

ANNUAL REPORT • 1970



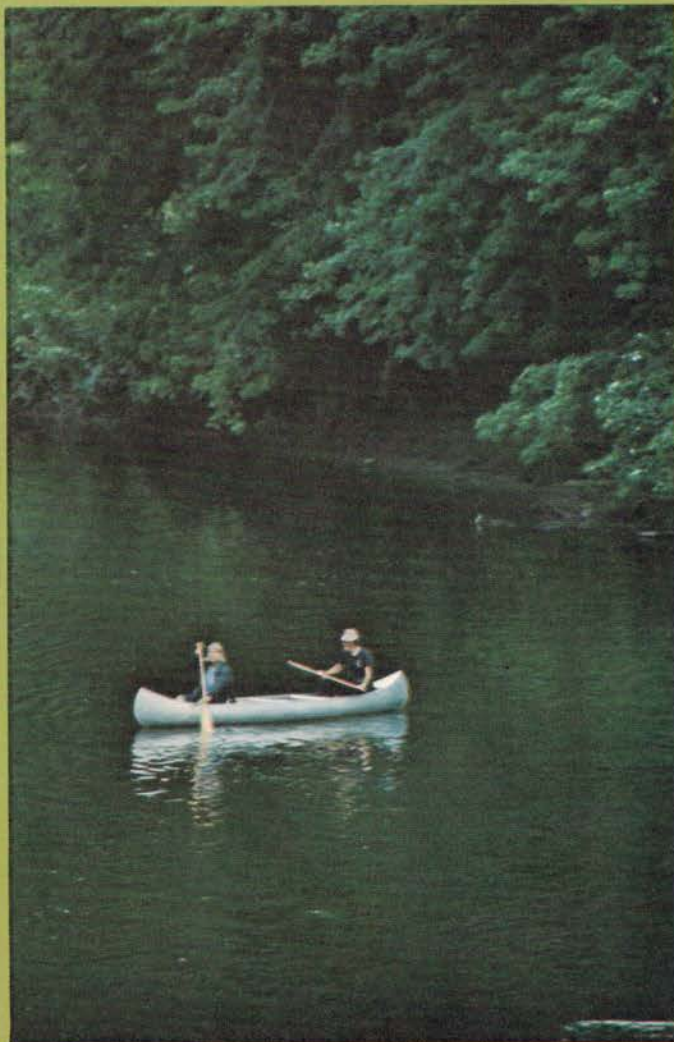
DELAWARE RIVER BASIN COMMISSION

Autumn on the Delaware Canal, once an important transportation artery and now the nucleus of Theodore Roosevelt State Park, is captured in cover photograph taken between Washington Crossing and New Hope, Pa.

Cover photograph by George Scheller

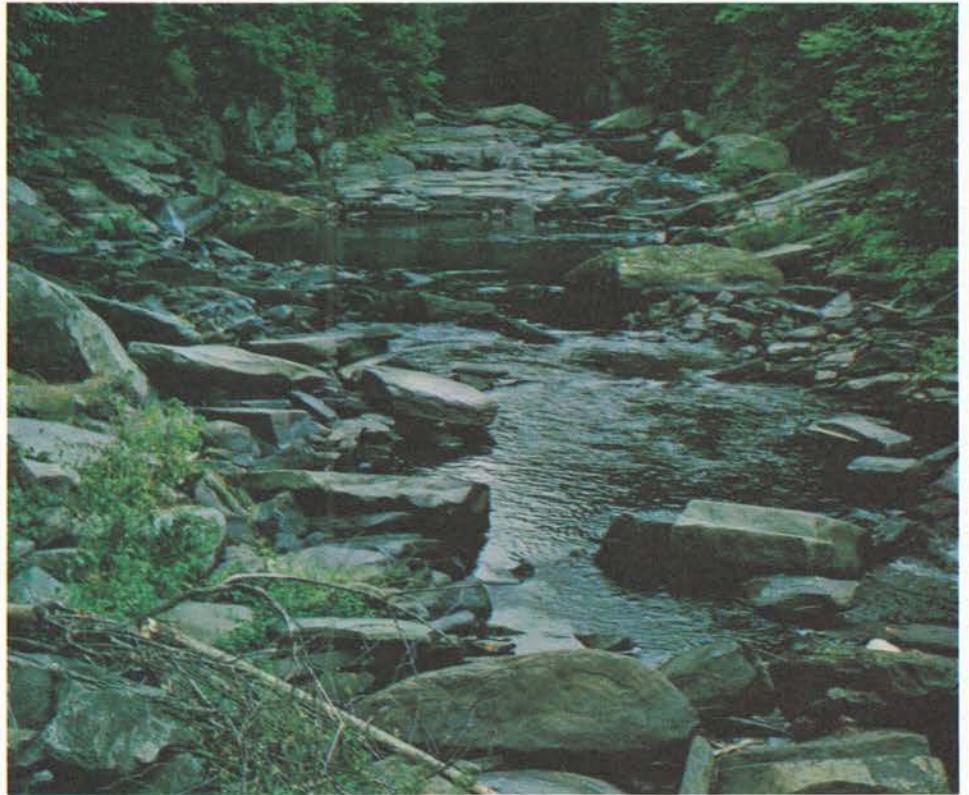
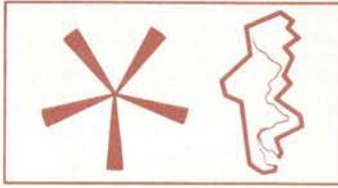
Typical recreation use of the upper Delaware River near Barryville, N.Y., is shown below. View looking upstream at Shohola Creek near its confluence with the Delaware in Pike County, Pa., in the Pocono Mountains appears on opposite page.

Photographs by James M. Staples



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INTRODUCTION

This is the eighth annual report of the Delaware River Basin Commission. It is presented to the seven million residents of the basin, the 15 million additional persons who reside in its service area, including New York City and Northeast Jersey, and their representatives in the Congress and the Legislatures of New Jersey, New York, Pennsylvania and Delaware.

Under the provisions of the Delaware River Basin Compact of 1961, the Commission is charged with planning, developing, managing and protecting the 13,000 square-mile valley's water resources from Capes May and Henlopen to the Catskill Mountains. Its regional jurisdiction extends deep into the four basin states and its multiple-purpose scope encompasses pollution control, water supply, flood control, water-based recreation, fish and wildlife protection and other phases of water management, except navigation.

The report covers the year ending June 30, 1970, a period of sharp upswing in public and political concern over protecting the whole environment, which is so strongly influenced by the water matters on which the Commission has worked for nearly nine years.

The year also marked the end of the 1960s, the decade in which the public demanded a reversal of the nation's pollution direction and in which the laws to implement these demands started to go into the statute books in great numbers. Enactment of the Delaware Basin Compact gave the river community a head start on dealing with pollution and other conservation problems.

The Compact mandates water pollution cleanup, and the Commission has put into motion the program that should deliver substantial results within a few years. The Compact also decrees that the resources shall be developed to supply the basin community's needs, and projects and programs are well under way to produce the water to meet the full range of these needs within protection limitations. Much of the credit for these advances belongs to the federal and state agencies which are working toward the common goals of the Commission's Comprehensive Plan.

The Commission pledges to work with its fellow agencies toward another productive decade of water management and protection.

