United States General Accounting Office

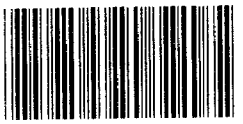
GAO

Report to the Honorable
Peter H. Kostmayer
House of Representatives

October 1986

WATER RESOURCES

Delaware River Basin Commission's Management of Certain Water Activities



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GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-224109

October 8, 1986

The Honorable Peter H. Kostmayer
House of Representatives

Dear Mr. Kostmayer:

This report responds to your request of August 15, 1985, that we provide information on certain issues related to the Delaware River Basin Commission's water resource management activities. We found that since 1975 the Commission has shifted its emphasis from constructing water resource projects to using water conservation techniques and strategies in order to meet water supply and streamflow needs. The Commission's 1980 population growth projection for the Delaware River Basin was generally accurate, but data on water use are not always collected or reliable. Furthermore, the Commission's policies for approving permits for large users of water have become more restrictive within the past 6 years, but permits are approved without knowledge of the permits' impact on streamflow in the basin. However, because the Commission is taking action to obtain better water use data, we are making no recommendations.

Unless you publicly announce its contents earlier, we do not plan to distribute this report further until 30 days from its issue date. At that time, copies will be sent to the Director, Office of Mangement and Budget, and other interested parties.

Sincerely yours,

J. Dexter Peach

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

The 330-mile Delaware River serves the water supply needs of 20 million people in Delaware, New Jersey, New York, and Pennsylvania. Concerned about continuing drought emergencies in the Delaware River Basin, Representative Peter H. Kostmayer asked GAO to provide information on the performance of the Delaware River Basin Commission, a federal-interstate organization that manages the river basin's resources Representative Kostmayer wanted to know, among other things,

- the extent of the Commission's water conservation strategies and techniques,
- the accuracy of population growth and water use forecasts, and
- the effectiveness of the Commission's process for granting permits to ensure adequate streamflow.

Background

The Commission was formed in 1961; its membership consists of the four states mentioned above and the federal government. Guided by a compact which sets out its general purposes, the Commission has formulated comprehensive plans for immediate and long-range development and use of the basin's water resources. The Commission's day-to-day activities involve drought emergency decisions, water permit approvals and meetings to elicit and consider public input on policy or project proposals. The four states and New York City, a principal user of Delaware River water, also agreed in the spring of 1983 to various arrangements, procedures, and criteria that the Commission uses for managing the basin waters, with water conservation as a key element. (See pp. 10 to 12, and 20.)

Results in Brief

Since 1975, the Commission has shifted its emphasis from constructing water resource projects to using water conservation techniques and strategies, in order to meet water supply and streamflow needs. (See p. 18.) The Commission's 1980 population growth projection for the basin was generally accurate, but data on water use are not always collected or reliable. (See p. 26.)

The Commission's policies for approving permits for large users of water have become more restrictive within the past 6 years, but except for major projects, permits are approved without knowledge of their impact on streamflow in the basin. (See p. 30.)

Principal Findings

Water Conservation Strategies

Since the cornerstone of its 1962 construction plan—the major, multipurpose Tocks Island Dam project—was not approved by the Basin state governors in 1975 for environmental reasons, the Commission has emphasized water conservation techniques, particularly during periods of drought. The conservation measures include reducing water flow to New York City and New Jersey, and state and Commission actions to reduce nonessential water use. The Commission believes that these measures will enable it to allocate water within the intent of a 1954 Supreme Court decree. The decree resolved a conflict over Delaware River water use by permitting New York City to divert 800 million gallons of water each day from three New York State reservoirs. New Jersey is permitted to divert 100 million gallons each day from the Delaware River Basin. These measures will also enable the Commission to meet its objectives of protecting the lower reaches of the basin from saltwater intrusion and providing adequate water supplies to basin users through the year 2000. (See p. 18.)

