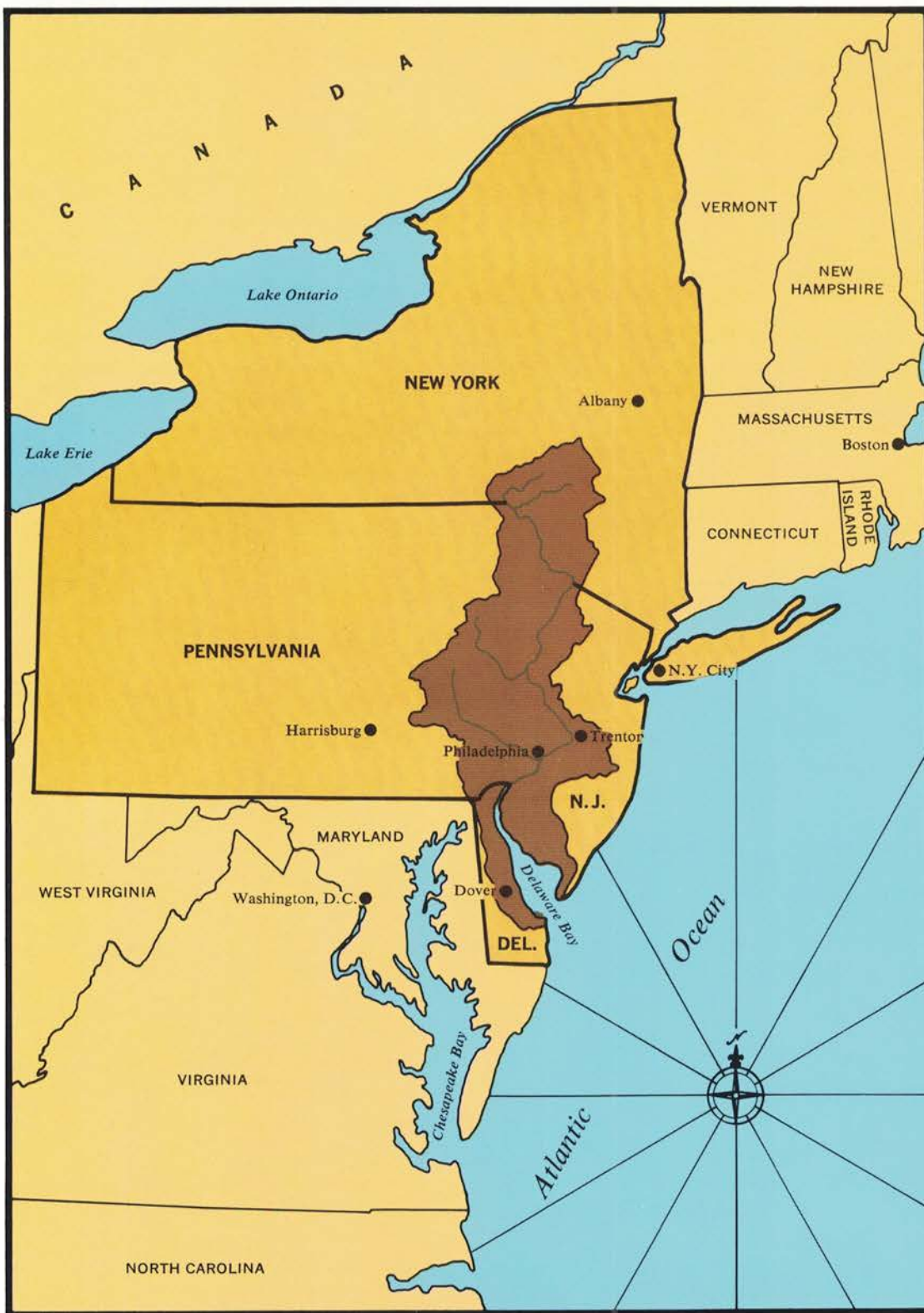


DELAWARE RIVER BASIN COMMISSION · ANNUAL REPORT 1973



# Delaware River Basin



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Cover: Sunset over Delaware Bay from the New Jersey shoreline.

Right: Closeup into the stream edge of a Delaware River tributary near the Water Gap.



## Introduction

With the year covered by this report, the interstate-federal Delaware River Basin Commission began the second decade of its assignment to manage the basin's water resources for the optimum benefit of the valley's seven million residents and to achieve a balance between the perennially rival forces for resource preservation and resource development.

The Commission stepped up sharply its environmental protection activities in 1973 with the first year's operation of a new unit that is, among other things, the agency's watchdog in behalf of the letter and spirit of the National Environmental Policy Act.

There was new emphasis also on efforts to reduce losses from flooding through the regulation of land uses and other non-structural means that are the companions of dams and levees in pursuing a comprehensive flood protection program.

And the prospects looked better than ever for having the sparsely developed upper Delaware, where it is the New York-Pennsylvania common border, become a National Scenic and Recreational River dedicated to permanent natural preservation.

Older programs such as reclaiming the Delaware River tidal estuary and assuring water supplies to meet future demands for homes, farms and industries moved ahead on schedule, as did the perpetual, vital yet unsung jobs of data collection, stream monitoring and surveillance, biological investigations, watershed planning, preparation of hydrologic reports and others.

This, the eleventh annual report, records these and other DRBC activities, trends and progress for the year ending June 30, 1973. It is respectfully presented to the residents of the valley in Pennsylvania, New York, Delaware and New Jersey and to their representatives in Washington and the State Capitols.



Report designed by  
Louis F. Conant,  
DRBC Graphic Artist

# 1973 • Review

Secretary Rogers Morton, on becoming chairman of the Delaware River Basin Commission at its 1973 annual meeting in New York City, declared that the “enthusiasm and promise” on which DRBC had been built more than a decade earlier harvested “a competent, interdisciplinary operation geared to performance and achievement” and cited recommendations and recognition from the Advisory Commission on Intergovernmental Relations, Brookings Institution and the National Water Commission.

Yet the new chairman warned that the work ahead in planning for more orderly urban growth while safeguarding the environment “will provide a major challenge to DRBC’s adaptability and capability,” citing the new mood that refuses to accept “unfettered growth and the business-as-usual attitude.”

The challenge of adaptability was in fact at hand, for 1973 already was bringing on one such challenge after another.

It was a year that enactment of a vanguard federal policy on water pollution control changed the rules in mid-game, forcing DRBC to reexamine and modify the entire fiber of its own laboriously forged program that is further along probably than any in the nation.

Subsequent sections in the report describe these and other subjects that highlighted the year’s events for the river, including developments on water supply sales, establishing uniform guidelines for using land controls and other non-structural approaches to cut down on flood damages, and preserving the sparsely-developed northernmost 75 miles of the Delaware as a National Scenic River.

It was a year in which DRBC was implored from one side to move faster on nuclear and other power plant applications as the energy pinch became more critical while, at the same time, being assaulted as too willing to submit to the region’s big electric utilities.

Issue after issue, not the least of which centered on the Tocks Island reservoir controversy, presented the same “major challenge” so accurately described by a Secretary of the Interior who was under the same pressures on a national scale.



**Reorganization** • At the annual meeting Ex-Governor Rockefeller succeeded Secretary Morton as vice chairman and Delaware’s new Governor Sherman W. Tribbitt participated in his first session as a DRBC member.

DRBC gets two new representatives in 1974 with the induction of Governor Brendan T. Byrne in New Jersey and Governor Malcolm Wilson in New York. Mr. Rockefeller had been the only remaining original member.

Two changes occurred in 1973 among the five Alternate Members who act in behalf of the principals on a day-to-day basis, including the regular monthly meetings. Secretary John C. Bryson of Delaware’s Department of Natural Resources and Environmental Control and a long-time environmental official there was named by Governor Tribbitt to replace Harold L. Jacobs, who served on DRBC nearly six years, and President Nixon appointed Thomas F. Schweigert to succeed Paul M. VanWegen, who had been the Federal Alternate from 1969. Mr. Schweigert, a forester and land surveyor, had been Federal Co-chairman of the Upper Great Lakes Regional Commission more than two years after being a Michigan State Senator for nine years.

The post of Advisor to the Federal Member also changed hands when Col. C. A. Selleck Jr. took over from Col. Carroll D. Strider as the Army Corps of Engineers’ new Philadelphia District Engineer. Col. Selleck, as a younger Corps officer, had helped direct the cleanup of the Delaware Basin after the disastrous flood of 1955.



Governor Tribbitt's predecessor, Russell W. Peterson, went on to become the new chairman of the President's Council on Environmental Quality.



Gov. Byrne

**Water Consumption** • In his annual report to the Commissioners, Executive Director Wright sounded the staff's increasing concern over the escalating demands on the river and its tributaries for consumptive water uses — those causing water loss through evaporation, mostly in the cooling of electric generators. "Present and near-future levels of demand and supply in the basin clearly suggest that basinwide quality and streamflow objectives cannot be achieved much longer if unrestricted consumptive uses are permitted," the Director stated.

Thus the staff initiated preparation of a prospective new article to the Comprehensive Plan which, in absence of adequate public storage facilities such as Tocks Island, would require that applications for approval of large consumptive water-using operations be accompanied by provisions for privately-built reservoirs or by in-plant water conservation practices.