THE COMMISSION • 1970

Chairman

William T. Cahill

Governor of New Jersey

Vice Chairman

Russell W. Peterson

Governor of Delaware

Raymond P. Shafer

Governor of Pennsylvania

Walter J. Hickel

U.S. Secretary of Interior

Nelson A. Rockefeller

Governor of New York

U.S. Member appointed by the President
Governors serve ex officio



Governor Cahill



Governor Peterson



Governor Shafer



Secretary Hickel



Governor Rockefeller

ALTERNATE MEMBERS



Mr. Sullivan



Mr. Jacobs



Dr. Goddard



Mr. VanWegen



Mr. Kilborne

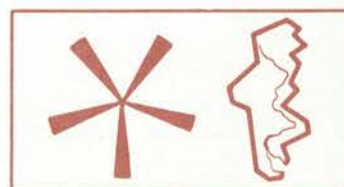
Richard J. Sullivan
Harold L. Jacobs
Maurice K. Goddard
Paul M. VanWegen
R. Stewart Kilborne

New Jersey
Delaware
Pennsylvania
United States
New York

ADVISORS

Maurice M. Feldman
Samuel S. Baxter
Col. James A. Johnson

New York
Pennsylvania
United States



THE STAFF

James F. Wright *Executive Director*
William Miller *General Counsel*
W. Brinton Whitall *Secretary*
Dawes Thompson *Public Information Officer*
Arthur E. Peck *Chief Administrative Officer*



Mr. Wright

PLANNING DIVISION



Dr. Hull, Mr. Howlett, Mr. Craighead, Mr. Thursby



Mr. Peck, Mr. Whitall, Dr. Miller, Mr. Thompson

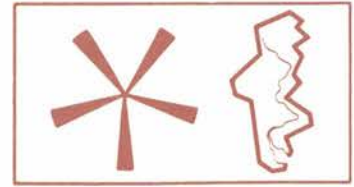


Mr. Selzer, Mr. Briganti, Mr. Goodell, Mr. Porges

Herbert A. Howlett *Chief Engineer*
J. W. Thursby *Staff Economist*
William M. Craighead *Staff Biologist*
C. H. J. Hull *Staff Engineer*
Ralph Porges, Head *Water Quality Branch*
Robert L. Goodell, Head *Operations Branch*
Theodore Briganti, Head *Project Review Branch*
Seymour D. Selzer, Head *Program Planning Branch*

REVIEW • 1969-70

Gains recorded toward attaining cleaner river and increased supplies in the 1970s



The Delaware River system will be cleaner in the 1970s and better able to deliver the more abundant water supplies demanded for homes, businesses and pleasure because of programs that moved ahead this year.

In the massive effort to make the tidal river below Trenton the first heavily used estuary in the nation to be reclaimed, the preponderance of organic wastes that degrade it were brought under pollution abatement orders and timetables on which the clock is now running.

Large volumes of water for both everyday necessities and recreation soon will be available from reservoirs that were completed or in construction. And Congress has now approved the start of construction of Tocks Island reservoir near Delaware Water Gap, to become one of the Northeast's largest flood control-recreation-water supply lakes in the late 1970s.

Activities progressed, too, on enhancing the four-state basin's troubled fish resources, using non-reservoir means to cut down flood damages, protecting the basin's groundwater supplies, developing local watershed resources, preserving a still-unspoiled section up-river, and preventing bay and marshland deterioration.

Meanwhile, the Basin Commission accepted the challenge of determining if its environmental protection activities are broad enough to respond to the day's conservation demands by launching a reappraisal of its authority, policies and programs.

Largely because of this conservation mindedness, the Commission expects to be faced with making an increasing number of difficult judgments in resolving demands for a more developed and technological society against insistence on preservation of the natural environment. The Northeast's need for additional energy already has thrust the Commission into such a mediating position due to the heavy use of water in generating electricity.

New Jersey's new Governor, William T. Cahill, took over his state's seat on the Commission from former Governor Richard J. Hughes and succeeded Governor Nelson A. Rockefeller of New York, the only remaining original member, as 1970 chairman. Governor Russell W. Peterson of Delaware is vice chairman.

During the year, President Nixon appointed Paul M. VanWegen of Pennington, N. J., a veteran small watershed conservationist, as U. S. Commissioner and Governor Cahill named as his Alternate Richard J. Sullivan, Commissioner of New Jersey's new Environmental Protection Department. They succeeded Vernon D. Northrop of the United States and H. Mat Adams of New Jersey, leaving Pennsylvania Forests and Waters Secretary Maurice K. Goddard the only original Alternate still serving.

Retirement deprived the Commission of the continued services of John Boardman, a widely known and productive resources engineer with the Project Review Branch who also was a veteran staff member of the old Interstate Commission on the Delaware (INCODEL).

Fisheries and recreation

Encouraging gains were registered in the Commission's water recreation and fish propagation work. Final results are forthcoming on two research projects — one an investigation of thermal and other pollution on four migrating fish species and the other a study of effects of water-level changes in reservoirs on native gamefish behavior. Programs progressed on oyster-decline research studies involving relationships of river flow to bay salinity and testing feasibility of applying artificial culture techniques to bolster production.

Another biological study progresses to help determine the river's health from Yardley to Belvidere through observation of suspended animal and plant life of microscopic size.

A federal-state research effort aimed at restoring abundant runs of shad and other anadromous



H. Mat Adams



John Boardman

fishes has been extended to 1973. Through several techniques, the study team traces movements of adult and juvenile shad, an effort made easier in 1970 by the best run in eight years. The work also will encompass alewives, striped bass, white perch, eels and possibly sturgeon.

As a service to the increasing thousands of canoeing enthusiasts who float the upper Delaware from spring through fall, the Commission is compiling a directory of river access, canoe rental, campsite, lodging and other facilities. The information augments the detailed river information contained on the Commission's recreation maps, of which 14,000 sets have been sold at \$1 and are still available.

Project reviews

The review of water-related projects proposed by all levels of government, commercial enterprises and others to protect the basin's resources and assure compatibility with the Commission's Comprehensive Plan continued to be a major endeavor. During the year, applications covering 206 projects — mostly public and private water supply and waste treatment facilities — were approved or processed. Piers, docks, bridges, dikes, water diversions between streams, pipelines, small watershed development plans, and marinas also were screened. Under new federal requirements aimed at reducing adverse impact of water projects on the environment, the scope of the Commission's investigation of

5 applications is being broadened.

Water Resources Program

The Commission publishes annually a Water Resources Program, which is a compendium of facts on the basin's water use supply-and-demand picture for the ensuing six-year period based on the longer-range Comprehensive Plan. The document relates to all phases of the Commission's multi-purpose responsibilities. The 1970 edition (the seventh) is available for \$2.25.

Administration

The Commission's general administrative budget supporting the 10 basic planning programs for fiscal 1970 totaled \$1,277,000, including \$17,026 in federal grant funds that were anticipated but not received. The agency's expenditures and encumbrances amounted to \$1,259,919, leaving an unexpended appropriated balance of \$55. The capital expenditure program of \$2,000 toward future water supply obligations was continued and payment was advanced to the federal government.

Cost of special programs and projects financed outside regular appropriation channels totaled \$628,326. They included the Tocks Island Fish Research Study, the Tocks Island Region Environmental Study, renovation of the Lambertville-New Hope Wing Dams, and the three-year Salem-Gloucester Regional Waste Study. Except for the waste study, these projects were phased out during the 1970 fiscal year.

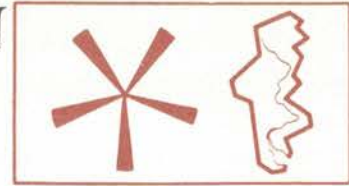
Audits of the Commission's financial records were completed by an independent firm as required by the Compact, and a grant audit was conducted by the U.S. Interior Department in connection with the Tocks Island Environmental Study.

Three of the 52 authorized positions were vacant at the end of the fiscal year.

Construction of the Commission's new headquarters building in West Trenton proceeded toward completion and occupancy in December 1970. At year-end, \$495,191 of the total projected building cost of \$995,000 had been expended.

ENVIRONMENTAL PROTECTION

DRBC programs reappraised; project reviews broadened



In reflection of and response to the new trends in conservationist thinking, the Delaware River Basin Commission's enabling law, programs, policies and rules are undergoing a thorough environmental appraisal even before the agency has reached its 10th birthday.

When the fathers of the Basin Commission were struggling with the language of the Delaware River Basin Compact that was to be submitted for approval by the basin state governors early in 1961, the goal was placement of total water resource management under a single regional agency. This represented the day's vanguard thinking in the field.

A big reason for creating the Basin Commission was that single phases of water problems — pollution control, water supply, flood control, flow regulation and the others — were fragmented and approached with too little regard for consequences to the whole water picture. Now it is wondered if the water scene is being managed with inadequate concern for the even bigger environmental picture.

Citing efforts to emulate the Delaware Basin Compact in the Susquehanna and Potomac Basins, Governor Rockefeller said upon stepping down from the Commission's chairmanship in 1970 that the Delaware arrangement "still appears the best approach devised for managing an interstate river system." He added, however, that changes in public awareness and priorities now require that "high officials weigh almost every act for its possible environmental influence."

With these comments, the Governor supported a Commission decision to launch a review of its policies, programs and the Compact to determine their adequacy to cope with the valley's water problems more in terms of their part of the total environment.

"It seems entirely likely that there is need for Commission involvement in water-related aesthetic values, land use patterns and other areas not originally encompassed," noted the Governor. "The Commission's ability to protect and manage the river may just not be enough to respond to today's demand."