Population Growth and Water Use Forecasts

The Commission's 1980 population projection for the basin was 7.2 million people, or 3.4 percent higher than the actual 1980 U.S. census population, and is satisfactory for planning purposes. (See p. 26.)

Accurate water use forecasting is not possible at this time because the Commission's data for surface and groundwater withdrawal for some purposes are not always accurate. For example, groundwater withdrawals for irrigation and rural domestic uses are generally not metered and must be estimated by the Commission. The Commission is obtaining better quality water use data and has developed two mathematical models to improve its forecasting abilities. (See pp. 26-29.)

Permitting Process

Within the past 6 years, the Commission has tightened its permitting requirements to protect water quality and to better control water withdrawals from the basin, particularly for groundwater. In 1980, for example, new groundwater users of 10,000 gallons per day in a southeastern Pennsylvania area where groundwater levels were low had to obtain a permit; previously, only users of 100,000 gallons per day

needed permits. Effective in January 1987, all new and existing groundwater and surface water withdrawals greater than 100,000 gallons per day must be metered. (See pp. 30-33.)

In approving permits, the Commission considers the impact of the individual permit on the immediate geographic area surrounding the user. These impacts include interferences with existing groundwater wells and changes in water quality. But except for major projects, the Commission is not in a position to identify whether the approval of additional permits would cause a basinwide water availability problem. As a result, GAO could not evaluate the effectiveness of the permitting process in ensuring adequate streamflow. The Commission is in the process of obtaining more reliable water availability and usage data. (See pp. 33-35.)

Recommendations

Because the Commission is taking action to obtain better water use data, GAO is making no recommendations.

Agency Comments

GAO provided copies of the report to the Commission and the four Compact states for their review and comment. The Commission and the three states that provided comments generally agreed with the information in GAO's report. The commenters suggested technical clarifications which were made to the report where appropriate. (See apps. IV to VII.)

Contents

Abbreviations

cfs	cubit feet per second
DRBC	Delaware River Basin Commission
EPA	Environmental Protection Agency
gpd	gallons per day
GAO	General Accounting Office
OMB	Office of Management and Budget

Introduction

In the 1920's, New York City sought to add to its water supply by tapping the headwaters of the Delaware River in New York State. Since the river and its basin also serve Delaware, New Jersey, and Pennsylvania, conflict resulted over the city's action and led to U.S. Supreme Court decrees in 1931 and 1954. The court granted New York City the right to divert up to 800 million gallons of water per day from the Delaware River, provided the city reduced its use during low-flow conditions. The decrees also allow New Jersey to divert up to 100 million gallons each day from the basin.