Such a new article would to some extent formalize as policy an important ad hoc decision made this year on proposals by Public Service Electric & Gas Co. of New Jersey and Philadelphia Electric Co. to build giant nuclear generating stations on the Delaware and Schuylkill Rivers.

Although the Commission was not yet prepared to rule on applications for the controversial stations, the Atomic Energy Commission discontinued its own hearings on the plants and told the companies they could not be resumed unless DRBC first indicated adequate water would be available to support them.

DRBC held hearings, then ruled that streamflows would be adequate to support the plants provided the companies agreed — which they did — to slowdowns or shutdowns in event flows dropped below dangerous levels. DRBC further ruled the companies would have to complete their own reservoirs by 1980 if no ample public storage facilities are then under way. The water availability ruling was made by DRBC with no commitment to approve the still pending A-plant applications, which deal primarily with pollution and water consumption factors.

AEC resumed its hearings, but then told Public Service it should abandon its planned Newbold Island site on the Delaware between Trenton and Philadelphia, which it did, in favor of expanding another nuclear operation already under construction on the river in Salem County. The proposed Schuylkill plant is Limerick, near Pottstown.

On a thermal pollution matter also related primarily to electric generating operations, the Commission took under consideration a flat ban on all once-through cooling practices. Under this practice, water is discharged back to the stream hot immediately after being used for reactor, generator or machinery cooling, resulting in both heat pollution and extensive evaporation.

The Commission also banned future pre-approval construction activity on projects still pending decision to avert situations that have developed in recent years on several power station jobs, some of which have involved millions of dollars in building work prior to clearance by DRBC and other regulatory agencies.



Gov. Wilson



Col. Selleck



Mr. VanWegen

**Master Plan** • Enlargement, reorganization and rewriting of the Basin Commission's Comprehensive Plan into a single, more readable and better presented multi-volume document, a project long under way, is nearing completion.

The old plan has grown from the original Phase I, itself a separate bound volume, into a multitude of standards, policies, projects and programs that sometimes lack uniformity and are not physically incorporated into a single form or place. The new loose-leaf version will be kept current easily and be more accessible to staff and the public.



Mr. Jacobs





Mr. DeGelleke

DRBC Chief Engineer Howlett (left) discusses a water pollution matter with representatives of the U.S. Geological Survey in a typical interagency consultation.

To further facilitate use of the Comprehensive Plan, a firm was engaged to set up a quick retrieval system for the extensive water use details on file for more than 1,000 projects and facilities in the plan, to which some 200 are added yearly. This will better reveal the impact of project review applications on affected regions in the basin. The system also will produce fast information on pipeline stream crossings and locations and the names and phone numbers of downstream water users in event of spills of oil or toxic materials.

●

**Middle River** • Director Wright lauded efforts under way to preserve the environmentally high quality of both the Delaware Bay area and the upper main stem bordering the Catskill and Pocono Mountains, but warned that the still-rural middle river region from Trenton to the Poconos has no comparable program to insure retention of its good-quality surroundings.

Four new superhighways joining the river with areas to the east and west will mean unprecedented accessibility inevitably accompanied by intense pressure for development, the Director said. He reported that the staff will thus explore a protection program entailing erosion and sedimentation control, prevention of harmful runoff from developing areas and guides to residential and industrial development.

●

**Water Control Projects** • Each year brings activity on a larger number of reservoir projects, all components of DRBC's Comprehensive Plan, by state and federal agencies.

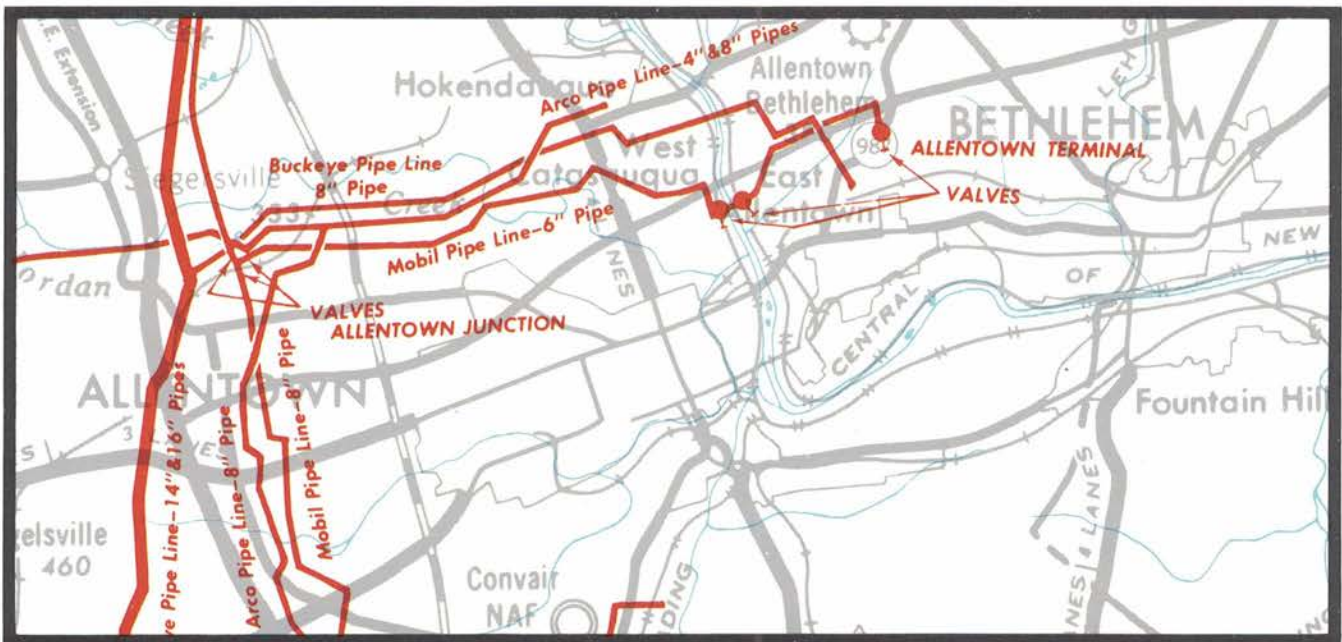
Pennsylvania has completed two projects this year. They are Nockamixon on Tohickon Creek in Bucks County, a recreation-now, water supply-later facility, and Marsh Creek, an impoundment built by the state, Chester County and U.S. Soil Conservation Service that will provide water supply for West Chester, Downingtown and other Brandywine Valley communities as well as flood protection and recreation.

Preconstruction work was completed on two multiple-purpose federal projects — Blue Marsh in the Schuylkill Valley, on which construction contracts are being let, and Trexler in the Lehigh Valley, which received no building appropriation for 1974.

Bucks County's pumping station-pipeline project at Point Pleasant on the Delaware is in final stages of detailed design. This facility will divert water from the river to supply fast-growing residential areas in the Neshaminy Valley and also into Perkiomen Creek for cooling purposes at the proposed Limerick nuclear generating station near Pottstown.

●

**Publications** • Just published and now available at \$5 a set are DRBC maps showing the general location of the 1,100 miles of petroleum pipelines in the four-state basin. The basic purpose of these maps is to minimize the occurrence



This Pennsylvania area detail is from DRBC maps giving the location of known liquid petroleum pipelines throughout the basin, just published to help prevent and cut down harmful impact from spills.

of accidents by promoting awareness of their presence by planners, designers, contractors, industries and government agencies. In the event of accident or failure, such knowledge will also be helpful in issuance of pollution alerts, and minimizing harmful effects on the water resources.

Rising costs for new printings of DRBC's popular outdoor recreation maps of the 200-mile non-tidal stretch of the Delaware necessitated doubling the price to \$2 a set. More than 20,000 sets were purchased, principally by canoeists, at the old price, which failed to cover expenses.

●

**Fisheries** • DRBC's investigation at the University of Delaware into local feasibility of a Japanese technique for growing oysters from suspended submerged objects to protect them from bottom-dwelling predators and silt was concluded with varying but somewhat discouraging results. A limnology survey (into water chemistries, plankton, macroinvertebrates and aquatic plants) was continued in the Delaware and major tributaries in the proposed Tocks Island reservoir area, and a multi-state and federal group of biologists completed a fisheries management plan for the Tocks lake.

●

**Metering** • To promote water conservation, DRBC voted to require installation of meters on all new public and private housing, commercial, industrial and other developments serving more than 250 connections or using more than 100,000 gallons daily.

●

**Visitors from abroad** • DRBC and the Delaware Valley continued to attract the attention of water scientists and administrators from around the world. As part of the U.S.-U.S.S.R. environmental exchange program set up in 1972, a team of Soviet pollution authorities spent three days in the valley learning about mathematical modeling for water quality, spray irrigation, watershed management and industrial treatment. Other visitors came from Italy, Brazil, Japan and Hungary.

●

**Retirement** • Peter DeGelleke retired after a long career with the National Park Service in which he watched his pet project grow from an idea to a famous park well on its way toward development. DeGelleke was the individual most closely identified with the Delaware Water Gap National Recreation Area, which he helped plan and of which he was superintendent from 1966 to 1973.







Governor Cahill, Governor Rockefeller, Secretary Morton, Governor Shapp and Governor Tribbitt.