In one of its final acts of 1969-70, the Commission engaged the University of Pennsylvania's Institute for Environmental Studies to critically review the Compact and programs in light of the National Environmental Policy Act's requirements that natural and social sciences and environmental and design arts be employed in planning and deciding issues with ecological influence. The report is due in 1971.

The Commission expressly directed that the review encompass the adequacy of its water pollution enforcement powers; authority regarding preservation and enhancement of natural, historic and scenic values relating to water; advisability of redefining water law principles and land use regulations; authority to protect and manage flood plains, tidal marshes and wetlands; implications of concentrations of people, industry and land development on water uses and related environmental quality; and methods of financing environmental-related programs.

The National Environmental Policy Act and National Historic Preservation Act both impose new requirements on the Basin Commission's procedures for reviewing proposed projects. Formerly confined to examining projects for effects on water resources, the review procedure must now be alert to adverse environmental consequences generally and aesthetic encroachments.

Gradually, proposals coming to the Commission for review are increasing the number of environmental issues with which it must deal as opposed to the straight water resource protection matters handled in earlier years. These include ecological consequences at Tinicum Marsh near Philadelphia from highway construction; scenic "pollution" of historic Honey Hollow Watershed in Bucks County from an overhead transmission line; long-range ecological effects from three proposed nuclear generating stations; and use of otherwise undeveloped Delaware Bay for an off-shore deep-channel oil terminal.

About 200 water-related projects of varying types and both public and private sponsorship come before the Commission for review during a year. Since the Compact says the Commission must approve an application unless it impairs or conflicts with the basin's Comprehensive Plan, the current reappraisal must consider the extent to which changes may be needed in the Compact, the Plan and review procedures to meet the demands of the day.

The conservationist's new look also has had its impact on Delaware Basin state governments. Three of the Commission's member states — New York, Delaware and New Jersey — have just centralized their environment-related operations in single departments.

For the Basin Commission, the superimposition of general environmental protection over its water resource management responsibilities means conversion somewhat of outlook as well as function. 6

BAY AND SCENIC RIVER

Protection plans moved, off-shore oil terminal in bay discussed

Two big preservationist missions — one salt water and one fresh — are under way at opposite ends of the Delaware Basin.

In the northern sector of the valley is one of the Northeast's popular river stretches — the uppermost 76 miles of the Delaware main stem from Matamoras, Pa., to Hancock, N.Y. This well-known canoeing and fishing area is to be recommended by a federal-interstate task force for preservation as a National Scenic River.

If the plan is approved by Congress and the President, the reach will become part of the recently-established National Wild and Scenic Rivers System to be kept largely in its natural state. As such, it would be an adjunct to the 35-mile portion of the river immediately downstream that is now in development as the Delaware Water Gap National Recreation Area and Tocks Island reservoir.

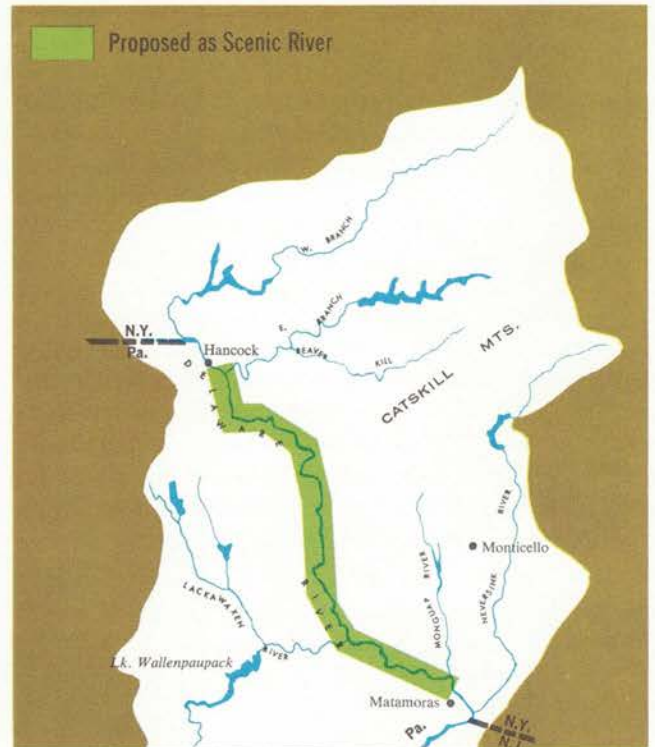
At the southern end of the basin is a commitment to help guide the preservation and intelligent land-water use of the rich estuarine areas that line Delaware Bay in the States of New Jersey and Delaware. The wetlands and still-unpolluted bay will be endangered if urban-industrial growth is permitted to proceed in the bay region without controls and guidance.

Governors Cahill and Peterson have established task forces to recommend protection and balanced development measures with Commission help.

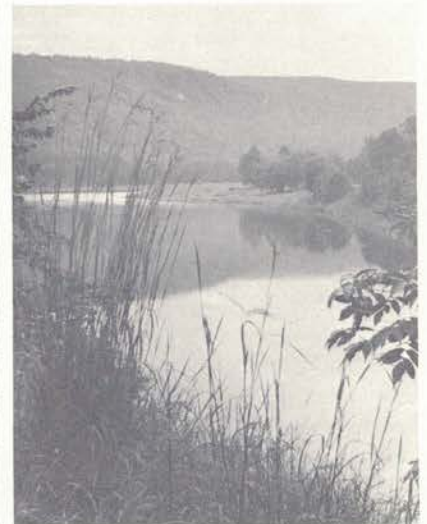
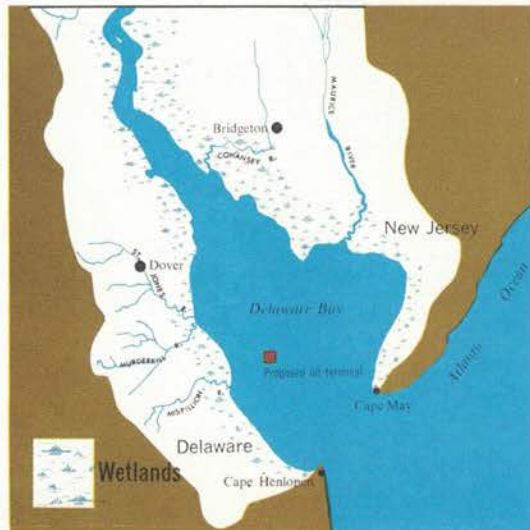
A moratorium was issued in April 1970 by the Governors on bay developments pending the study outcome. They said the freeze applies to a large off-shore oil terminal near Big Stone Beach, Del., for unloading 250,000-ton super tankers. A group of big oil companies proposed the facility as a money-saving method of delivery (by pipeline from the terminal) to the nation's second largest complex of oil refineries in the Philadelphia

metropolitan area. The Corps of Engineers regards the plan as "apparently feasible," while conservation groups and Pennsylvania and New Jersey natural resource agencies see it as an environmental threat.

Underlying conservationists' and local residents' objections are the fear of the terminal as a harbinger of future bay development and the specter of massive oil spills. The area is popular for swimming and boating and located nearby are oyster beds for which increased productivity is sought.



Maps show proposed 76-mile Scenic River reach of upper Delaware from Matamoras to Hancock (above); and Delaware Bay, with surrounding marshlands and proposed off-shore oil terminal location. In Scenic River photographs, canoeists inspect limestone cliffs near Millrift, Pa. (left), and stream flows gently seaward from Hancock area at northern end of the main stem.



POLLUTION CONTROL

Abatement timetables are now running on most of estuary's wasteload

In the Commission's program to sharply improve the Delaware through the 1970s, dischargers whose wasteload allocations comprise 80 percent of the allowable organic pollution burden on the tidal river have been brought on the road toward compliance.

Pollution abatement schedules submitted by 41 municipal and industrial dischargers whose wastes eat up hundreds of tons a day in river oxygen have now been formally accepted by the Basin Commission. An abatement schedule is a discharger's own binding commitment to a specific timetable for upgrading effluent quality through higher treatment.

Although 24 of the tidal estuary's 91 organic dischargers had contested Commission findings, some with justification, staff-discharger negotiations or Commission decisions have resolved the disputes without necessity of court action.

The 1970 activity toward compliance brought under agreement the City of Philadelphia, by far the river's heaviest discharger with some 40 percent of the allocated wasteload. Abatement accord was reached also on three major industrial installations of E. I. duPont deNemours Co., plants of Scott Paper Co., Mobil Oil Corp. and Atlantic Richfield Co. and the Darby Creek Joint Authority in Delaware County, Pa.