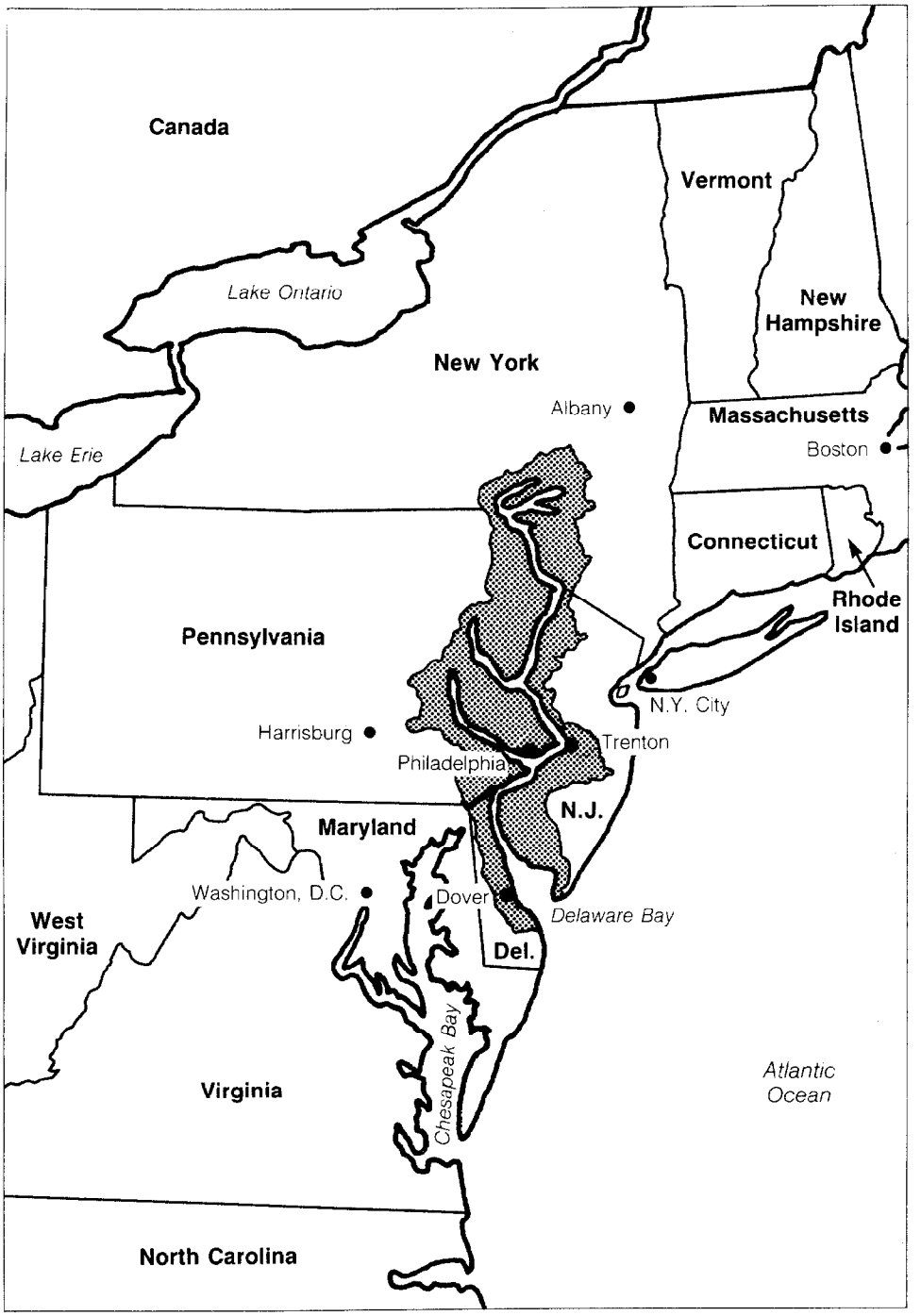
In 1961, the four states in the basin and the federal government formed the first federal-interstate compact—the Delaware River Basin Compact—to promote effective basinwide water resources management. The Compact departed from traditional compacts in that (1) the federal government is a signatory party with the states and (2) extremely broad powers are granted to the Compact commission. The Compact established the Delaware River Basin Commission (DRBC) as an agent and instrumentality of the governments of the signatory parties—the federal government, Delaware, New Jersey, New York, and Pennsylvania. DRBC is responsible for multipurpose planning, management, and development of the river basin's resources.

The Delaware River Basin

The Delaware River originates in southeastern New York State, flowing 330 miles downstream along the borders of Pennsylvania, New Jersey, and Delaware before emptying into the Delaware Bay. The Delaware River and its tributaries drain an area of about 13,000 square miles—the Delaware River Basin.

The basin serves as a major water supply source for New York City and Philadelphia. The upper part of the basin contains sparsely settled farmland; the lower part is densely populated and highly industrialized. About 20 million people, including 7 million basin residents, depend on the Delaware River, its tributaries, and groundwater for their water supply. Figure 1.1 shows where the basin is located.

Figure 1.1: Delaware River Basin



Source: DRBC.

