (EPA).

The DRBC also took samples along the Delaware estuary during 1985, continuing a monitoring program which began in 1967. The results of these studies, along with the results from the upper Delaware program, will be published in 1986 in a report entitled "Delaware River Water Quality Assessment 1984-85 305(b) Report."

Section 305(b) of the Federal Clean Water Act requires biennial assessments of water quality to be prepared by state agencies and various interstate commissions. From these reports the EPA prepares a national report which it submits to Congress for use in gauging the act's effectiveness and in determining whether new legislation or additional resources are needed.

The 305(b) reports serve a similar function at the regional, state and local levels.

As 1985 came to an end, efforts were underway to initiate two major water quality studies on the Delaware estuary, which remains the river's most polluted stretch, especially in the Philadelphia/Camden area.

One study will examine the effect of the disinfection (usually through chlorination) of wastewater on river bacterial quality. Water samples will be taken from the Delaware from the Torresdale water treatment plant in Philadelphia to Ship John Light in the upper Delaware Bay, as well as in surrounding shellfish areas.

The program's cost is estimated at $400,000. A $200,000 grant has been obtained from the National Oceanic and Atmospheric Administration and efforts were underway to obtain additional funding from the EPA and from municipalities in the study area.

The second study, known as the Delaware Estuary Use Attainability Project, is a two-year effort to determine the feasibility of restoring "fishable/swimmable" water quality in degraded portions of the river. Also to be examined are the types of pollution abatement measures which would be necessary to achieve such a goal.

The project is a cooperative effort between the DRBC, the basin states and various federal agencies.

A draft plan of the study was being compiled at year's end. It is to be the forerunner of other reports which are expected to include recommendations for upgrading water quality standards.

This watercolor, by American artist Thomas Eakins, is titled "Taking Up the Net." It was painted in 1881 in the vicinity of Gloucester, N.J. The Metropolitan Museum of Art, Fletcher Fund, 1925. (25.97.3)

Ground Water Management

Well registration, one of eight major recommendations that grew out of a special three-year, ground-water study by the DRBC, has been adopted by the Commission.

These eight recommendations, in the form of proposed amendments to the DRBC's Comprehensive Plan and Rules of Practice and Procedure, were prepared by the Ground Water Advisory Committee and presented to the Commission in October of 1984.

In conjunction with the recommendations, the U.S. Geological Survey in 1985 began implementing a comprehensive ground-water data bank and computer management system for the basin. The USGS also is conducting detailed modeling investigations of the Potomac-Raritan-Magothy aquifer system in southern New Jersey and New Castle County, Delaware, and of a carbonate aquifer in the Little Lehigh Creek Basin. These studies are expected to lead to new policies and standards regarding ground-water management.

Well Registration

Basinwide well-registration, an important ingredient in any ground-water management plan, was adopted by the DRBC in the spring of 1985.

The program is expected to provide the Commission with an organized and retrievable source of hydrogeologic data necessary to ensure ground-water protection, both in quality and quantity.

Under Resolution No. 85-19, which amended the DRBC's Comprehensive Plan and Water Code on May 29, 1985, all new and existing wells or projects that withdraw 10,000 gallons per day or more during any 30-day period must be registered with the respective basin states in which they operate.

Data generated by the registrations are being used to build a common computer database being administered by the U.S. Geological Survey which should streamline the disparate well registration systems of the four basin states. The data will be available to the states, the U.S. Environmental Protection Agency (EPA), the DRBC, as well as to the USGS. It is estimated that records for some 10,000 wells will be automated, about half in New Jersey.

Keeping track of the number of wells operating in the basin in a uniform manner is important because well pumping can modify paths of movement of contaminants. This is especially true where ground-water development has created large cones of depression. These cones can cause or accelerate the movement of contaminants toward pumping centers from buried wastes, improperly constructed waste disposal facilities, and other sources.

Well pumping also can induce intrusion of surface water into aquifers and, where surface water is of poor quality, seriously pollute this underground water supply.

Another significant goal of the well-registration program is to manage the resource in such a way as to protect perennial streamflows. If the ground-water table is excessively lowered, for instance, perennial streams can become intermittent in flow, making meaningless the seven-day, ten-year low flows upon which treated waste effluent requirements are based. Consequently, fish, wildlife, recreation, downstream water supplies, and waste assimilation uses all suffer.