Generally, the abatement schedules for the big dischargers commit them to full compliance operation in 1973 and the smaller installations somewhat earlier.

The Commission granted more time to the City of Philadelphia to upgrade its three big sewage treatment works, the heaviest of all dischargers to the river. In so doing, the Commission concurred with the City's explanation that it needed the time to carry out a cleanup program of such financial and technical magnitude. The City's compliance cost has been estimated at \$75 million.

The dischargers with approved timetables also include a group under dual schedules — one as prospective participants in a Commission-promoted regionalization system in the Salem-Gloucester region of South Jersey and another for going it alone. Other regional schemes will receive like consideration.

The 51 dischargers still without approved abatement schedules account for only 20 percent of the allocated wasteload to the estuary, an 85-mile stretch of the river from below Wilmington to the end of tide at Trenton. About a dozen of these may already be in compliance with the cleanup program and

reviews are under way to determine this, and others have submitted schedules which have not fully cleared state-Commission evaluation. The remainder will be submitting schedules alone or as participants in forthcoming regional systems to rectify their violation status.

(A chart listing dischargers under abatement schedules appears on page 10.)

Abatement schedules represent that point in the estuary cleanup process at which the burden of action under the program passes from the Basin Commission and cooperating state agencies to the discharger.

The Commission's tidewater program began in 1967 with enactment of comprehensive pollution control standards that established the river uses to be protected — water supply for public consumption and industry, fisheries enhancement and water-contact recreation. Next was preparation and adoption of implementing regulations requiring that the 1¼ million pounds daily of oxygen-consuming wastes now being dumped to the estuary after 50 percent treatment must be chopped an additional 75 percent. Then came assignment to each of the 92 polluters of its share of the tolerable 322,000 pounds.

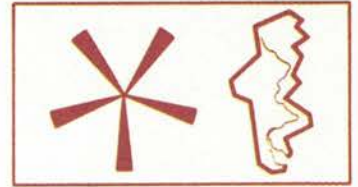
The abatement schedules negotiated this year reflect the work and time required for a discharger to get his wasteload down to his allocation, generally meaning a doubling of present levels of removing organic materials dumped to the stream. Abatement schedules list specific engineering and construction progress timetables and compliance dates.

As for the Commission's own timetable for seeing tangible results from the estuary program, the most advanced on any of the nation's heavily used rivers, staff experts forecast marked improvement in the 1973-75 period. They note indicators already that the river's deterioration has been stabilized and perhaps reversed.

Nontidal and intrastate water protection

The immensity and pressing nature of the pollution problem in the river's tidal waters naturally earned the estuary top priority in the Commission's water quality activities.

The next priority was assigned to the four-state basin's other interstate waters — nontidal streams that form or cross state boundaries. Principally, these are the main trunk of the Delaware forming the Pennsylvania-New York border from Port Jervis to Hancock, the East and West Branches, and



Brandywine Creek and other tributaries traversing state lines.

Spot attention already has been paid by the Commission to many emergency problems caused by spills and low quality discharges to these interstate nontidal waters.

In a more widespread nontidal program, arrangements now are under way for the states to report to the Commission on delinquent dischargers — those providing sub-standard treatment or dumping banned substances. Under the plan, the states will be asked to issue upgrading orders to violators who would then submit abatement schedules to the Commission for review as with the estuary polluters. In some special cases, the Commission's own order-and-hearing procedure may be used.

A similar program is slated for eventual application on intrastate waters where the states will be asked to bring the Commission's abatement schedules technique into the picture.

The basis for much of the estuary cleanup came from a mathematical model of the lower river. The Commission recently embarked on a similar program of modeling 50 miles of the nontidal river from Trenton to Easton in search of data critical to keeping that area generally pollution-free. Besides providing a clearer picture on the stream's waste assimilative capacity, the modeling project should shed light on the little-known effects of the nontidal river on the estuary.

Sampling and surveillance

To keep steady track of the quality of the estuary and the effluents and streams flowing into it, the Commission contracted with the three adjoining states two years ago to collect and analyze water samples to produce the input for its surveillance program. This effort includes weekly boat runs over a 75-mile stretch of the river and periodic sampling of tributaries and sources of pollution. To now, the program has centered primarily on oxygen factors. It is to be expanded to emphasize other measures of quality, including color, toxic substances, suspended matter and nitrogenous oxygen demand.

Pesticides, mercury and waste lagoons

Under Commission anti-pollution regulations, discharge of toxic substances to the streams is forbidden. During the year, concentrations of both pesticides and mercury, a highly poisonous heavy metal, were traced to locations along the estuary.

Following disclosure of a chemical manufacturer's mercury discharge, which has since dropped to less than a pound daily from in excess of five, a basinwide survey by the Commission and states has been launched to determine the sources and extent of discharges of the dangerous substance. Clinical, dental, household and other use is widespread, and environmental interests suggest that more epidemiological studies of mercury by health people would be in order.

Unlike with mercury, the problem of pesticides in streams is on the decline, due to the sharply curtailed worldwide use of DDT and similar materials and to improved methods of treating it as waste. Steps are under way to eliminate the recently-discovered discharge to the Delaware by a producer in the Philadelphia area.

The escape of contaminating liquid wastes recently into flowing streams from industrial waste storage lagoons focused attention on the dangers from this type of waste disposal. The location of lagoons on private industrial property has made supervision difficult. During the year, Pennsylvania assumed regulatory power over waste lagoons, as has New Jersey. Meanwhile, the basin states are conducting an inventory of all such lagoons in cooperation with the Commission to give authorities more knowledge of the extent of the problem of protecting both surface and underground water from lagooned industrial substances, often highly toxic chemicals.

Working with the signatories

In 1965, the Commission established the Water Quality Advisory Committee comprising pollution control experts of the four basin states and federal government. Besides making available to the Commission the technical knowledge and skills of top professionals representing the five signatories, the Advisory Committee's bimonthly sessions provide an effective interstate forum for coordination, continuity and information on programs.

New Jersey anti-pollution program

New Jersey became the third basin state to win approval from its voters of a massive financial attack on the water pollution problem with passage of a quarter-billion-dollar bond issue in November 1969. These funds can help pay for the \$160 million in needed sewerage facilities in the Delaware Basin portion of the state and at the same time attract substantial federal grants.

ESTUARY DISCHARGERS UNDER ABATEMENT SCHEDULES

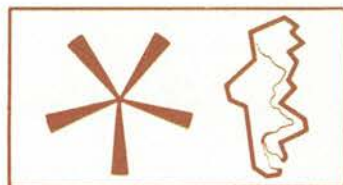
Discharger	Allocated Discharge*	Full Compliance by
Allied Chemical Corp., Claymont, Del.	845	May 1972
City of Wilmington, Del.	13,400	December 1973
Darby Creek Joint Authority, Darby, Pa.	4,000	October 1972
Union Tank Car Co., Philadelphia, Pa.	2	December 1969
Lower Bucks County Joint Municipal Authority, Bristol, Pa.	2,410	October 1970
Bristol Township Authority, Croydon, Pa.	590	July 1970
Pennsylvania Industrial Chemical Corp., Chester, Pa.	21	February 1970
Phoenix Steel Corp., Claymont, Del.	11	June 1969
Borough of Eddystone, Pa.	140	February 1973
Borough of Marcus Hook, Pa.	255	June 1972
BP Oil Corp. (formerly Sinclair), Marcus Hook	2,650	April 1973
Burlington City, N.J.	510	April 1969
Municipal Authority of Morrisville, Pa.	780	October 1971
Borough of Bristol, Pa.	640	December 1971
Gulf Oil Co., Philadelphia	2,910	July 1972
Gulf Oil Co. (sanitary waste), Philadelphia	18	July 1972
Scott Paper Co., Chester	3,750	December 1973
Scott Paper Co., Eddystone	54	February 1973
Sun Oil Co., Marcus Hook	14,400	August 1973
Muckinipates Authority; Norwood Borough, Pa.	1,380	February 1973
Paterson Parchment Paper Co., Bristol	290	May 1971
Philadelphia Gas Works, Philadelphia	1	July 1972
Atlantic Richfield Co., Philadelphia	6,560	May 1973
Atlantic Richfield Co. (sanitary waste), Philadelphia	3	December 1971
City of Chester	2,830	July 1973
Bryton Chemical Co., Trainer, Pa.	49	October 1969
Congoleum Industries, Trainer	38	January 1970
Pennsville Sewerage Authority, N.J.	350	31 months**
Penns Grove Sewerage Authority, N.J.	240	31 months**
E. I. duPont Co. — Repauno Works, Gibbstown, N.J.	9,800	66 months**
E. I. duPont Co. — Carneys Point Works, Penns Grove	1,060	66 months**
E. I. duPont Co. — Chambers Works, Deepwater, N.J.	21,100	66 months**
Mobil Oil Corp., Paulsboro, N.J.	4,250	55 months**
South Philadelphia Youth Development Center, Philadelphia	9	October 1970
FMC Corp., Marcus Hook	670	August 1972
National Sugar Refining Co., Philadelphia	490	September 1973
Northeast Sewage Treatment Plant, Philadelphia	69,300	October 1975
Southwest Sewage Treatment Plant, Philadelphia	29,000	October 1976
Southeast Sewage Treatment Plant, Philadelphia	33,200	October 1977
Old Fort Mifflin Sewerage Plant, Philadelphia	5	September 1970
Publicker Industries Inc., Philadelphia	180	September 1971