## Alternate Members



Richard J. Sullivan  
New Jersey



W. Mason Lawrence  
New York



Thomas F. Schweigert  
United States



Maurice K. Goddard  
Pennsylvania



John C. Bryson  
Delaware

# The Commission 1973

### Chairman

Rogers C. B. Morton

Secretary of the Interior

### Vice Chairman

Nelson A. Rockefeller

Governor of New York

William T. Cahill

Governor of New Jersey

Sherman W. Tribbitt

Governor of Delaware

Milton J. Shapp

Governor of Pennsylvania

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

## Advisors

Col. C. A. Selleck Jr.

United States

Martin Lang

New York

Carmen F. Guarino

Pennsylvania

## The Staff

James F. Wright

Executive Director

William Miller

General Counsel

W. Brinton Whitall

Secretary

Dawes Thompson

Public Information Officer

Arthur E. Peeck

Chief Administrative Officer

Robert L. Mann

Head, Environmental Unit

### Planning Division

Herbert A. Howlett

Chief Engineer

C. H. J. Hull

Staff Engineer

### Branch Heads

Seymour D. Selzer

Program Planning

Ralph Porges

Water Quality

Robert L. Goodell

Operations

Theodore Briganti

Project Review



Mr. Wright



View looking up the Delaware from downtown Trenton. Buildings in foreground comprise the New Jersey State Capital complex. Pennsylvania is on the left.



## River Conditions

The report year started with a hydrologic bang on July 1, 1972, with flood waters receding in the wake of Hurricane Agnes, which brought the highest, most destructive torrents in history to the Schuylkill River, the Delaware's largest tributary.

The Delaware main stem was spared by Agnes. However, a National Weather Service report issued a year later declared that the river at Trenton would have suffered flows nearly double those of the record 1955 flood disaster and further that all major points throughout the valley would have been record-crest victims if Agnes had traversed the upper Delaware.

No feasible combination of reservoirs would have provided adequate protection from such a flood, but Tocks Island would have retarded nearly a third of the water and thereby sharply limited the magnitude of inundation of all flood-prone communities on the main stem. (A section of the flooding from Hurricane Agnes appeared in the 1972 report.)

And the year almost ended as it began with the Delaware River cresting just three inches below flood stage behind the State Capitol in Trenton three hours before midnight on June 30, 1973. The near-flood flow reached within 2,000 cubic feet per second of flood stage level, 135,000 cfs. This was the river's closest call yet of several since 1955, which marked a record flow of 329,000 cfs.

**Flood Damages Canal** • Some upper basin areas and tributaries were not so lucky as the main stem after the June 1973 storming. Delhi and Walton Villages in New York State were severely battered and in Pennsylvania's Bucks County some 250 families were evacuated to escape swollen flows of Neshaminy Creek. And the Commonwealth's historic Delaware Canal, paralleling the river from Easton to Bristol, sustained a major break from the high river water.

Precipitation and runoff both were considerably above normal during the entire year. Upper basin precipitation totaled 54 inches, or 10 inches above normal, while runoff at Trenton averaged 16,500 cfs, almost half again the customary levels.

November 1972 precipitation in the basin above Port Jervis was 8.4 inches, for the highest total in 32 years for that month. Trenton and Philadelphia suffered their heaviest November rainfall since the 19th Century. The upper basin's runoff had not been greater in any November since 1939, nor Trenton's since 1927.

Above-average precipitation was the rule for nine straight months ending in June.





Aerial photographs show how the Delaware River shoreline has attracted development in urban, suburban and rural areas, much of it on the hazardous flood plain. Views are of Morrisville, Pa., and Trenton (top left); New Hope, Pa., and Lambertville, N.J. (top right); Upper Black Eddy, Pa., and Milford, N.J. (bottom left); and Phillipsburg, N.J. and Easton, Pa. at the Lehigh River confluence.

## Flood Plain Controls

The first step toward achieving a major management system for regulating damage-prone areas throughout the four-state Delaware River Valley has been taken with publication of a recommended basinwide program for flood plain delineation.

A prerequisite to imposing controls over use of any flood plain is an investigation that produces a detailed history of its floods, including dates, frequency, water volume and depths and accurate boundaries of areas inundated. Such histories have been either finished or undertaken for a thousand miles of shoreline along dozens of hazardous streams in the Delaware Basin, but there is little standardization between them.

Probably the principal feature of the recommended new program, which would bring about basinwide uniformity and also be geared to the new



guidelines of the U.S. Water Resources Council and national flood insurance law, is a suggested set of standards for protecting public health, safety and property through good flood plain use. The standards are proposed for incorporation in the DRBC's basinwide Comprehensive Plan.

As advocated by the Water Resources Council and other authorities, the report is aimed at producing a total management program. This means combining the most effective of both non-structural preventive measures and structural protective projects. These incorporate flood plain zoning and regulation, crest forecasting and warning, evacuation readiness, land treatment and acquisition, tax adjustments, impoundments, dikes, walls, channel improvements and flood-proofing of buildings. The report endorses the Tocks Island reservoir on the upper Delaware, of which flood protection is one of several project purposes, as part of the total management goal.

**River Needs Cited** • The consultants urge that flood inundation areas be delineated throughout the four-state basin, with high priority given to hazardous stretches of Brandywine Creek and the Schuylkill and Lehigh Rivers. In the summer of 1972 the Schuylkill was struck by its worst flood in the wake of Hurricane Agnes. That storm luckily spared the Delaware main stem, which the National Weather Service said would have suffered flood flows nearly double those of the record 1955 flood if the storm's course had been through the upper valley.

Immediate establishment of a flood plain regulatory program as the first step of a total management system is urged under which DRBC should compel conformity to the Comprehensive Plan; require that federal, state and local flood plain programs be undertaken in conjunction with DRBC; and, where necessary, adopt flood regulations itself for particular lands.

Besides making a series of specific suggestions for DRBC to establish standards and regulations, the report offers three model flood plain zoning ordinances for the assistance of local governments, each embodying the standards that would be added to the DRBC master plan. For varying local situations, the ordinances provide controls for short-term interim needs, longer-term interim regulations for rural areas where precise flood data is currently unavailable, and permanent rules for urban areas where the necessary statistical information is available.

Largely to help establish eligibility for their residents to purchase flood insurance under the three-year-old federal subsidy program, some 200 communities have either adopted or signified intention to enact flood zoning ordinances, but here again there is a general lack of uniformity that the report urges be remedied. Prior to creation of the federal insurance program, flood zoning ordinances were in effect in only about a score of Delaware Valley communities.

**N.J. Controls Enacted** • New Jersey adopted this year a statewide law empowering it to move on establishing flood plain regulations where local government neglects or refuses to act, and Pennsylvania's Legislature is considering similar legislation.

It is important that the Commission develop the information necessary for it to make estimations of recurrence intervals of given flood flows for any stream point in the valley, the report stresses.

As an example of how the flood land delineation criteria, standards and procedures can be used, the report applies them for demonstration study purposes to the 82-mile reach of the Delaware from Tocks Island, just upstream of Delaware Water Gap, to Trenton, the end of the non-tidal river. Eleven maps show the river's floodway and also the flood hazard area limits of a 150-year recurrence flood with inundation that would go well beyond any yet experienced, even in 1955. Flood-threatened communities detailed on the maps include Trenton, Yardley, New Hope, Lambertville, Stockton, Frenchtown, Milford, Riegelsville, Phillipsburg, Easton, Belvidere, Portland and Columbia.







The ocean-to-the-mountains diversity of the Delaware Valley is illustrated by views of the upper river where it separates New York from Pennsylvania (left); a rapid-flowing stream in the Poconos (top right); and Delaware Bay sparkling from sun that is obscured by a five-foot-high plume grass plant.

## Environmental Safeguards

Two key sections of the DRBC organization are responsible for keeping water-related activity in the Delaware Valley in step with the National Environmental Policy Act and of assuring that the basin's water resources are not spoiled by the scores of uses to which they are put.

One is the new Environmental Unit, which has completed its first year of operation to the accompaniment of an undreamed-of workload. The other is the older Project Review Branch, which turns out the spadework on which the Commission bases its clearances to proceed for an annual average of about 200 water-using operations by industry, government, agriculture and others.

The Project Review Branch, part of the technically-oriented Planning Division, investigates a wide scope of activities to assure there is no conflict with the Comprehensive Plan and that the water resources are not impaired.

The broader intent of the national environmental law, enacted seven years after the Commission's formation, is that any type activity either undertaken



or reviewable by a federal agency, including DRBC, be fine-toothed for possible degradation of any phase of the environment.

Encompassing specialized vocations of landscape architecture, economics, biology, regional planning, limnology, ecology and others, the four-member Environmental Unit, working under the Executive Director, screens a steady stream of impact statements prepared by other agencies and in addition authors DRBC impact statements on its own activities or those for which it is the principal federal reviewing agency.

In its initial year, the Environmental Unit processed or commented on 36 impact statements on projects undertaken or reviewed by other federal agencies. The projects involved highways, parks, dredging, an atomic power plant, electric transmission lines, a planned new town, an oil line, a dike, water pollution control systems, hydroelectric power generating plants and a reservoir.

In addition, the new unit turned out the Commission's own impact statements on two big fossil-fueled electric generating systems, a complicated inter-watershed diversion to accommodate both household and industrial water supply demands, and a municipal reservoir project.