Major Provisions of the Delaware River Basin Compact

The purposes of the Compact include promoting interstate cooperation; removing causes of controversy such as the use and management of the basin's resources; and providing for cooperative planning and action for conservation, utilization, development, management, and control of the basin's water resources. The Compact binds the signatory parties for an initial period of 100 years until 2061, although the Congress may at any time withdraw the federal government as a party to the Compact.

DRBC members include the four basin states' governors (ex officio) and a special member appointed by the President to represent all federal agencies. Historically, the appointee has been the U.S. Secretary of the Interior. Each state DRBC member and the President have appointed alternates with powers that include the authority to attend DRBC meetings and to vote. Each member has one vote. Apportioning operating expenses among the signatory parties and modifying the rights of the parties to the 1954 decree require a unanimous vote, while other actions require a majority vote.

The Compact requires DRBC to formulate and adopt a comprehensive plan for the immediate and long-range development and use of the basin's water resources, a water resources program, and annual expense and capital budgets. Water projects in the basin that have substantial effect on basin resources require DRBC approval before the water can be withdrawn. To be approved, the project must comply with the comprehensive plan.

In consenting to the Compact, the Congress attached reservations to safeguard federal interests. A key reservation provides that the concurrence of the federal member is needed to bind the federal government to the comprehensive plan. Furthermore, the President may, by Executive order, suspend, delete, or modify any provision of the comprehensive plan as it applies to federal agencies or officers if he determines that such a change is in the national interest.

DRBC Functions

Guided by the general conditions in the Compact, DRBC has formulated comprehensive plans for immediate and long-range development and use of the basin's water resources. The Commission's day-to-day activities involve drought emergency decisions, water permit approvals, and meetings to elicit and consider public input on policy and project proposals. For example, DRBC acts on all policy matters of general or permanent significance by resolution. Resolutions range from establishing standards for the discharge of oil and grease into the Delaware River to

declaring a basinwide drought emergency. In addition, the Commission is required to approve all projects having a substantial impact on the basin's water resources that conserve, utilize, control, develop, or manage the resource; the projects may not conflict with the comprehensive plans. Water projects having a substantial impact on the basin's resources include water supply requests for nuclear electric-generating stations, expansion of sewage treatment plants, and groundwater withdrawal projects in a certain protected area in southeastern Pennsylvania.

Each state and the federal government contribute funds for the DRBC's operation. DRBC's financial officer told us that the funding share of each party is predicated on an equitable distribution of cost, on the basis of the benefits or services an individual party receives. Over the past 5 fiscal years (1981-85) ending in June 1985, for example, the federal government and the states have provided about $1.5 million each year, as shown in table 1.1.

Table 1.1: Funding for DRBC From the States and the Federal Government, Fiscal Years 1981-85

Contributor	Average annual contribution, 1981-85	Percentage of total
Delaware	$148,860	10.0
New Jersey	389,420	26.3
New York	216,000	14.6
Pennsylvania	456,640	30.8
Federal government	270,500	18.3
Total	**$1,481,420**	**100.0**

Source: DRBC.

In addition, the Environmental Protection Agency (EPA) has provided, during the same 5-year time frame, an average annual grant of $234,000 to DRBC, through its section 106 water quality pollution control program under the Clean Water Act, for water quality control and evaluation activities. Along with other revenue sources, DRBC had available during the 5-year period about $2 million each year to carry out its program operations.

Most of the funds are used for salaries and administrative costs of its staff and for various studies performed under contract. DRBC's professional staff have backgrounds in civil engineering, hydrology, and planning. As of March 1, 1986, the staff totaled 37 full-time employees.

Construction projects are generally not funded by DRBC but by federal or state entities. Projects have been funded by the U.S. Army Corps of Engineers, the Department of Agriculture's Soil Conservation Service, and by state agencies. DRBC has funded water supply storage for two Corps projects and plans to fund storage for two other Corps projects. DRBC also rebuilt dams at one project.