*Discharger's allocation of organic pollutants (biochemical oxygen demand) in pounds per day

**Time to be allotted to complete separate treatment facilities if discharger does not participate in proposed Deepwater regional project

REGIONAL WASTE SOLUTIONS

South Jersey, Tocks Island studies near completion; local work pushed



As part of program to bring centralized industrial-municipal wastewater management to the Salem-Gloucester region in South Jersey, this pilot plant was built and operated in 1969-70 at Deepwater under Commission contract. In background are Delaware Memorial Bridges.

With all indicators pointing to more suburban and resort sprawl along with continued population and industrial growth, the Basin Commission formally embarked in the 1960s on what will surely be a never-ending campaign for regional waste collection and treatment within the valley's sub-basins.

Joint collection, conveyance and treatment systems in sub-regions invariably are economical and efficient for participating dischargers, besides making for effective large-scale pollution control.

The Commission's regionalism efforts, reaching into all four basin states, gradually have grown into one of its major and most energetic activities. These efforts range from being the principal sanctioning organization for two expansive systems well along in the planning stages to acting as intermediary, coordinator and adviser to local groups. With the states, the Commission's role — and goal — in many of these instances is elimination of intermunicipal rivalries, often stemming from timetable conflicts where one area feels it is too far ahead to wait for a neighbor's participation.

Deepwater

To serve some 30 miles of lower Delaware River shoreline in Salem and Gloucester Counties, the Commission one year ago initiated what could become one of the most advanced regional liquid waste pollution control systems ever built. The first year has involved design of the collection network and construction and operation of a miniature high-degree treatment plant as prototype for the later big plant. A dozen participating dischargers are sharing the \$1.3 million study costs along with the federal government and the Commission.

As the year ended, the Commission's engineering consultants reported they had achieved 90 percent removal of major pollutants from the trucked-in mixture of wastes from factories and municipalities.

Decisions will have to be made soon on whether the dischargers want to proceed on the big project and on how and by whom the operation would be financed, built and run.

Tocks Island Region

The final report in the other big regional scheme, to serve the three-state area surrounding the 72,000-acre Delaware Water Gap National Recreation Area, is being readied for presentation to the many local, state, regional and federal participants in the study. When released, the report's alternative physical recommendations will be scheduled for public hearing, probably in the Tocks Island region.

Meanwhile, the Commission has engaged the Maxwell School of Public Administration at Syracuse University to explore the best means of financial and administrative implementation of physical solutions to the regional environmental problem.

Other efforts

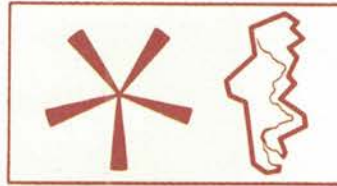
The interstate nature of pollution problems on Brandywine Creek, which flows from Chester County, Pa., into the State of Delaware, produced an advisory and coordinating role for the Basin Commission in reaching some accord on a watershed anti-pollution drive.

Impetus has largely been from local sources and state anti-pollution agencies on a number of other attempts to establish effective regional management, including a plan in Gloucester County, N.J., one in Kent County, Del., and another in its early stages in Delaware County, Pa., below Philadelphia.

As development of the basin continues and as old waste plants grow obsolete, promotion of regional approaches in combatting water pollution will remain a Commission high priority.

WATER FOR POWER

Energy competing for more water; conservationists fear effects



The Delaware River Basin Commission is fast being confronted by a perhaps unequaled dilemma — how to permit the use of an annual water crop that does not increase in size to help meet energy demands that are growing at a staggering rate.

The valley's annual precipitation averages more than 40 inches — a generous bounty. But the demands on it for carrying off even treated wastes and delivering household, industrial and farm water supply are great already and steadily increasing, not to mention its need in pure form for recreation and fishlife preservation.

Meanwhile, the Northeast in whose midst the Delaware is situated cries out for more and more electrical power yearly. Utility companies talk of consumer demands doubling every few years in their service areas and, under their obligations as licensed monopolies, they are busily working toward production of the corresponding supplies.

Thus the already complex problem of providing good, useable water for a host of other competing purposes is compounded by the stampeding energy market.

Both fossil and nuclear-fueled power plants use large volumes of water to cool their generators or reactors, and much of that is lost due to evaporation, whether placed in cooling towers for recirculation or discharged hot directly to the streams. In addition, whatever volume of water they do discharge back into the stream is heated and causes some degree of thermal pollution. Nuclear plants discharge wastewaters with radiation levels that many scientists and technicians in the field feel are safe but that environmentalists, joined by dissenting experts, fear can have dangerous if not disastrous long-range effects. Hydroelectric plants run on falling water that neither evaporates nor pollutes, but impoundments are usually required which many conservationists complain disturb the ecology. Furthermore, electricity that is transported over long distances is sent by way of overhead high-tension systems that are visual anathemas to the conservation-minded generation. (Underground lines

are impractical because of heavy voltage loss.) Cooling towers, which are sometimes equal to 40-odd stories in height, get a similar reception.

Recent utility company activity has brought a flurry of power issues to the Basin Commission in the form of applications for approval of projects that involve water resources, and the prospect for the foreseeable future is for more of the same. For example, as the year ended, applications for approval of three new nuclear generating stations were under review by the Commission.

One station planned by a group of companies operating on both sides of the river is proposed for construction along the Delaware River on Artificial Island in Salem County. Its wastewater would be piped directly into the wide river there without cooling towers, since the sponsors contend they can operate within the Commission's thermal pollution limitations if granted a mixing zone where the heat ceilings could be exceeded. Under Commission regulations, such zones are permissible.

The other two nuclear plants would be located in Limerick Township on the Schuylkill River near Pottstown, Pa., and at Newbold Island on the Delaware in Bordentown Township, N.J. With river volumes far smaller at these locations than off Salem County, thermal pollution limits could not be met and cooling towers would be a must.

In each of the three instances, water volumes equal to that consumed by a small city would be evaporated. Reservoirs existing or to be built in the upper basin may meet the volume needs of these projects and still maintain a healthy river, but supplies for some of the other future power plants under discussion might overtax the river.

Utilities contend that radiation from the proposed plants is well within Basin Commission limits, but the standards of the National Radiation Council on which DRBC's are based are now under challenge.