Next year will call for publication of impact statements on at least two power generating stations and a highly involved pipeline for transporting petroleum 90 miles through five Eastern Pennsylvania counties from a marine terminal on the estuary to a power producing plant in the Poconos. The unit probably also will start processing environmental reports — on which DRBC impact statements on reviewed projects are based — for one new and one expanded oil refinery, a marine terminal, a coal-fueled power plant and a pumped-storage generating station.

**Project Reviews** • The 1973 water resource protection work of the Project Review Branch led to formal approval by the Commission of 158 applications, including 78 required pollution control facilities; 56 wells for farms, industries and housing projects; a dozen stream contact operations such as shore stabilization facilities, docks, wharfs and a rerouted creek; and four pipelines, two protection programs for small watersheds, a pair of flood control structures and the Tincum Marsh preserve.

The statistics, however, tell perhaps only half the story of the work of both these DRBC operations and, in fact, are deceptive.

For example, Project Review cases that reach the public forum of a Commission meeting for vote are virtually all approved. The figures do not show the equal number of cases where the applicant is advised the project is flatly unacceptable or must be amended if approval is to be recommended.

As for the Environmental Unit, the completed impact statement represents only the end product of a long, involved review process. What the impact statement doesn't show is where an applicant's environmental report is rejected outright or bounced for more thorough information or, better yet, for a more environmentally acceptable plan of construction.

The processing of one applicant's report on a major petroleum pipeline proposal has led to significant modifications in the plan. This included relocation of a tank farm from a top quality watershed to a more environmentally acceptable site, rerouting the pipeline alignment to avoid a historic structure, and designing a pumping station for fieldstone construction to blend with the rustic rural surroundings. This review also has led the applicant to engage professional archaeological assistance to weigh historical and other considerations and to consider skirting a possible future reservoir site.

Also, for the first time, the Environmental Unit's work has resulted in consideration of land use factors on a routine basis, an activity that has been urged by outside ecologists.



# Scenic Upper Delaware

If the 37-mile Tocks Island lake plan was at a standstill, the same was not true for the proposal to preserve in its natural state the beautiful 75-mile northernmost reach of the Delaware immediately upstream.

Five years ago Congress enacted the Wild and Scenic Rivers Act establishing a policy "that certain selected rivers of the nation which, with their immediate environments, possess remarkable scenic, recreational, cultural, or other similar values, shall be preserved in free-flowing conditions, and that they and their immediate environments shall be protected for the benefit of present and future generations."

The Delaware was among the rivers designated for study of the desirability of being added to the system, leading to establishment of an Interagency Field Task Force led by the U. S. Bureau of Outdoor Recreation and comprising DRBC, the Pennsylvania Department of Environmental Resources, the New York Environmental Conservation Department and several federal agencies.

**Alternatives Offered** • The Task Force's work now has culminated in a detailed report recommending that the upper Delaware from Matamoras, Pa., to Hancock, N.Y., be incorporated in the system as a Scenic and Recreational River and offering groups of alternative development, management and administrative arrangements.

The report was expected to be submitted to the Congress and appropriate U.S. Executive Branch agencies.

The proposal appeared to be gathering substantial support in the tri-state region most affected from environmentalists and others, although some opposition, primarily from local property owners, did develop at public information meetings held in the area.

Tocks Island lake proponents contended that the Scenic River proposal would be complementary to and compatible with the downstream reservoir plan, since it would provide permanently that the river remain in its free-flowing state along its least-developed segment. Tocks foes also supported the Scenic River, but pleaded in favor of proceeding with development of the Delaware Water Gap National Recreation Area without the Tocks lake that would be its central feature.

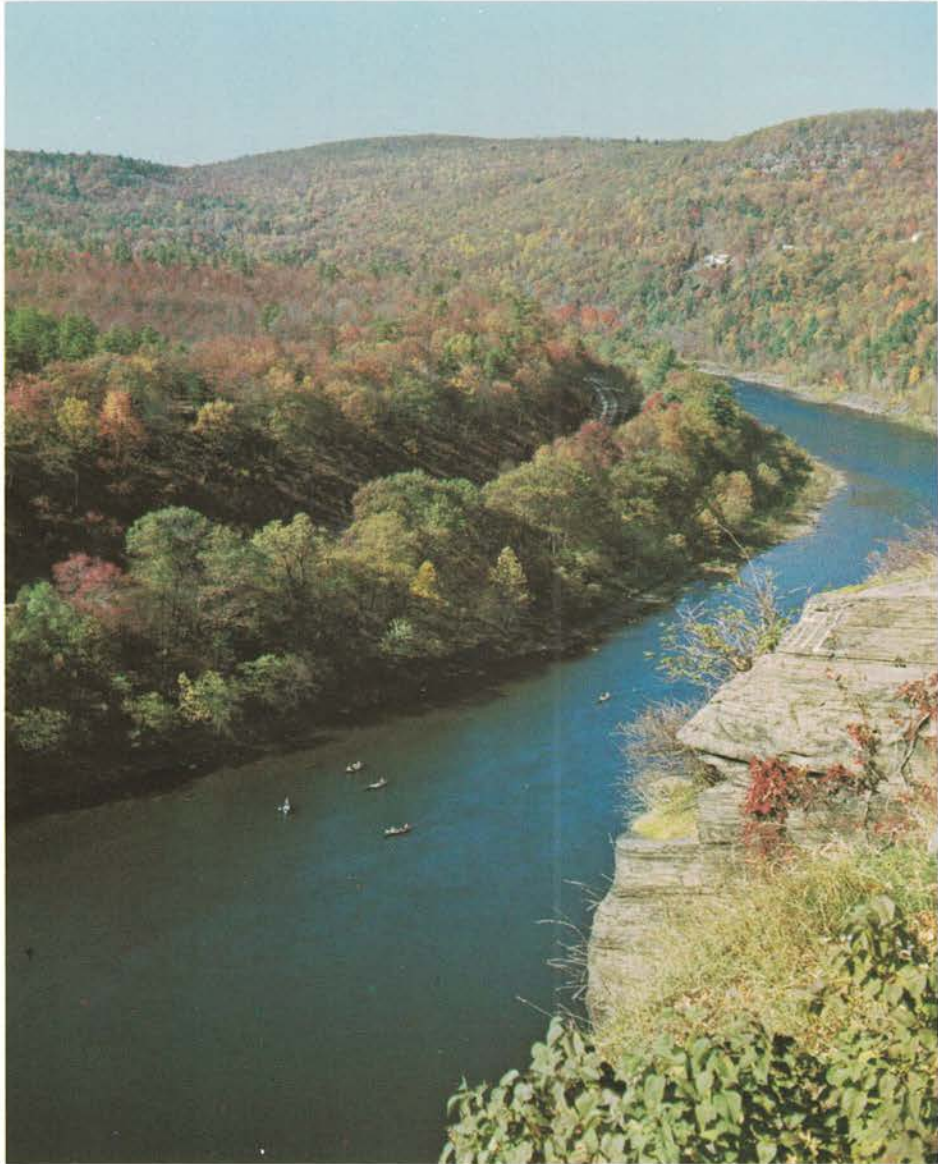
The Scenic River segment would assure unimpairment of the sparsely developed corridor along nearly a quarter of the entire 330-mile main stem of the Delaware from Hancock to the Atlantic Ocean and more than a third of the non-tidal river down to Trenton. It separates Pennsylvania's Pocono Mountains from New York's Catskills and, while still bucolic unlike other parts of the popular ranges, lies within 250 miles of a quarter of the nation's population with ready access from all directions by superhighways.

**Recreation Emphasis** • Most of the thousands of sets of recreation maps of the river sold by DRBC go to canoeists who find this one of the finest streams in the Northeast. The near pollution-free stream invites swimming in the numerous pool areas, fishing for many species including smallmouth and rock bass, shad and walleye, and other water contact activities.

The preserved stretch would include three recreational sections comprising 48 miles that include most of the river towns and grown-up areas visible from the river. These would be separated by two scenic reaches totaling 25 miles and marked by minimum development.

The development options range from a low investment, minimum control plan to a total management system providing many facilities. Each would involve a different combination of public ownership, scenic easements and local zoning protection inside the proposed project boundary.





Income from sales under DRBC's water supply program will help pay for the new Beltzville reservoir in the Lehigh Valley (right) and other projects needed to meet household, farm and industrial demands.



## Water Sales

The Tocks Island reservoir controversy had a real rival for the main object of public attention to DRBC business this year in the agency's proposed program of instituting charges for water supply sales. And the prospect was that interest in water sales would be sustained into 1974 since they were unresolved at year-end.

It was more than eight years ago that the Commission began paving the way publicly for eventual imposition of charges for certain withdrawals of water from Delaware basin streams for private and public use. And at the widely noticed DRBC annual meeting of 1971, the Delaware Valley Governors and Interior Secretary Morton enacted a broad policy explaining why users would be allocated and charged for using water to be made up from federally constructed reservoirs at DRBC expense.

Yet not until this year was widespread concern expressed by prospective customers over the charges that some of them would begin paying soon. Unlike public hearings on the earlier water sales-related decisions of 1964 and 1971 that drew little attention, the 1973 hearing on adopting pricing regulations was of marathon duration and produced a voluminous record.

The spirited response by water users produced substantial basic objections to the regulations, particularly the restrictive application of exemptions and the tight limit on discounts for water returned to the stream. It also offered a broad variety of suggestions for specific alterations. Some users even challenged the Commission's authority, as bestowed by the Delaware River Basin Compact, to charge for water at all.