A public hearing on the well-registration and records-automation program was held in Philadelphia on March 27, 1985. The program is being funded in part by EPA.

Basinwide Water-Use Data Bank

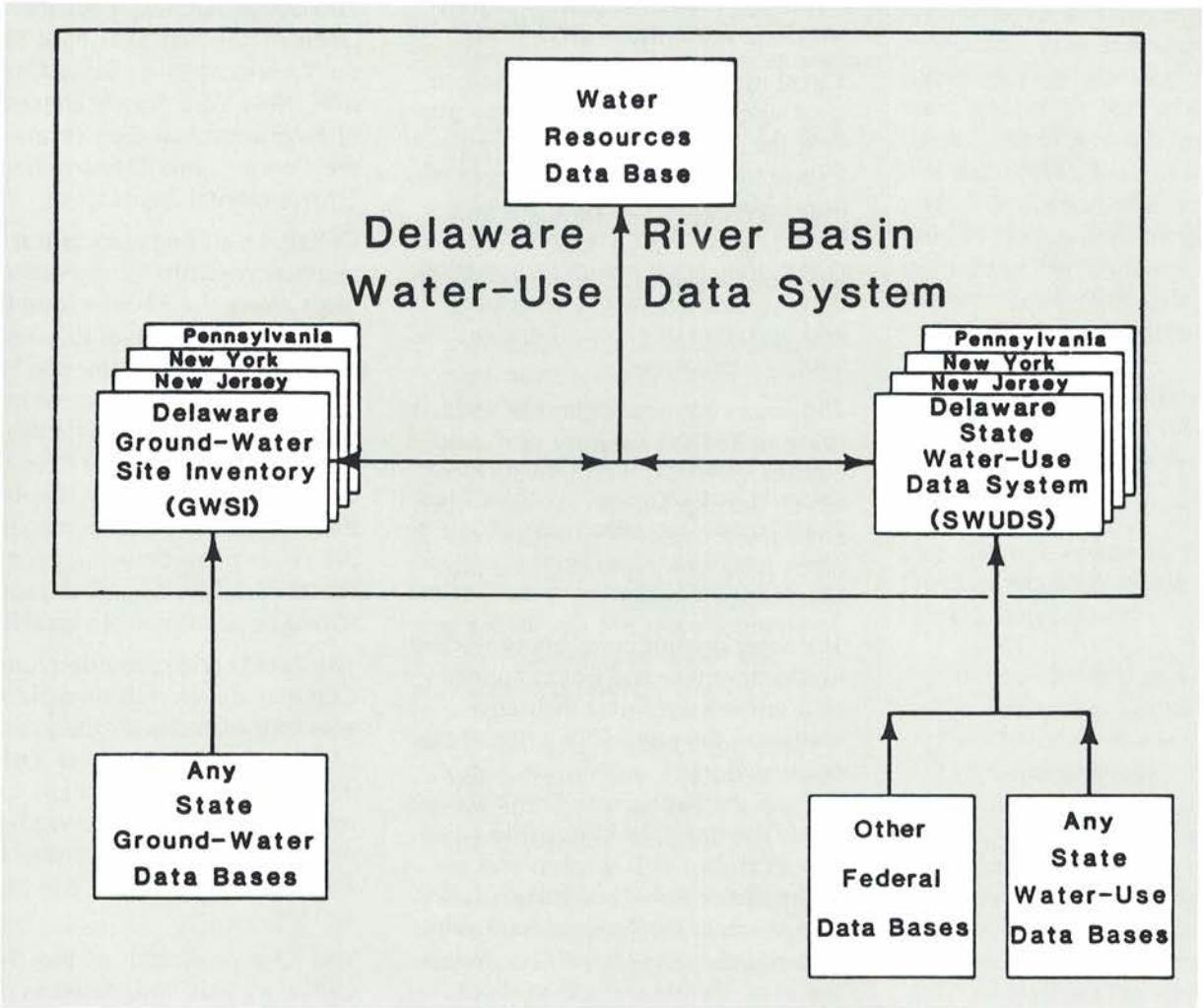
A primary objective of the special ground-water study was the development of a basinwide ground-water and water-use database. Study members recommended that the U.S. Geological Survey, in cooperation with the DRBC and the four basin states, develop such an integrated storage and retrieval system.