Besides directly-related water issues, citizens and organizations have raised broad environmental and aesthetic issues that go beyond the Commission's

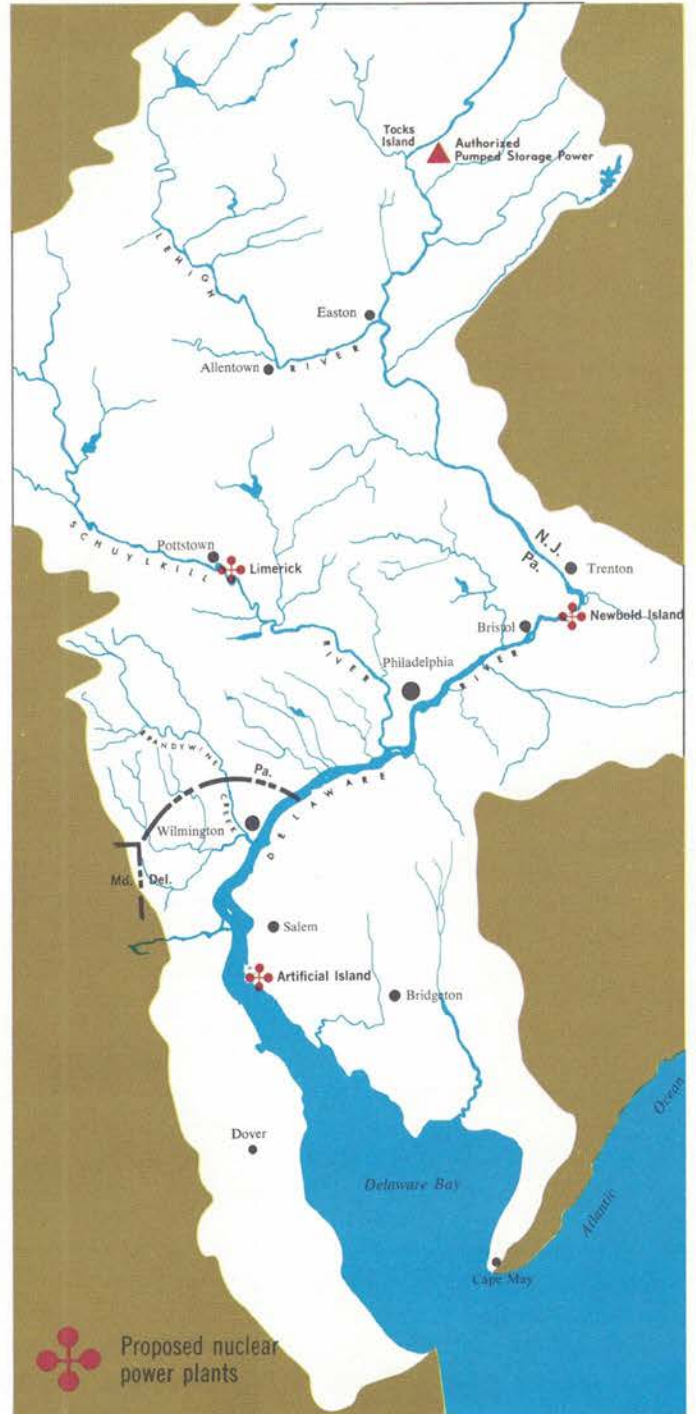
present jurisdiction, such as the proximity of one plant's cooling towers to a popular historic attraction. Also, site preparation work not involving water use has commenced at all three plants, and the Commission has notified the companies that such work in advance of approval is done at their own risk.

Another pending power issue involves the plan of a group of New Jersey utilities to construct a pumped storage generating facility on Kittatinny Mountain opposite the Tocks Island dams site and adjacent to an existing pumped storage operation. Congress and President Nixon this year granted authorization, required because the system would be operated in conjunction with the Tocks Island Reservoir that soon enters construction. The Basin Commission and Federal Power Commission still must review detailed plans for the proposal, which has provoked conservationist fears over effects on the mountain and reservoir ecology. The federal authorization incorporates the conservation conditions imposed in 1968 by the Basin Commission on the mountain's use, including minimum environmental disruption, underground power and water lines and landscaped dikes.

These prospective demands on Delaware water brought recognition by the Commission staff that thought-out and scientifically-based data will be required to make intelligent determinations on future applications. The Commission thus prompted a long-range study to be conducted by nine power companies tied to the network serving the basin. The work will encompass desirable power plant site locations, power requirements, ability of the Delaware to meet water demands, environmental implications and other factors.

How many future power plants that could be supported by the Delaware River will be determined by many factors, including competition for water, environmental developments and technological advances, particularly respecting water uses.

13 A half-dozen future stations are under discussion.



BUCKS-MONTGOMERY WATER SUPPLY

Pumping-pipeline weighed to meet domestic, power needs

Several years ago the Basin Commission approved Bucks County's comprehensive water supply plan for Neshaminy Creek Watershed which included a pumping station on the Delaware River at Point Pleasant and pipelines to help fill the county's reservoir system.

Meanwhile, Philadelphia Electric Co. divulged a proposal to construct a twin-reactor nuclear generating station on the Schuylkill River near Pottstown that would need more water for cooling purposes — about 40 million gallons a day — than the Schuylkill could spare.

Since the East Branch of Perkiomen Creek extends to within a few miles of the planned pumping station on the Delaware and flows near the proposed power plant, consideration was given to building a larger Point Pleasant pump-pipeline facility to meet both the power generating and Neshaminy water supply needs.

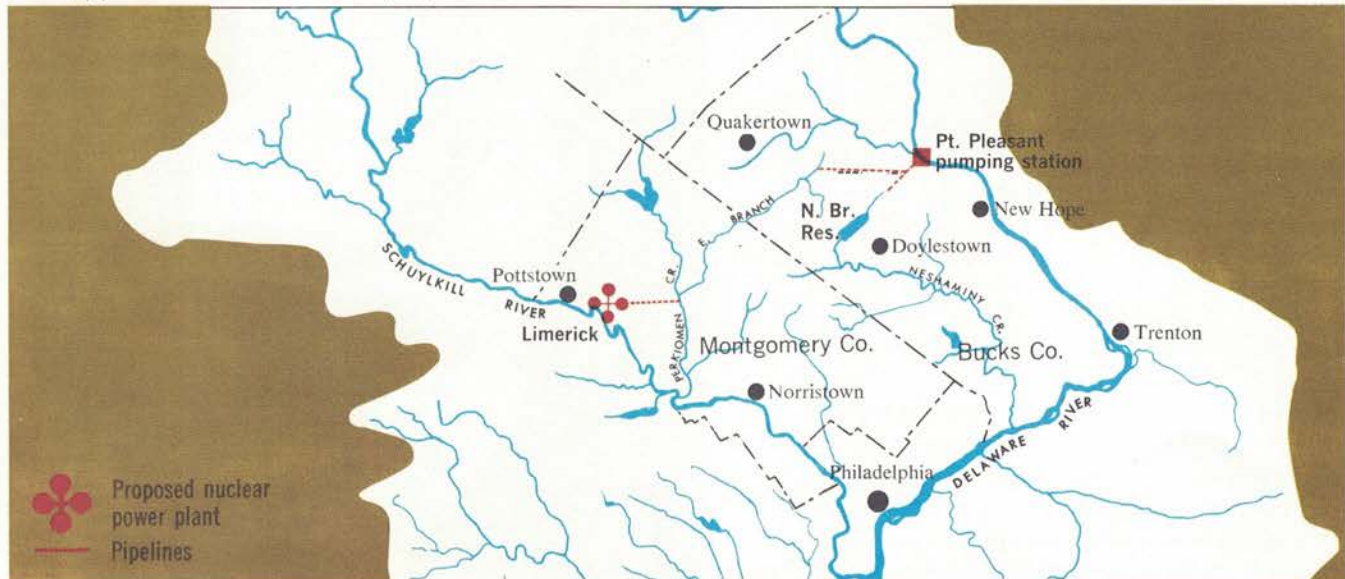
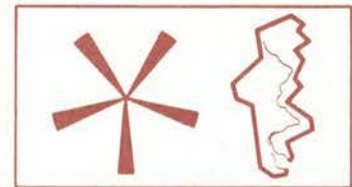
After a consulting engineer found the plan economically and physically feasible, Bucks County applied to the Commission for approval of the dual water supply transmission system.

At a Commission public hearing, Bucks County and representatives of local areas, including a section of Montgomery County that wants to buy Neshaminy water, supported the plan, but conservationists said the increased flows in the Perkiomen from the Delaware might change its ecology. A water resources expert said the change would be for the better.

The year ended with the issues, including the questioned wisdom of the inter-watershed transfer and who should build and operate the pumping plant and how it would be financed, still unresolved.

The scheme calls for short pipelines to both the Neshaminy and Perkiomen headwaters. The water delivered to the Neshaminy — 50 million gallons a day at first and doubling by 1990 — would flow a short distance to a reservoir, where it would be released for delivery to the Doylestown-Chalfont areas and Montgomery County after treatment. Water pumped to the Perkiomen East Branch would flow nearly 30 miles to the creek's main stem, and from there be transported by a power company pipeline to the nuclear plant.

Water for cooling the power plant, most of which would be evaporated, would come from storage in upper Delaware Basin reservoirs, as would the supplies for the Neshaminy system.



WATER CONTROL PROJECTS

Beltzville reservoir completed and Tocks work to begin; other facilities move ahead

Activity bustles on half of the eight multiple-purpose reservoirs authorized for the Delaware Basin by Congress in 1962 and on many local projects in DRBC's river control plan.