**Proposal Overhauled** • An extensive analysis of the hearing record was ordered by the Commissioners, resulting in a major overhaul of the recommended regulations in certain areas. The revision increased 10-fold the discount for water returned and also increased considerably the number of dischargers eligible for the cut. It also vastly expanded availability of exemptions from charges.

The Commission released the staff's analysis and revisions and announced that the rewritten version would be rescheduled for hearing in the coming year after ample time for public review. Some parties had complained that the four weeks notice provided for the 1973 hearing was inadequate. At year end, the new hearing date had not been set.



Charges would be made only for new water used. Quantities equal to those capable of being taken as of March 1971 or to those granted by state permits issued before then would continue to be free. Groundwater, that drawn from wells, is not involved.

Municipalities, authorities, water companies and other purveyors of water, and also industries that draw large volumes of water from the streams are affected. DRBC, in effect a wholesaler, will not be selling water to households and other customers of purveyors.

Users throughout the basin would be subject to the charge irrespective of their location in relation to any federal reservoir.

**Return Flows Discounted** • The anticipated initial basic price is 4 cents per 1,000 gallons. By far the bulk of the revenue would come from the sale of water taken then evaporated, water exported from the Delaware Basin, or that otherwise not returned to the stream — called consumptive uses. These sales would be pegged at the full rate.

Water drawn but returned after being used would be charged at a non-consumptive discount rate of only a hundredth of the consumptive price or about .4 mill. This is 10 times lower than the earlier proposed non-consumptive rate of about .4 cents, which was slashed when calculations based on water use inventories disclosed it would produce revenues exceeding those needed by DRBC to supply the water.

Also, the discarded earlier proposal would have allowed the discount only for water returned in unimpaired quality, mainly after being used for industrial cooling. The newer discount allowance for all water returned, including effluent from sewage and industrial wastes, represents a far broader application of the lower charge.

Agricultural spokesmen argued that irrigation should be granted concessions as an extension of public policy in the region favoring retention of land for farm use. The staff concurred and proposed that this water be exempt from charges except that future additional volumes would be sold on a preferred basis of acres irrigated rather than amounts drawn.

Staff also agreed with objections to charges being made for uses of water made up from storage in reservoirs developed at non-DRBC expense and revised the regulations accordingly.

**Based on Federal Law** • Action toward imposition of DRBC water sales is necessitated by the development of several federal reservoir projects in the basin that will provide space for water supply storage. Federal law requires that the cost of such space be reimbursed to Washington over a 50-year period, allowing low interest rates. A DRBC formal commitment to assume the reimbursement obligation was made in 1964, and the guidelines for the implementing sales regulations were adopted in 1971.

The policy provides that the water sale price reflect the pooled cost of storage space at all federal projects on the line at a given time. The estimated 4-cent initial rate is based on the tentative final cost of the Beltzville reservoir in the Lehigh Valley, the only impoundment yet completed. The price is to be recomputed with completion of future projects — Blue Marsh in the Schuylkill Valley, now under construction; Tocks Island on the Delaware main stem, which is construction-ready, and Trexler in the Lehigh Valley, which has been designed.

Besides revenues from water sales, DRBC will get funds to meet its annual repayment obligations, to the extent that sales fall short of amounts required, from appropriations already being made by the states as general beneficiaries. The states' share will decrease to zero as sales increase. Any revenues in excess of DRBC repayment obligations and related administrative expenses will be rebated to the users.



# Water Quality

Substantial gains were recorded this year in the massive job of improving the quality of the basin's polluted streams — particularly the tidal estuary — and of keeping the clean ones that way.

It was during this year that Congress enacted the drastic new national water quality policy that set an ultimate goal of virtual elimination of all industrial and nearly all municipal pollution discharges to America's lakes and rivers. Until now, pollution control programs throughout the nation, including DRBC's, have recognized at least some waste assimilation as a legitimate use of waterways, and will continue to do so for municipal wastes. The Commission, as others, was thus faced with the responsibility of making its policies, particularly concerning industries, compatible with the new federal requirements. The job of resolving the differences actually had just gotten under way as the year ended.

Federal authorities agreed that the Commission should continue its system of wasteload allocations, under which cities and factories are allowed small discharges after treatment representing their share of the total wasteload limits to be tolerated in achieving stream quality goals enacted in the 1960s.

The industrial wasteload allocations arrangement appeared to some to be in conflict with the zero discharge goal, but attainment of that end is far off, if at all attainable in some cases technologically and practically. The allocations already assigned to the 100 dischargers along the estuary from Trenton downstream meanwhile serve as a practical interim goal. In effect, each allocation means that the city or industry must remove about 90 percent of its total organic wasteload prior to discharge to the estuary — a big improvement over the 50 percent-minus average treatment practiced before the program began.

DRBC also will continue to review the plans of any town or industry to install or upgrade any waste treatment facilities to assure compatibility with the basin's Comprehensive Plan, of which the pollution control standards are part. Both the continually updated Comprehensive Plan and the project review function are mandated in the Delaware River Basin Compact, the Commission's enabling legislation.

Since the U.S. Environmental Protection Agency and state pollution control units now issue discharger permits under the new law, DRBC's four-year-old program of adopting pollution abatement schedules was transferred to those agencies. Such schedules set down precise deadlines by which cities and industries are legally committed to prepare engineering plans, construct needed facilities, and finally comply with their allocations. Those schedules already adopted will remain in force — and they represent 92 percent of the total wasteload in the 86-mile estuary region.

In four years of this activity, the Commission formally approved 95 schedules, plus numerous revisions. In 1973, 10 schedules were approved. (A list of these appears on page 17.)

**Ten-year Cleanup on Course** • It was in 1967 that DRBC launched its river cleanup — then and now the most comprehensive reclamation effort on any American river. The standards and rules adopted were based on — and an enlargement of — years of research by the Federal Government and others on cause and effect of the river's pollution.

The target set in 1967 was attainment of the stream quality objectives in a decade, and the program is advancing on schedule toward that goal. The progress is illustrated by charts (page 17) showing compliance in terms of both percentage of total allocated wasteload and percentage of dischargers.

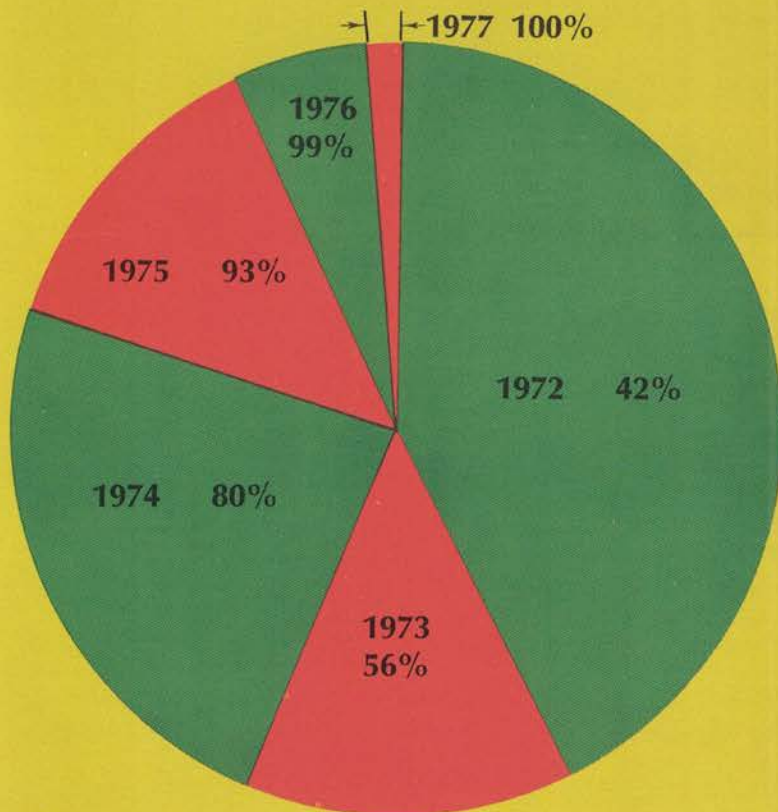


# Waste Dischargers Brought Under Abatement Schedules • 1973

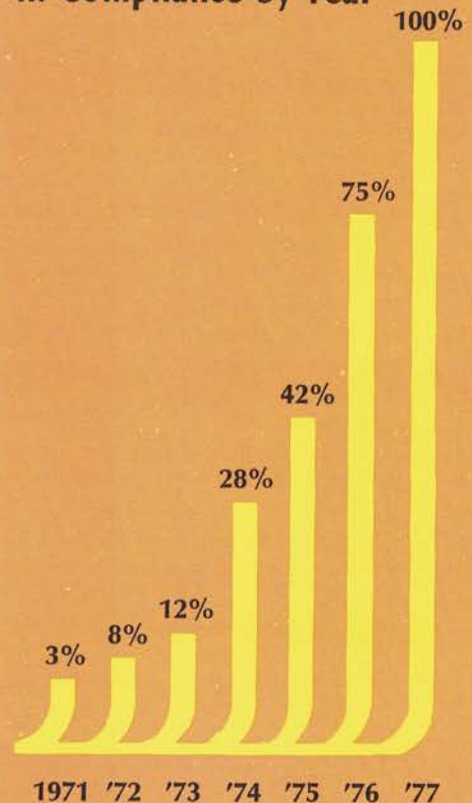
Discharger	Allowable Organic Discharge*	Full Compliance by
Riegel Products Corp., Milford, N. J.	**	December 1973
U. S. Army Ammunition Plant, Burlington, N. J.	***	June 1973
Rollins-Purle, Inc., Logan Township, N. J.	200	September 1974
Shell Chemical Co., Woodbury, N. J.	520	November 1974
U. S. Army, Frankford Arenal, Philadelphia, Pa.	****	December 1972
New Castle County Public Works Department, Delaware City, Del.	36	May 1974
Diamond Shamrock Chemical Co., Delaware City, Del.	35	August 1974
Amoco Chemicals Corp., New Castle, Del.	*****	April 1975
Gulf Oil Company, Philadelphia, Pa.	****	December 1974
Township of Falls Authority, Bucks County, Pa.	220	December 1975

\* Allocation of carbonaceous (first-stage) oxygen demand in pounds per day.  
 \*\* A non-tidal discharge not under allocation.  
 \*\*\* Allocation withdrawn. Plant operation discontinued.  
 \*\*\*\* Inorganic discharge, thus not under allocation.  
 \*\*\*\*\* Allocation not yet assigned.