The USGS, with cooperative funding from the DRBC in 1984, looked into its feasibility and in early 1985 issued a report stating that it not only was practicable, but cost effective. The USGS offered a proposed program that will take four to five years to complete and is now underway.

Two USGS databases are being loaded in each state. One, the Ground Water Site Inventory, already is being fed information, mostly hydrogeologic and well data from well registrations. The second, the State Water Use Data System, will house primarily water-use information.

The logic is simple: If each state collects the same data (through basinwide well registrations, for instance) and computerizes that data in like manner, a common pool of information that is basinwide in scope and uniform in character will be created.

Eventually, this basinwide data pool, to be known as the Water Resources Database, or DRBC Compendium Database, will be housed in a DRBC computer.



Other Basin Highlights

Flood Loss Reduction

The Delaware River Basin Commission initiated four new flood insurance studies in Pennsylvania during 1985 under contract with the Federal Emergency Management Agency (FEMA).

Flood hazards are being evaluated and data compiled on flood frequency and severity in the communities of Hatfield Township in Montgomery County, Chalfont Borough and New Britain Township in Bucks County, and Smithfield Township in Monroe County. The findings will be provided to property owners and residents in the communities to help them qualify for maximum coverage under the National Flood Insurance Program which is administered by FEMA.

The studies, which are expected to conclude in the fall of 1986, also provide the DRBC staff with valuable information regarding the effect of flood plains on planned projects in the basin. And they provide community leaders with information that is essential to the adoption and updating of comprehensive land-use programs.

The four contracts signed in 1985 bring to 151 the number of municipalities, mostly in Pennsylvania, for which flood plain studies have been conducted since 1974 under contracts between the DRBC and the federal government.

The three communities being studied in Montgomery and Bucks counties also underwent flood insurance studies in the late 1970s prior to the construction of two flood control dams in the Neshaminy Creek watershed. The dams, on Unionville Tributary in Hilltown Township and on Railroad Creek in New Britain Township (both in Bucks County), have reduced the severity of flooding in the area. The new studies reflect this additional protection and also have generated information on streams not previously investigated.

The DRBC staff also completed a flood insurance study in the spring of 1985 in Pocono Township in Monroe County. Flood insurance maps were presented by FEMA to township officials for review.

Upper Delaware Management Plan

A draft of a revised Management Plan for the Upper Delaware Scenic and Recreational River was nearing completion at the end of 1985.

The revised plan was developed by the Conference of Upper Delaware Townships (COUP) with the assistance of the National Park Service, the Delaware River Basin Commission, New York State's Department of Environmental Conservation, and the Pennsylvania Department of Environmental Resources.

COUP, an ad hoc association of representatives from 15 towns and townships along the 73-mile long Upper Delaware Scenic River (between Hancock, N.Y., and Matamoras, Pa.) was 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 the alternative management plan after plans drawn up by the National Park Service and the states met strong opposition from local interests.

The Park Service provided funding to COUP to develop its own plan, which was formulated with the assistance of three consulting firms and a 35-member Plan Oversight Committee. An initial draft was handed over to COUP by the committee and the consultants during the summer of 1985.

The 73-mile stretch of the Upper Delaware was designated as part of

the National Wild and Scenic Rivers System by Congress in 1978. The act states that the river must be protected in its free-flowing condition and that it must be managed for the benefit and enjoyment of present and future generations.

The DRBC has assisted in the implementation of the legislation since the act's inception, providing technical information and support in response to interstate concerns relating to water quality, environmental protection and flow management.

Hydroelectric Power

Design work for a demonstration hydroelectric power project at Blue Marsh Reservoir on Tulpehocken Creek in Berks County was completed during 1985 by Stone & Webster Engineering Corp.

The design work is subject to review by the U.S. Army Corps of Engineers and Acres International, agent for the U.S. Department of Energy. The overall project must meet the approval of the Federal Energy Regulatory Commission (FERC).

When the Blue Marsh hydroelectric project was first envisioned the price of oil was relatively high, still recovering from the Arab oil embargo that skyrocketed prices in the early 1970s. Now that the price of oil has decreased significantly and project power rates also have declined, there is question whether the Blue Marsh project is still economically feasible.

The FERC has extended the date for construction start-up by two years to April 1988.