Beltzville

Work remains only on the finishing touches at Beltzville Reservoir, located on a Lehigh River tributary, which already has protected downstream communities from floodwaters. It will be fully operational by June 1971, including recreation facilities slated to accommodate 250,000 visitors yearly in the picturesque Pocono region. The Basin Commission, backed by state credit, has contracted with the local Corps officials to buy the impoundment's water supply for future wholesaling.

Tocks Island

Congress finally has ordered construction to begin on this, the principal reservoir in the four-state valley and one of the eastern United States' largest. Earth-moving begins next year. With full-speed appropriations from Congress, the 37-mile-long on-river Tocks Island Reservoir and surrounding Delaware Water Gap National Recreation Area can be completed in eight years.

Opponents of the facility who failed to win Congressional sympathy now look to the President's Council on Environmental Quality for support, but the war-delayed reservoir and park development continues to enjoy endorsement from basin state governors and most lawmakers on grounds of needed water supply, flood protection and recreation. Opponents complain that the project will bring undesirable change to the area and may disrupt the river's ecology.

To now, land purchase policy limitations have created hardships for many willing sellers because funds were unavailable for part of their land, but Congress has now earmarked money for split tracts that span the reservoir-park boundary. Long before final completion of the project, it will provide flood protection and park facilities.

Blue Marsh

Six miles northwest of Reading will be the location of Blue Marsh reservoir, which the Corps is now designing and about to start purchasing land for. Besides supplying water for suburban Reading and other areas and augmenting low flows to improve stream quality, it is a recreation-flood control project, scheduled for completion in the mid-1970s.

Trexler

Lehigh County authorities are negotiating with the Basin Commission for purchase of water to be provided from Trexler reservoir, to be built in a game



This year marked completion of Beltzville reservoir in the Lehigh Valley, a multi-purpose facility that will be filled by Spring 1971. View is across dam, with water outlet works in foreground.

preserve on a Lehigh River feeder stream 10 miles west of Allentown. Because of this water need, the Commission and local officials are pressing for early completion of design work by the Corps.

As with Blue Marsh, the Basin Commission this year formally assumed responsibility to repay the Corps for including the water supply feature with funds to come from wholesale water distribution. Similar repayment assurances have been provided on Beltzville and Tocks Island.

State-SCS-local projects

Now being completed on Tohickon Creek in upper Bucks County is Nockamixon reservoir, a Pennsylvania Forests and Waters Department facility slated for immediate recreation use and future water supply.

Another Forests and Waters Department reservoir, developed in cooperation with the U. S. Soil Conservation Service and Chester County, is moving ahead on Marsh Creek, an upper Brandywine Valley stream. The dam is to be completed in 1971, when work will begin on recreation. It also will provide water supply for Downingtown and West Chester, streamflow protection for the State of Delaware, and flood protection.

A joint Conservation Service-local reservoir is to be completed soon on Mauch Chunk Creek in Carbon County. An earlier start on this multi-purpose impoundment would have been fortuitous, since work was launched only days after the worst flooding in years occurred in Jim Thorpe in 1969.

Conservation Service-local projects also are progressing in a number of other New Jersey and Pennsylvania watersheds, including Assunpink and Brodhead Creeks.

DRBC's ADVISORY ROLE

Basin communities employ Commission services on pollution, flood damage and watershed management problems

Much of the daily staff effort of the Commission is expended performing the advisory, cooperating and coordinating functions mandated prominently in the 50-page Delaware River Basin Compact.

The situations which draw into play the Commission's advisory activities are diverse and plentiful. Many arise routinely as agencies clear their plans with the Commission, with others in spontaneous response to emergencies or other unpredictable circumstances. The aid goes to private water-related organizations as well as to government agencies, mostly county and municipal-level.

The most critical and sustained endeavors involve promoting community attacks on pollution problems, particularly through regionalized waste collection and treatment in subsections of the basin for better water quality at lower cost. The current campaign to solve pollution problems along heavily built-up Darby Creek in the Philadelphia suburbs, for example, has entailed Commission consultation on selecting from alternative solutions as well as analysis of the stream to determine its waste assimilative capacity. Sometimes requested and sometimes proffered, such Commission involvement extends into many sections of the basin.

The Commission conducted last year a well-attended seminar on industrial wastewater management and policy to help industrial managers select approaches and techniques to waste treatment in light of the basin's new pollution control requirements.

A crisis tackled by the Commission in its early years on protecting streams from dangers of petroleum pipeline breaks gave the agency an expertise in application of safety measures that has been in repeated demand far beyond the Delaware Valley's boundaries.

Each year, the Commission cosponsors with the private Water Resources Association a two-day water resources conference which exposes public and private officials in the water use and regulatory fields to new ideas and information in resource management. The Association and Commission also

have engaged in numerous other cooperative ventures for nearly a decade, including promotion of land use measures for flood protection, preservation of the good quality of Delaware Bay and its marshland areas, and good local watershed management.

Also in the watershed management field, the Commission has aided the Mid-Atlantic Council of Watershed Associations in formulating its long-range planning activities. This year the Commission helped organize and participated in the first Pennsylvania-wide watershed workshop.

In helping to guide the upsurge of local citizen conservation action, the agency has helped organize or revive a dozen-odd private watershed associations over the past two years, including the formation this year of the Bushkill Creek, Chester-Ridley-Crum and Pocono Mountain Watershed Associations. Efforts to organize similar groups also are under way in some half-dozen additional Delaware tributary areas.

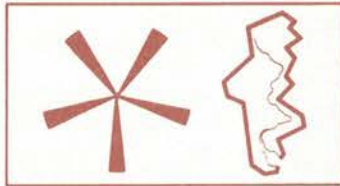
Numerous organizations in planning and water resources request and receive Commission participation on regular or special committees. For example, the open space, water supply and waste disposal committees of the Delaware Valley Regional Planning Commission include DRBC members. The Commission routinely exchanges information and services with the important Tocks Island Regional Advisory Council for the benefit of both organizations' programs.

A key member of the Commission's staff serves on the federal-state task force dealing with the proposed inclusion of an upper reach of the Delaware in the National Wild and Scenic Rivers System.

Each year, scores of presentations on the Commission's work and water resource matters are made by executive and technical representatives of the agency before professional, business, civic and school groups. Commission views on a variety of resource issues are sought by legislative committees and commissions. A score of appearances by DRBC personnel before environmental groups were made during Earth Week alone.



ANNUAL MEETING • 1970



The Commission's ninth annual meeting, held April 14 at the New Jersey Cultural Center at Trenton, brought together four Governors and Secretary Hickel for the series of events pictured.

Leigh Photographs

CONDITIONS: FLOODS

Some areas hard-hit; another close call for river's main stem

The severest flooding in 15 years and a most unusual icejam were the notable events in the river's conduct in 1969-70.

A long period of normal precipitation and streamflows was broken abruptly when rain torrents of five to eight inches produced serious local floods, disastrous in some locations, for several days through August 2, 1969.

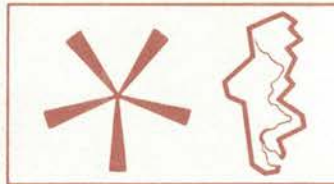
Federal disaster declarations were issued for Carbon, Monroe and Schuylkill Counties in Pennsylvania and Sullivan County, New York, as a result of overflows in the watersheds of the Lehigh, Mongaup and Neversink Rivers, Bushkill and Shohola Creeks and Beaver Kill. Under disaster decrees, local areas are eligible for federal relief.

Some spectacular rescues prevented loss of life, and thousands of persons were evacuated from danger areas. Damage to private and public property, normally about \$2 million annually on all the Delaware's upper tributaries, tolled nearly \$10 million in this flood alone. Victimized communities included Jim Thorpe, Tamaqua and East Stroudsburg in Pennsylvania and Liberty, Livingston Manor and Pond Eddy in New York.

Then, spring rains and thaws swelled the main river at Trenton to its highest level in a decade, only two feet below flood crest.

An unusual massive icejam developed during February in the 25-mile stretch of the river between the Delaware Water Gap and Dingmans Ferry. Hydrologists estimated that the icejam was holding back a "reservoir" of billions of gallons of water that might have produced some flooding downstream had an icebreak occurred. However, the flood threat disappeared when the return of cold weather retarded the thaw, allowing the "stored" water to seep through.

Precipitation for the year totaled slightly above the averages — 41 to 45 inches — in most sections of the four-state basin, although the Reading area received an unusually heavy 52 inches. Streamflow levels followed suit, running just above normal at most locations. Reservoir supplies were ample and groundwater tables remained generally healthy. The annual salt water intrusion from the ocean stayed a safe distance away from Philadelphia's water supply intakes, but there was no change in the customary severe oxygen depletion of the Delaware below Philadelphia when the weather got warm.