### Percentage of Delaware Estuary Dischargers Complying with Allocations by Year



### Percentage of Delaware Estuary Allocated Load in Compliance by Year







The intense urban-industrial-port development that places a heavy strain on the waste assumption capability of the Delaware estuary is depicted in this view of the Philadelphia waterfront.

While well over half of the 100 industries and municipalities that discharge organic wastes to the tidal estuary already are complying with their load allocations, only about an eighth of the total allocated load is being treated up to specifications. The explanation is that the more numerous smaller installations that emit smaller waste volumes, both private and public, have far fewer problems, mostly technical, in complying with requirements. Thus, they meet them earlier.

On the other hand, for example, the City of Philadelphia, with three giant sewage treatment plants that handle massive household discharges and large volumes of industrial waste as well, is not slated for full-compliance operation until 1977. The City is the source of 45 percent of all organic pollutants going into the estuary, and it forecast three years ago that meeting the Commission's requirements would cost \$75 million, likely a conservative estimate in view of construction and financing cost rises since then.

Attainment of the decade cleanup goal sometimes seems elusive due to the myriad of pressures that would appear to make it impossible for industries and cities, especially the larger ones, to avoid some delays. These include high costs, financing difficulties, acquisition of federal and state grants,



and also environmental constraints, some stemming from air quality requirements. But by no means are all the delays regarded by the Commission or by federal and state authorities as acceptable.

**Polluters Cited** • At its final meeting of the year, the Commission's concern that about a third of the dischargers under abatement schedules were delinquent was sounded by Maurice K. Goddard, Pennsylvania's Environmental Resources Secretary and Governor Shapp's Alternate on DRBC.

"While in a few instances there may be justifications due to financial, technological or other difficulties for falling behind, it is our view generally that these delinquencies are unnecessary," said Dr. Goddard. Some appeared to be defiant of public cleanup demands in unfairness to the majority that were complying with their allocations and schedules, he said.

The Commission ordered preparation and publication of a report listing the status of each discharger, including the degree of non-compliance, if any. The followup report noted that 44 dischargers had completed their required waste treatment facilities, indicating compliance or near-compliance, and that 16 others were keeping abreast of the timetables in their abatement schedules. On the other hand, 37 were behind — usually a few months, but in some cases more than two years — in their schedules.

The report singled out four industries and nine South Jersey municipalities as particular problem sources. It recommended that the Commission initiate enforcement action against one Pennsylvania industry, which it did, and also against a group of the municipalities but this was deferred when a logjam appeared to be breaking in reaching a regional solution to the local waste problems.

**Other Activities** • The Commission also took a new type action against a pollution violator when it denied a municipality's request to increase its water supply. Grounds for denial were that it was violating water quality standards by putting about 20 percent more organic waste in the river than allocated. This was, in effect, a pollution control enforcement action tied to DRBC's project review function.

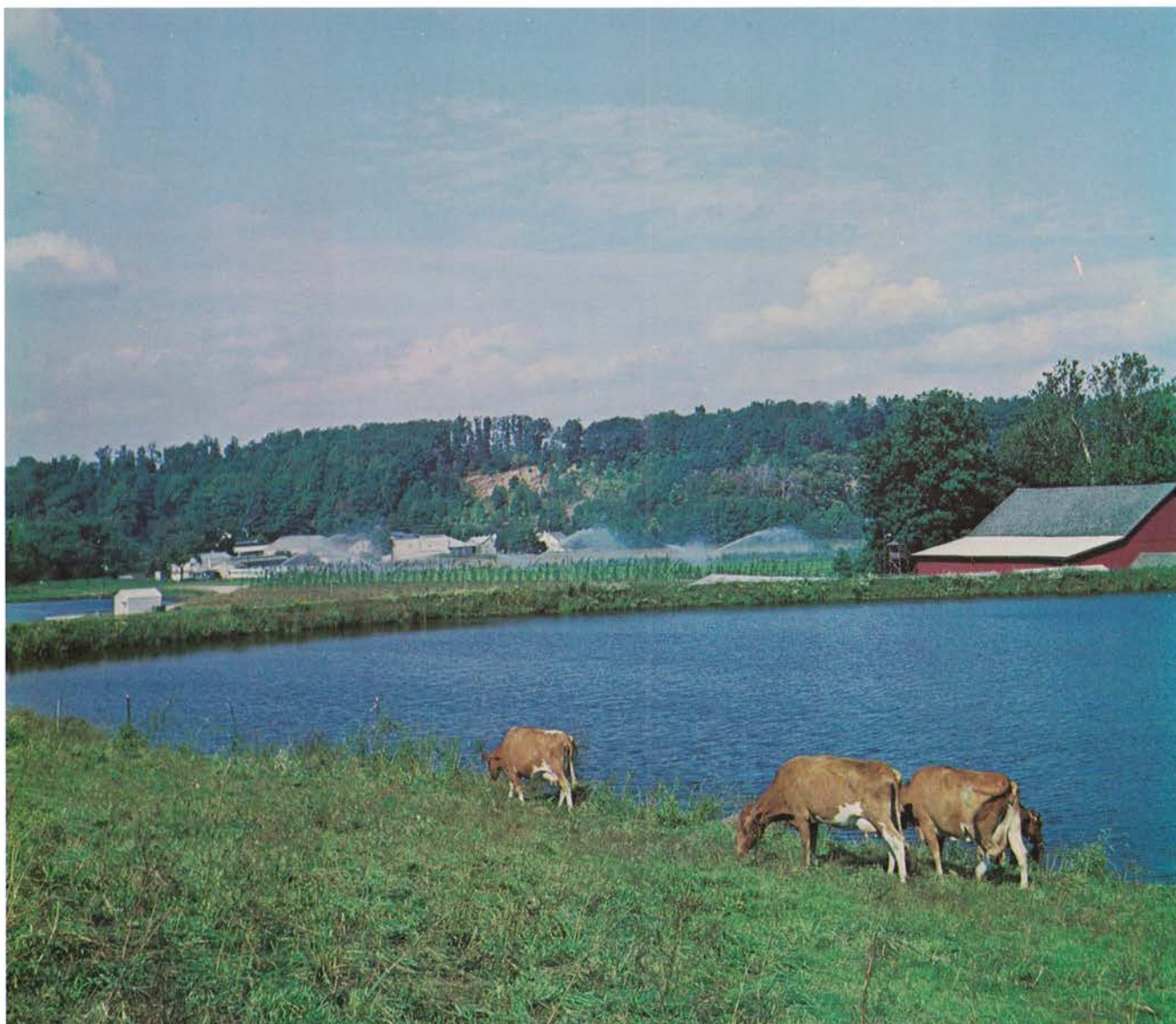
The water quality monitoring and sampling program initiated in the 1960s by DRBC continues as a principal data source for all agencies involved in pollution control work. Soon to be published by the U. S. Geological Survey is a series of reports covering three years of information on stream quality parameters gathered by boat runs conducted for DRBC under contract by the State of Delaware. This material will augment data for 1967 already published.

In 1974, the Commission is slated to receive from a consulting firm a model based on results of an investigation of the good-quality reach of the Delaware from Trenton to above Easton. This model will aid DRBC in assigning wasteload allocations to dischargers, when and if necessary, as was done for those on the estuary below Trenton.

A groundwater quality protection policy was added to DRBC's Comprehensive Plan this year establishing protected water uses and setting water quality objectives. Implementing rules, also adopted, establish enforcement procedures and specify prohibited activities that would degrade the resource. DRBC this year placed on sale for \$2 a consultant's report recommending an extensive groundwater investigation and protection program.

Disposal of sludge, that is the solid residue of liquid waste treatment, remains a most vexing problem in the Delaware Valley as everywhere. The search continues for the right environmental solution for ridding the surroundings of unwanted sludge, since all of those now in conventional use lead to further problems — still more pollution from incineration, ocean dumping and landfills. Active research meanwhile must continue on how to make the unwanted substance productive for such as producing heat, organic enrichment of land, and crop fertilization. Meanwhile, temporary approval has been granted by EPA for several dischargers to continue ocean disposal.