Ice Jam Project

On Nov. 26, 1985, the DRBC adopted Resolution No. 85-48 expressing its intent to serve as the non-federal sponsor of a project to reduce ice jam flooding in the Port Jervis-Matamoras area of the Delaware River.

The resolution stipulated that the benefitting parties in New York and Pennsylvania (Matamoras, Pa., Westfall Township, Pa., and Port Jervis, N.Y.) provide the Commission with all the required non-federal funds for acquisition of necessary lands, easements, rights-of-way, construction and annual maintenance.

In 1982, the DRBC, through Congress, requested that the U.S. Army Corps of Engineers conduct a study of the ice jam flooding problem which a year earlier had caused an estimated $14.1 million in property damage.

The Corps issued a draft report in December of 1985 stating that it would be economically feasible to construct a diversion channel about 13,000 feet long with tree and brush clearing which would facilitate passage of ice-clogged river water. The channel would be located in the vicinity of Mashipacong Island in New Jersey.

A final report was expected in 1986.

DRBC/Limerick Water Withdrawal

Philadelphia Electric Co. was issued a temporary permit on Oct. 2, 1985, reducing from 530 cubic feet per second (cfs) to 415 cfs the Schuylkill River streamflow rate at Pottstown below which river water could not be withdrawn for cooling at the nearby Limerick nuclear power plant. The permit expired at the end of 1985.

A companion application requesting permission to draw up to ten cfs from an abandoned strip mine (Beechwood Pool) in Schuylkill County was denied. On Sept. 12, 1985, the DRBC had turned down a request from P. E. to use up to 32½ cfs from the pit, which contains water of poor quality.

Financial Summary*

Budgetary

Revenues

	Budgeted	Received
Delaware	$ 166,800	$ 166,800
New Jersey	443,000	443,000
New York	200,000	200,000
Pennsylvania	511,600	511,600
United States	283,000	279,500
Water Quality Pollution Control Grant	230,000	242,000
Reimbursement of overhead	25,000	25,000
Sale of publications and sundry items	5,100	9,372
Project review fees and other income	32,000	52,841
Interest income	0	141,894
Fines and assessments	0	17,500
Contingent funding	65,000	0
Fund balance	50,000	0
	$2,011,500	$2,089,507

Expenditures

	Budgeted	Expended
Personal services	$1,161,000	$1,150,878
Special and contractual services	214,000	213,496
Other services	34,000	33,839
Supplies and materials	42,000	41,744
Space (including $48,775 of principal payments on Plant Fund mortgage)	184,000	183,826
Communications	50,200	50,150
Travel	27,200	27,170
Maintenance, replacements, and acquisitions	43,000	42,206
Equipment rental or lease	26,100	22,266
Fringe benefits and other	230,000	229,568
	$2,011,500	$1,995,143
Excess of revenues over expenditures (budgetary basis)	0	94,364
Reconciliation to GAAP basis of reporting — encumbrances		(8,582)
Excess of revenues over expenditures	$ 0	$ 85,782