Rain torrents of July-August 1969 brought the tragic results recorded in these photographs taken in Jim Thorpe, Pa., at the peak of the Delaware Valley's worst flooding in 15 years. Waters were from overflowed Mauch Chunk Creek, where, ironically, an upstream flood control dam went into construction just days later.



REDUCING THE DAMAGES

National Flood Insurance promoted; more high-risk areas mapped

In the four-state, 13,000-square-mile Delaware River Basin are some 65 or more local areas that suffer periodic flooding. It is the job of large flood control reservoirs to skim off the waters that would cause flooding of disaster proportions, and smaller impoundments are intended to do the same for small watersheds. Woodlot management and other land treatment measures also cut damages.

But structural and land treatment measures cannot — and are not intended to — guarantee against every last flood threat. Also, the cost of dams big enough to stop all floods is prohibitive.

Over the centuries, stream and river-lined lands known as flood plains have helped carry off swollen flows to the sea. Though nature has provided them for this purpose, man still insists on defying the risks by building his houses and other facilities there.

Water resource agencies in the basin are making a big effort to prevent incompatible use of flood plains in addition to their work on cutting losses by means of large and small flood control structures.

With a goal of inducing municipalities to zone flood plains accordingly, water agencies and organizations have prepared flood history atlases along 450 miles of rivers and streams with a history of flooding. These maps precisely delineate the boundaries of lands that are subject to flooding, say, every five, 25 or 100 years. The Corps of Engineers, U. S. Geological Survey, state agencies, Basin Commission and volunteer watershed associations all have cooperated in this venture.

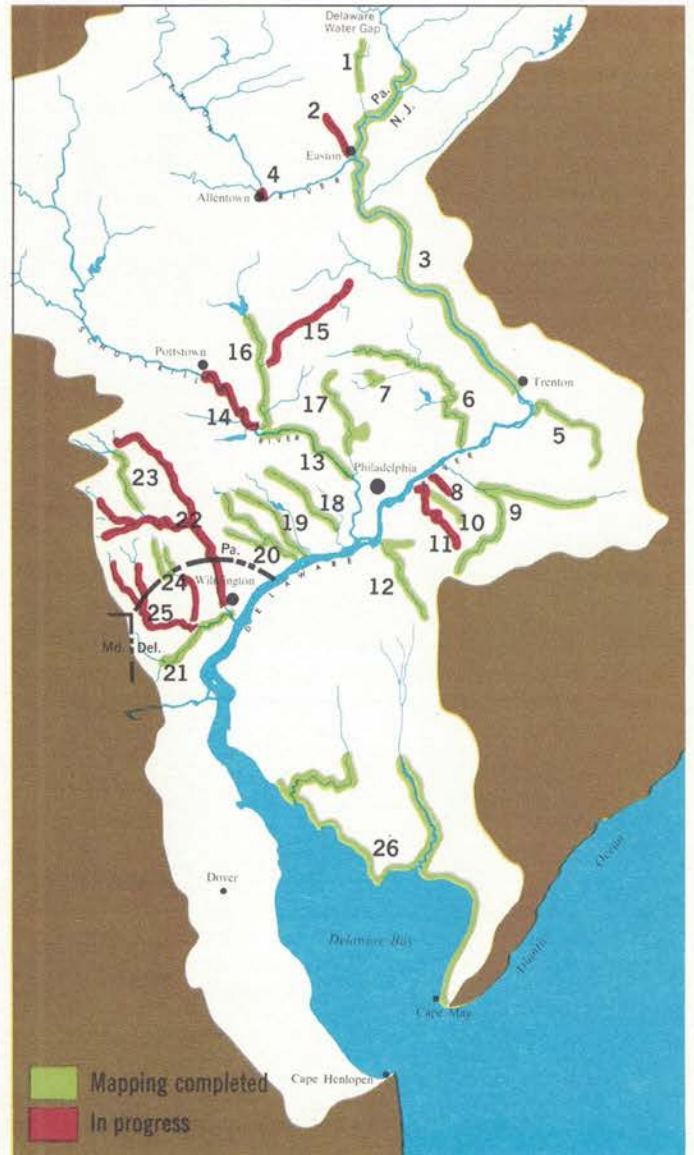
The flood plain mapping now has taken on added importance with the enactment of the National Flood Insurance Program. Federally subsidized flood insurance is now available on private residential and commercial property, but only in municipalities that act to control future use of flood plains through zoning and other measures.

The federal law also requires that participating municipalities be in possession of local flood history information. Thus, availability of the flood maps prepared by the water agencies means that scores of municipalities already can meet part of the eligibility requirement.

Only a few communities have qualified for insurance, but a score or more have adopted flood plain zoning ordinances, and others are preparing them.

Insurance coverage on residences and small businesses is available, with premiums ranging from 40 to 70 cents per \$100. Deadline for municipalities to qualify is the end of 1971. The program will not pay benefits on a property more than once.

19 The map shows where flood plain mapping has been completed or is in progress.



FLOOD PLAIN MAPPING

- | | |
|--|---|
| 1 Martins Creek | 14 Schuylkill River — Pottstown |
| 2 Bushkill Creek (Northampton Co.) | 15 East Branch Perkiomen Creek |
| 3 Delaware River | 16 Perkiomen Creek |
| 4 Lehigh River | 17 Wissahickon Creek |
| 5 Crosswicks Creek | 18 Darby Creek |
| 6 Neshaminy Creek | 19 Ridley Creek |
| 7 Little Neshaminy Creek | 20 Chester Creek |
| 8 Pompeston Creek | 21 Christina River |
| 9 Rancocas Creek | 22 Brandywine Creek |
| 10 North Branch Pennsauken Creek | 23 West Branch Brandywine Creek |
| 11 Pennsauken Creek and South Branch | 24 Red Clay Creek |
| 12 Big Timber and Little Timber Creeks | 25 White Clay Creek |
| 13 Schuylkill River | 26 Delaware Bay, Cohansey River and Maurice River |

FINANCIAL SUMMARY

BUDGETARY

1970 REVENUES		1970 EXPENDITURES*	
Budgeted	Received	Appropriations	Expended
Delaware 68,500	68,500	Directorate 160,871	186,949
New Jersey 280,500 ⁽¹⁾	280,500 ⁽¹⁾	Administrative Division 127,369	137,914
New York 239,500	239,500	Planning Division 988,760	935,056
Pennsylvania 252,900 ⁽¹⁾	252,900 ⁽¹⁾	TOTAL 1,277,000	1,259,919
U.S. 153,000	153,000		
FWQA Grant 171,000 ⁽²⁾	153,974 ⁽²⁾		
Miscellaneous 1,000	3,312 ^(3a)		
Signatory Balance 112,600	112,600		
TOTAL 1,279,000 ⁽³⁾	1,264,286 ^(3b)		
(-) 14,714			
1,264,286			

By Organization		By Program	
		WATER SUPPLY	54,000
		WATER DEMAND	22,000
		RECREATION	69,000
		POWER	11,000
		PROJECT REVIEW	126,000
		WATER QUALITY	510,000
		COMPREHENSIVE PLAN	238,000
		FLOOD LOSS	67,000
		BASIN OPERATION	111,000
		SMALL WATERSHEDS	69,000
		TOTAL	1,277,000
		Capital Program	2,000
		Excess Appropriations over Expenditures	17,081
		GRAND TOTAL	1,279,000

(1) Includes \$1000 appropriation for Capital Budget

(2) \$17,026 of grant amount not received

(3) \$2,367 unencumbered balance transferred to Working Reserve

a. \$2,312 excess miscellaneous revenue

b. \$55 unexpended funds

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

*Expenditure figures subject to audit of computerized cost analysis report.

NON-BUDGETARY

	Funds Available	Expenditures	Unexpended Dedicated Allotment
Tocks Island Region Environmental Study	24,972	16,178	8,794
Wing Dam	79,947	79,947	0
Tocks Island Fish Research	53,348	21,960	31,388
Deepwater Regional Study	664,076**	510,242	153,834
TOTAL	822,343	628,327	194,016

**246,969 FWQA receivable

Delaware River Basin Commission
Box 360 · Trenton, N.J. 08603



The Delaware's second largest tributary is the Lehigh River. Shown is a Lehigh headwaters scene below White Haven, Pa., in the popular Pocono Mountains.