Green Valley Farms, near Downingtown, Pa., is succeeding in disposing of wastes through spray irrigation (seen in background) for crop and woodlot production.

Photo by Dr. Norman F. Reber, Pennsylvania Farmer Magazine.

In Chester County, a dairyman and Pennsylvania ex-legislator, Benjamin J. Reynolds, has carried on a highly successful application of cow herd manure in the form of liquid spray irrigation from lagoons on both farm crops and woodlots at his Green Valley Farms. This cycles wastes without stream pollution and at the same time improves soils, producing more nutritious food for animals and people and better tree growth. The project, endorsed by both DRBC and the Commonwealth, is being watched closely by researchers in the field in the hope that it will prove to have broad application, which Reynolds is confident it will.

A hopeful sign of things to come was the withdrawal of the wasteload allocation assigned to the GAF Corp. plant at Gloucester City, N.J., the result of the waste operation going to full recycling instead of discharging to the river, except for cooling water. Other companies are tightening valves, instituting in-plant controls and reducing overall wasteloads.

The Commission sponsored this year a technical seminar that examined the potential and prospects of closed cycle liquid waste operations by industry as an alternative to meeting increasingly stringent pollution control laws and regulations, especially the zero-discharge goal contained in the new federal water quality law. Some 165 specialists from industry, government, colleges



and environmental consulting firms participated in the session, which included presentations on treatment problems in production of petroleum, chemicals, pharmaceuticals, paper and steel, as well as talks on government requirements and latest research and technology. An earlier Commission-conducted seminar had explored the broader subject of industrial waste management generally. (The 1973 seminar proceedings are available for \$2.)

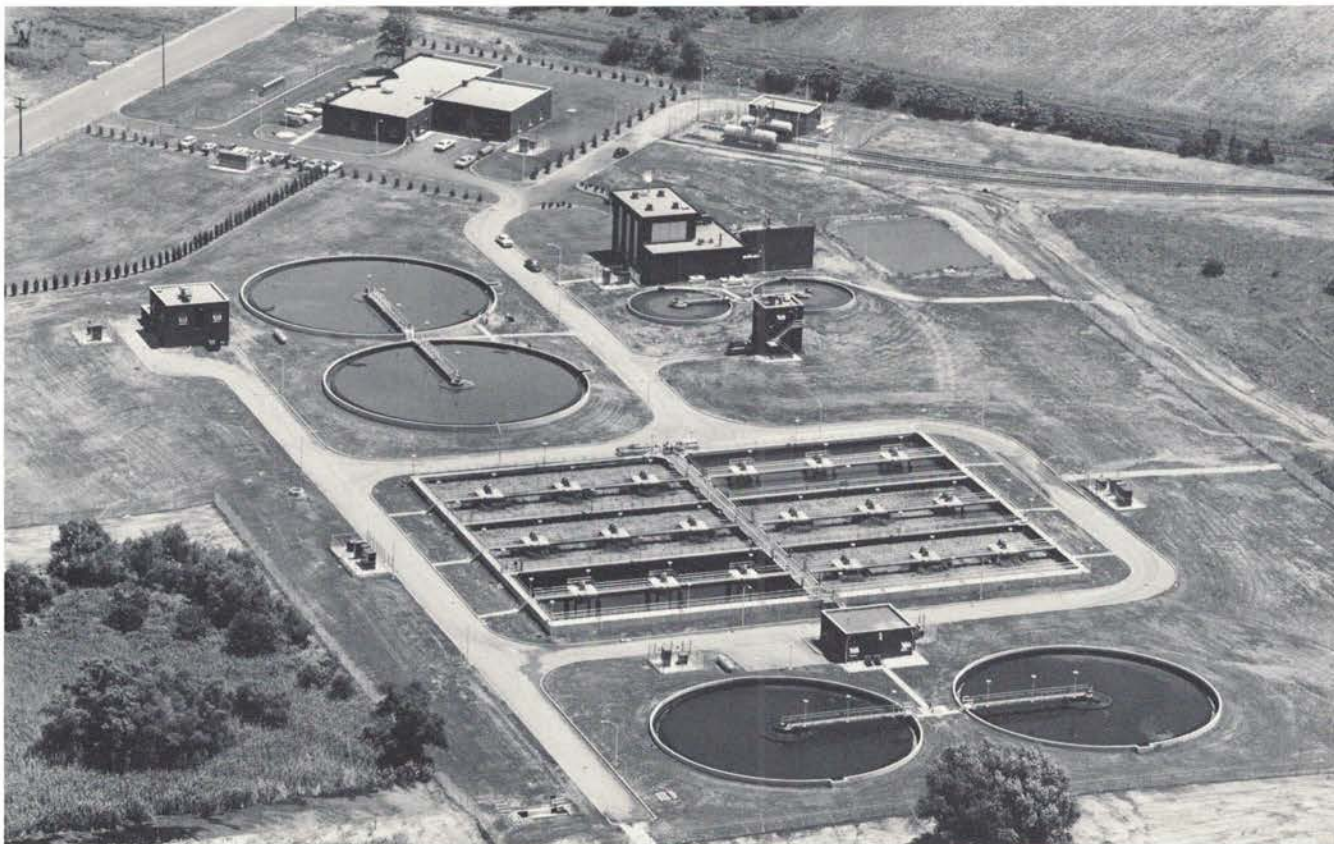
**Gloucester Regional Plant on Line** • A major new contribution toward improving the quality of the tidal waters of the lower Delaware River will be the \$41 million regional waste collection and high-level treatment facility of the Gloucester County (N.J.) Sewerage Authority just completed in 1973. This plant, the first of such scope built with funds from New Jersey's 1969 quarter-billion dollar water quality bond issue, supplants some 30 outmoded municipal and industrial plants and will serve 13 communities populated by 135,000 persons. Substantial federal grant assistance helped finance the project also.

Another critically needed regional sewerage system is moving ahead — this one on the Pennsylvania side of the river below Philadelphia in Delaware County, where continued development has brought serious local water pollution problems. There, in accordance with the Commission's Comprehensive Plan, the Delaware County Regional Water Quality Control Authority is implementing a program that will result in the eventual integration of many industrial and local waste treatment plants. Wastes from the northeasterly portion of the county will go to Philadelphia's southwest treatment plant, which is being enlarged and sharply upgraded, and those from the southwesterly portion of the county to the Chester treatment plant, which the Authority is expanding and modernizing. Both the Philadelphia tie-in and the Chester plant construction work are under way. Development of the Delaware County plan was induced and assisted by DRBC, supported by the Commonwealth, Delaware County and local interests.

As soon as the link with Philadelphia is achieved in 1975, the quality of polluted Darby Creek will improve. Completion of the Chester regional plant is slated for 1976.



The newest and most modern water pollution control facility in the Delaware Basin was put into operation in 1973 near Paulsboro, N.J., by the Gloucester County Sewerage Authority.





# Tocks Island

For the Tocks Island reservoir, 1973 was a period of intensive activity to satisfy a series of conditions and demanded assurances before the long-stalled project could enter construction on the Delaware main stem five miles upstream of the Water Gap.

The outcome of this activity was awaited by the Governors of the affected states, the President's Council on Environmental Quality and congressional appropriations committees. Their signal was awaited in turn by the Tocks project agencies so building work could proceed.

Meanwhile, the debate progressed over the alleged environmental defects and whether they would be too high a price to pay for the benefits of water supply, flood protection, lake-based recreation and energy from the massive installation.

The multi-use, 37-mile-long reservoir had been authorized by Congress a decade earlier and the surrounding Water Gap National Recreation Area shortly thereafter, both amid general approbation. When time came to proceed with construction in the late 1960s, other national demands on the available funds took precedence, followed by amplification of environmental objections. What promised to be a short delay has lingered now for six years, during which the cost estimates have soared. Preconstruction work has been completed for some time by the Corps of Engineers, which stood ready to put the job out on bids.

Governor Cahill advised his fellow DRBC members early in the year that New Jersey realized there were no readily available or feasible alternative means of realizing the project benefits that would be "less expensive and less environmentally destructive" than Tocks. However, at the same time the Governor laid down a series of conditions and said that after receiving assurances that they would be met he would give the signal for building to commence.

Governor Shapp of Pennsylvania and U.S. Interior Secretary Morton, the Federal Member, both long-time supporters of the Tocks Island project, joined Governor Rockefeller, representing the third project area state, and Governor Tribbitt in allotting time to resolve the issues raised by Governor Cahill.

In the ensuing months, staff work by DRBC and others was undertaken toward satisfying the Governor's requirements. In addition, lawmaking activity in the Congress bore on a couple of the New Jersey demands.

**Meeting the Conditions** • Two of the conditions that fell within DRBC jurisdiction were resolved at the Commission's 1973 annual meeting, the second gathering of the Governors in eight months.

Governor Cahill had insisted on decentralization of the proposed regional ring sewerage system, designed to avert reservoir pollution, in favor of separate facilities to serve local population areas. He called also for a scaledown of the park facilities to serve four million visitors a year instead of the 10½ million previously programmed. With Governor Cahill's support, the Commission enacted amendments to its Comprehensive Plan satisfying both conditions.

The Governor said this left two important issues to be resolved. These were the imposition of state land use controls in the New Jersey Tocks impact area, primarily Sussex and Warren Counties, and enactment by Pennsylvania of pending legislation to impose flood plain restrictions. The action sought by Governor Cahill on these two issues actually represented completion of activity already initiated.