Prior GAO Report

In February 1981, we issued a report to the Congress entitled Federal-Interstate Compact Commissions: Useful Mechanisms for Planning and Managing River Basin Operations (CED-81-34, Feb. 20, 1981). The report described the major interstate water problems existing within the Delaware and Susquehanna River Basins and discussed how the two existing federal-interstate compact commissions work to solve these problems. The report pointed out that the most critical issue facing the DRBC was the need to maintain adequate streamflow or water volume during droughts. Other major issues included pollution by toxic substances, water quality in the estuary, groundwater shortages, and flood loss reduction. The report further noted that how to deal with future droughts through water allocations had not yet been resolved, but that negotiations were underway which were intended to quantify the amounts of water diversions and minimum releases required of the affected parties during droughts. The report did not contain any recommendations.

Objectives, Scope, and Methodology

In an August 15, 1985, letter (see app. I), Representative Peter Kostmayer requested that we provide information on five issues concerning DRBC's water resource management activities:

- To what extent has DRBC encouraged water conservation techniques and strategies in order to maintain adequate streamflow in the Delaware River? Does DRBC emphasize nonstructural alternatives to river management? (See ch. 2.)
- How accurate have DRBC forecasts been for population growth and anticipated water use in the river basin? (See ch. 3.)
- How effectively has DRBC used its permitting process and its authority to limit water withdrawals to ensure adequate streamflow in the Delaware River? What effect will DRBC permits for depletive water use (water leaving the basin and not returning) have on future streamflow? (See ch. 4.)
- To what extent have public input and comments been incorporated into DRBC policymaking? (See ch. 5.)

- What are the "federal interests" that the President's appointee to the DRBC represents and how well are those interests represented? (See ch. 6.)

We discussed these matters with DRBC's Executive Director, Secretary, the Head of the Project Review Branch, and the Chief Engineer and reviewed reports and documents DRBC prepared on its activities. Most of our work was performed at DRBC's headquarters in West Trenton, New Jersey.

To address the issue regarding water conservation strategies, we reviewed documents establishing the authority and responsibilities of DRBC, including the Delaware River Basin Compact, the U.S. Supreme Court Decree of 1954, comprehensive planning documents, and a 1982 planning agreement.

To evaluate DRBC's forecasting procedures, we reviewed DRBC's population projection methodologies, forecasting assumptions, and the two models DRBC used to predict water availability. We also compared the 1980 population projections with actual growth and obtained information on DRBC's recent efforts to improve its water use forecasts. We could not evaluate the accuracy of the water use forecasts because data on actual water withdrawn from the basin are not always available or accurate.

To obtain information on how effectively DRBC used its permit process to ensure adequate streamflow, we traced the development of DRBC's entitlement and permitting policies and reviewed the entitlements and allocations granted since 1965 to new and expanded water users. We contacted permitting officials from the four compact states to obtain their views on how the process operated within their jurisdictions. DRBC's data did not allow us to determine the effect that permits for depletive water use would have on future river streamflow.

We attended DRBC business meetings, public hearings, and Water Conservation Advisory Committee Meetings between September 1985 and December 1985. We reviewed DRBC's meeting minutes, public input, and related official dockets and resolutions for the period from October 1984 through October 1985, the most recent 1-year period available when we began our review. We also interviewed representatives from five public interest groups, such as the League of Women Voters, the Watershed Association of the Delaware River, and the Water Resources Association of the Delaware River Basin. (See app. II.)

We discussed with the U.S. Commissioner (the federal representative to the Commission) his role with DRBC and his views on how he carried out his responsibilities. We also spoke with 31 federal officials from 20 federal departments and agencies. The 20 federal departments and agencies, which all have interests in river basin activities, included the Department of Interior's Fish and Wildlife Service and National Park Service, the Department of Agriculture's Soil Conservation Service, and the Environmental Protection Agency. Appendix III is a list of the 20 entities and our principal contacts.