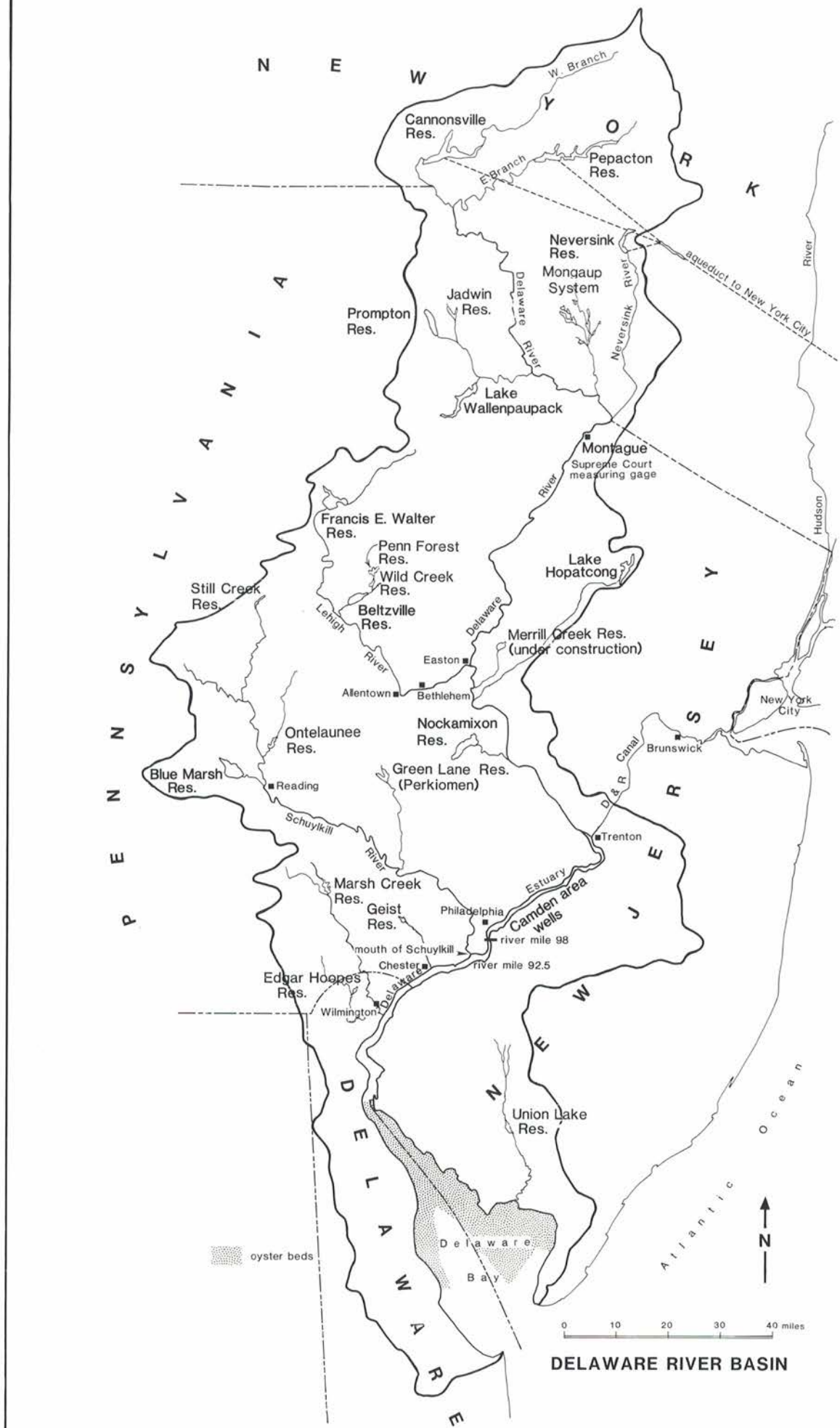
Non-Budgetary**

Special Programs and Projects	Fund Balances July 1, 1984	Revenues	Transfers	Expenditures	Fund Balances June 30, 1985
2 D Model	$ 0	$ 89,660	$ 0	$ 75,000	$ 14,660
USGS gaging	4,863	20,259	0	20,157	4,965
Monitoring Ship John Light-Reedy Island	0	20,000	0	19,750	250
Other monitors	(18,887)	89,755	50,000	84,965	35,903
Flood Plain Contract Fund — Pennsylvania	0	6,595	0	6,595	0
Blue Marsh — Prompton Dam	(28,000)	0	0	0	(28,000)
Study of Exotic Wastes — Phase II	46,079	0	0	32	46,047
Ground water	113,723	0	0	27,259	86,464
Merrill Creek	12,590	0	0	0	12,590
Flood Plain Contract Fund — Pocono	0	29,279	0	29,279	0
Recreational — Scenic Rivers	0	5,000	0	5,000	0
Feasibility Study — Blue Marsh	0	50,000	0	10,000	40,000
Ground water — Pennsylvania protected area	189,102	132,300	0	76,870	244,532
Merrill Creek environmental	424	48,362	0	27,756	21,030
Ground water — withdrawal fees	1,045	30	0	0	1,075
Computer	37,731	5,524	0	0	43,255
Tybouts Corner — Delaware	0	3,228	0	3,228	0
National Park Service Summer Program	0	2,000	0	2,000	0
Daily Flow Model	0	3,242	0	3,013	229
	$358,670	$505,234	$50,000	$390,904	$523,000

*For Fiscal Year ended June 30, 1985.

**Revenues from sources outside current expense budget.

The records of the Commission are independently audited each year as required by the Compact.



DELAWARE RIVER BASIN

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