On the flood plain regulation issue, half of the Governor's condition already had been met months earlier with enactment of state controls in New Jersey.

In the case of the land use controls, the Governor already had announced a proposed legislative program, although opposition had arisen locally to state encroachment on home rule prerogatives.

A second condition relating to water quality called for assurances of adequate controls of nutrient runoff from areas upstream of the Tocks project to prevent excessive algae growth, or eutrophication, in the reservoir itself.

The Environmental Quality Council had asked for assurances on this same matter from the Tocks region governors before construction could begin.

The DRBC resolution satisfying the Governor's sewerage decentralization condition also addressed the upper basin nutrient problem with this commitment: "Management of non-point sources of water pollution in the area, and drainage areas tributary thereto, shall be in accordance with Environmental Protection Administration policy . . . and with applicable regulations, (but) without limitation thereto, relating to erosion and sediment control, efficient fertilizer use and land disposal of animal wastes."

**Nutrient Controls** • DRBC and Corps staff investigations and studies conducted by outside experts had been in progress for several years on the matter of Tocks reservoir water quality and continued into 1974. These nutrient-related activities included inventories to determine the magnitude of the diminishing dairy and poultry herds that could be an upstream pollution source, and studies giving baseline nutrient conditions in the streams and measuring the inflow at the upstream end of the reservoir. Also conducted was a series of probes focused on preventives or actual control procedures that could be followed if any harmful eutrophication occurs in the reservoir.

Results indicated that much of the manure-source nutrients never reach the streams and that the water entering the reservoir area is representative of local conditions without upstream uses having an effect that far down-river. DRBC staff concurred that, in the absence of preventive measures, a limited algae problem might possibly develop at Tocks. But it also gave assurances that the state of applicable technology is such that the problem, with near-certainty, would be headed off; however, if some harmful eutrophication were to occur, the studies showed that effective corrective measures are available. Moreover, new federal law mandates that agricultural and non-point pollution discharges be drastically cut or eliminated over the period prior to completion of the Tocks dam, thus further assuring effective nutrient control.

The two other conditions called for federal payments of half or more of the cost of needed access roads and federal "consideration" of payments in lieu of taxes to local government. However, in the wake of the scaledown of the park visitor load, New Jersey's highway planning chief declared that no additional highways would be needed to accommodate the revised recreational facilities and that the state was now concentrating on Northwest Jersey roads needed irrespective of Tocks Island. Meanwhile, the newly-enacted federal aid highway law enabled the Federal Government to pay 70 percent of construction costs of new state primary road jobs.

Governor Cahill's request for federal consideration of payments in lieu of taxes was formally supported by a DRBC resolution sent to Delaware Basin representatives and appropriations leaders in Congress and to appropriate Executive Branch agencies. Such payments by Washington are not customary, but the new Federal Revenue Sharing Act resulted in payments to the two New Jersey counties and their municipalities, starting with \$2.4 million in 1972 and increasing in subsequent years.

With preconstruction work completed, funds were available from Congress for it to start building when the water quality and highway issues are resolved. Meanwhile, environmentalists opposing Tocks Island said they were poised to challenge the project in court once construction activity is initiated.



# Financial Summary

## Budgetary

1973 REVENUES		
	Budgeted	Received
Delaware	121,300	121,300
New Jersey	355,900	355,900 <sup>(1)</sup>
New York	313,900	313,900
Pennsylvania	383,900	383,900 <sup>(4)</sup>
U.S.	216,000	216,000
EPA Grant	234,000	177,400 <sup>(2)</sup>
Flood Control Support	30,000	30,000
Miscellaneous	2,000	6,349
Project Review Fees	0	13,194
<b>TOTAL</b>	<b>1,657,000</b>	<b>1,617,943</b>
		<b>39,057<sup>(3)</sup></b>
	<b>1,657,000</b>	<b>1,657,000</b>

(1) Includes \$2,000 capital appropriation

(2) \$56,600 of grant amount not received

(3) Net revenue loss

(4) Includes \$25,000 capital appropriation

(5) Includes \$601 unexpended funds,  
\$13,194 Project Review fees,  
\$4,349 excess miscellaneous receipts,  
and \$39,057 net revenue loss (grant)

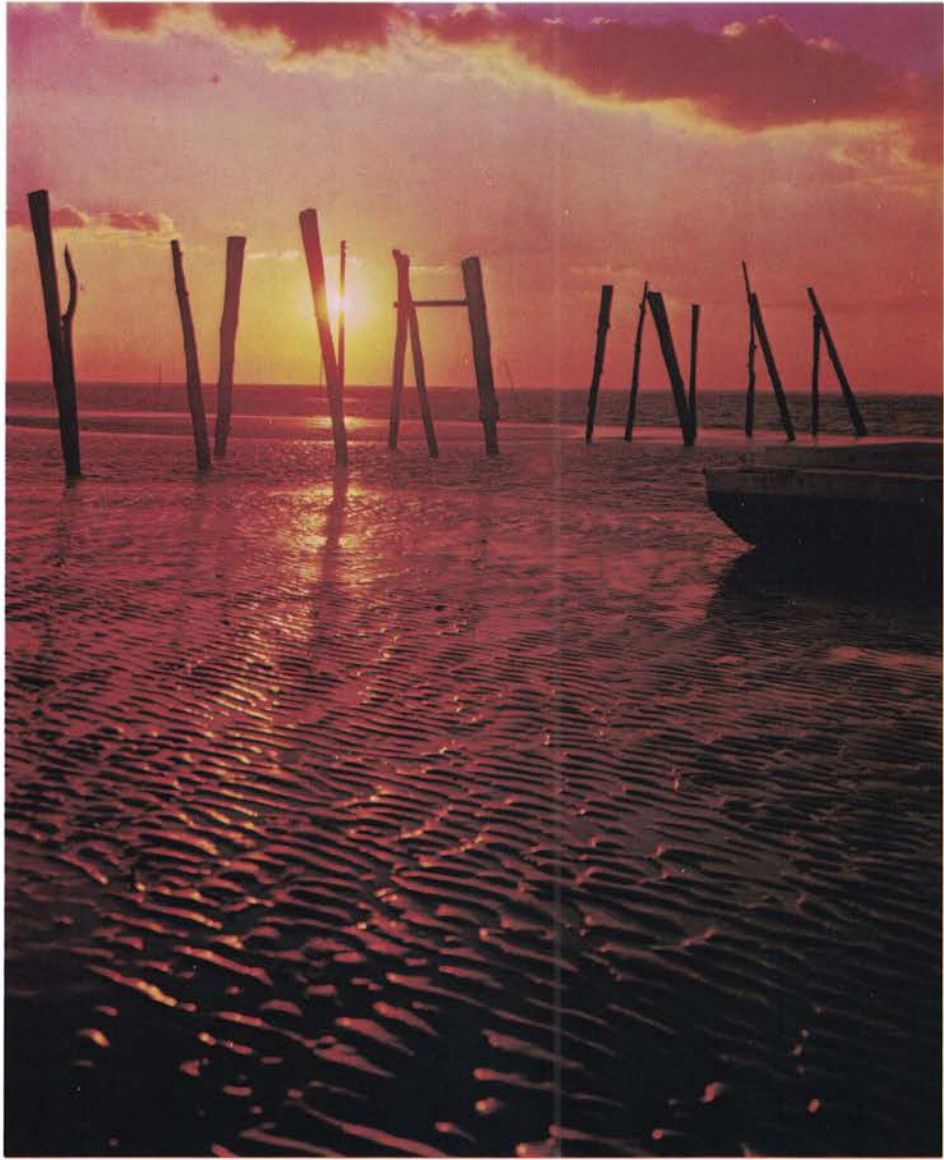
The records of the Commission are independently audited each year as required by the Compact.

1973 EXPENDITURES			
	Appropriations	Expended	
<b>By Organization</b>			
Directorate	306,516	296,634	
Administrative Division	180,954	186,832	
Planning Division	1,169,530	1,116,333	
<b>TOTAL</b>	<b>1,657,000</b>	<b>1,599,799</b>	
<b>By Program</b>			
Water Supply	63,000	32,081	
Water Demand	25,000	15,681	
Recreation	70,000	64,514	
Power	33,000	42,345	
Project Review	142,000	135,824	
Water Quality	610,000	657,933	
Comprehensive Plan	183,000	273,964	
Flood Loss	109,000	33,437	
Basin Operation	157,000	163,830	
Small Watersheds	28,000	11,903	
Environmental Analysis	210,000	141,287	
<b>TOTAL</b>	<b>1,630,000</b>	<b>1,512,799</b>	
Capital Program	27,000	27,000	
Excess or deficit in appropriations or receipts over expenditures		57,201 <sup>(5)</sup>	
<b>GRAND TOTAL</b>	<b>1,657,000</b>	<b>1,657,000</b>	

## Non-Budgetary

	Funds Available	Expenditures	Unexpended Dedicated Allotment
Tocks Island Region Environmental Study	8,687	0	8,687
Tocks Island Fish Research	20,317	3,701	16,616
Deepwater Regional Study	69,905	27,942	41,963
<b>TOTAL</b>	<b>98,909</b>	<b>31,643</b>	<b>67,266</b>





A Delaware Bay sunset.





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