We interviewed the 31 officials the agencies designated as the principal contacts in order to determine (1) how these agency officials perceived their federal interests and (2) how well these interests were represented by the U.S. Commissioner. Most of these 31 officials were field personnel with working relationships with DRBC and/or the U.S. Commissioner. Six of the 31 officials were located in the Washington, D.C., metropolitan area. Most of the other officials were located in the Philadephia or New York City metropolitan areas. Seventeen officials were managers, 12 were specialists, and 2 were in liaison positions. We did not independently assess the legitimacy of the problems that these officials discussed with us.

We performed this review from August 1985 through August 1986 in accordance with generally accepted government auditing standards.

Agency Comments

We provided copies of our draft report to DRBC, the U.S. Commissioner, and the four Compact states for their review and comment. DRBC and three of the four states (New Jersey, New York, and Pennsylvania) provided comments on a draft of this report. (See apps. IV to VII.) Generally, the comments stated that the report was a well-written assessment of the five issues. The commenters suggested clarifications and amplifications which we have incorporated where appropriate.

DRBC Uses Nonstructural Alternatives to Help Maintain Adequate Streamflow

DRBC is attempting to resolve the basin's water supply and streamflow problems during periods of drought by balancing the use of structural projects with nonstructural, or water conservation, techniques. This approach has evolved over the years. DRBC's first comprehensive plan in 1962 had only one emphasis—to construct water control projects. When the cornerstone of its construction plan—the major, multipurpose Tocks Island Dam—was rejected in 1975 by the basin states, DRBC shifted its emphasis toward water conservation. DRBC believes that by combining a moderate construction program with the benefits derived from conservation techniques and practices, it will be able to allocate the water within the intent of a 1954 Supreme Court decree, as well as to meet its objectives of keeping saltwater from intruding into the lower reaches of the basin and providing adequate water supplies to basin users through the year 2000.

Evolution of a Balanced Approach to Resolving River Management Problems

The 1961 Delaware River Basin Compact required that DRBC prepare and adopt a comprehensive plan for managing the basin's water and related land resources. The Compact also subscribed to the general philosophy that conservation, utilization, development, management, and control of the basin's water and related resources under a comprehensive, multipurpose plan would bring the greatest benefits and produce the most efficient service in the public welfare. The Compact also stated that such a plan would provide effective flood damage reduction and conserve and develop ground and surface water supplies for (1) municipal, industrial, and agricultural users and (2) the development of recreational facilities.

On the basis of input from the Army Corps of Engineers, the Department of Agriculture's Soil Conservation Service, and state agencies, the Commission adopted a comprehensive plan in March 1962 that focused on the construction and/or expansion of 20 projects within the basin. The planned completion dates ranged from 1962 to 2010. The core of the plan was the proposed Corps of Engineers' Tocks Island Dam project (located about 7 miles northeast of Stroudsburg, Pa., on the Delaware River), which would have provided about 300 billion gallons for water supply, flood control, hydroelectric power, and recreational benefits. A major planning assumption was that the project would have supplied enough water to meet the basin's water needs during droughts. But opposition to the dam's potential environmental and economic impacts increased during the early 1970's, and in 1975 a majority of the basin state governors decided not to recommend congressional funding for its construction. DRBC has deferred further consideration of Tocks Island

Dam until after the year 2000 because it believes its current strategies will provide an ample water supply for the basin until then.

The other projects the Corps proposed to DRBC included constructing five new dams and modifying two flood control projects to increase water storage capacity. In addition, basin state agencies proposed four large reservoirs, and the Department of Agriculture's Soil Conservation Service sponsored eight small watershed projects that provide water supply and flood control.

As of February 1986, only two of the five federal dams (Beltzville and Blue Marsh) had been constructed, the modifications to the two flood control projects were still pending, and one of the four reservoirs and all of the eight watershed projects had been built. The other projects were either deferred or dropped from the plan. DRBC's Chief Engineer told us that the main reason the projects were not constructed was that state and local governments, conservationists, and other nonfederal interests changed their attitude toward constructing dams and major reservoirs.

Plan Modified to Emphasize Water Conservation in the Basin

DRBC's decision to postpone the Tocks Island project changed the validity of DRBC's planning assumptions, underscoring the need to update and revise its comprehensive plan. DRBC initiated a detailed study (referred to as Level B) of the basin in October 1976 to develop a plan for managing the basin's water resources by identifying policies, programs, and projects affecting water conservation, water quality, and water supply. DRBC studied the present and projected demands for water within the basin, compared those demands with available water supplies, and developed measures to keep the supply and demand in balance. The Final Report and Environmental Impact Statement of the Level B study, completed in May 1981, emphasized water conservation as the cornerstone of the basin's management plan. The study presented conservation strategies to maximize efficient water use by industrial, municipal, and agricultural users. The three strategies that the study suggested as having the most beneficial effect were

- building and plumbing codes requiring the use of water-saving plumbing in new construction and renovation of existing buildings,
- programs in major cities to control leaking water supply pipes, and
- emergency conservation measures and contingency plans to be enacted during periods of drought.

In 1981, DRBC also adopted a resolution requiring all public authority, municipal, or private waterworks suppliers and industrial and agricultural users of over a million gallons a day to prepare conservation plans.

In December 1978 DRBC called upon the five parties to the 1954 U.S. Supreme Court decree (Delaware, New Jersey, New York, New York City, and Pennsylvania) to enter into discussions to establish the arrangements, procedures, and criteria for managing the waters of the basin, now that the Tocks Island Dam would not be constructed. The Interstate Water Management Recommendations of the Parties to the U.S. Supreme Court decree of 1954 (the "Good Faith" agreements) were completed in the spring of 1983; the recommendations were identical or similar to the proposals contained in the Level B study. Water conservation actions were one of the key elements endorsed by the five parties.

Limited Construction Program Is Underway

DRBC's current construction program represents a scale-down from the projects approved in the 1962 comprehensive plan. The Good Faith agreements were formally adopted in February 1983 and call for the construction of four projects designed to provide 61 billion gallons of additional storage capacity. These projects include (1) modifying two existing federal flood control reservoirs (an added 33 billion gallons), (2) enlarging one of New York City's reservoirs (an added 13 billion gallons), and (3) constructing a reservoir on Merrill Creek (an added 15 billion gallons).

These projects are scheduled to be completed by December 1995. The Corps' modification of the existing F.E. Walter reservoir in Luzerne County, Pennsylvania, is targeted for completion by December 1990, and its modification of the existing Prompton reservoir in Wayne County, Pennsylvania, is scheduled for completion by December 1995. The state of New York is evaluating the environmental impact of enlarging the Cannonsville reservoir in Delaware County, New York, while Merrill Creek reservoir is to be constructed in Warren County, New Jersey, by a consortium of electric utility companies by December 31, 1986.

Special Conservation Measures Enacted During Drought Periods

Adequate streamflows in the basin are needed generally to control saltwater intrusion and protect fresh water supply sources. Insufficient precipitation produces droughts, which make maintaining adequate streamflows more difficult.

While rainfall in the Delaware River Basin is generally adequate in most years, the basin has periodically experienced droughts of varying intensity. For example, DRBC declared droughts in the 1960's and in 1980, 1981, and 1985. The drought that lasted from 1961 to 1967 is the drought of record in the Delaware Basin. The 1985 drought lasted almost the entire year—from January 23 through December 18.

Declaring a Drought

DRBC has criteria to identify the onset and stages of a drought. Drought warnings for the basin are predicated upon the combined storage levels for New York City's three Delaware River Basin reservoirs during given times of the year. The Cannonsville, Neversink, and Pepacton reservoirs have a combined storage capacity of 271 billion gallons, or about 90 percent of the total basin's surface water supply storage capacity.

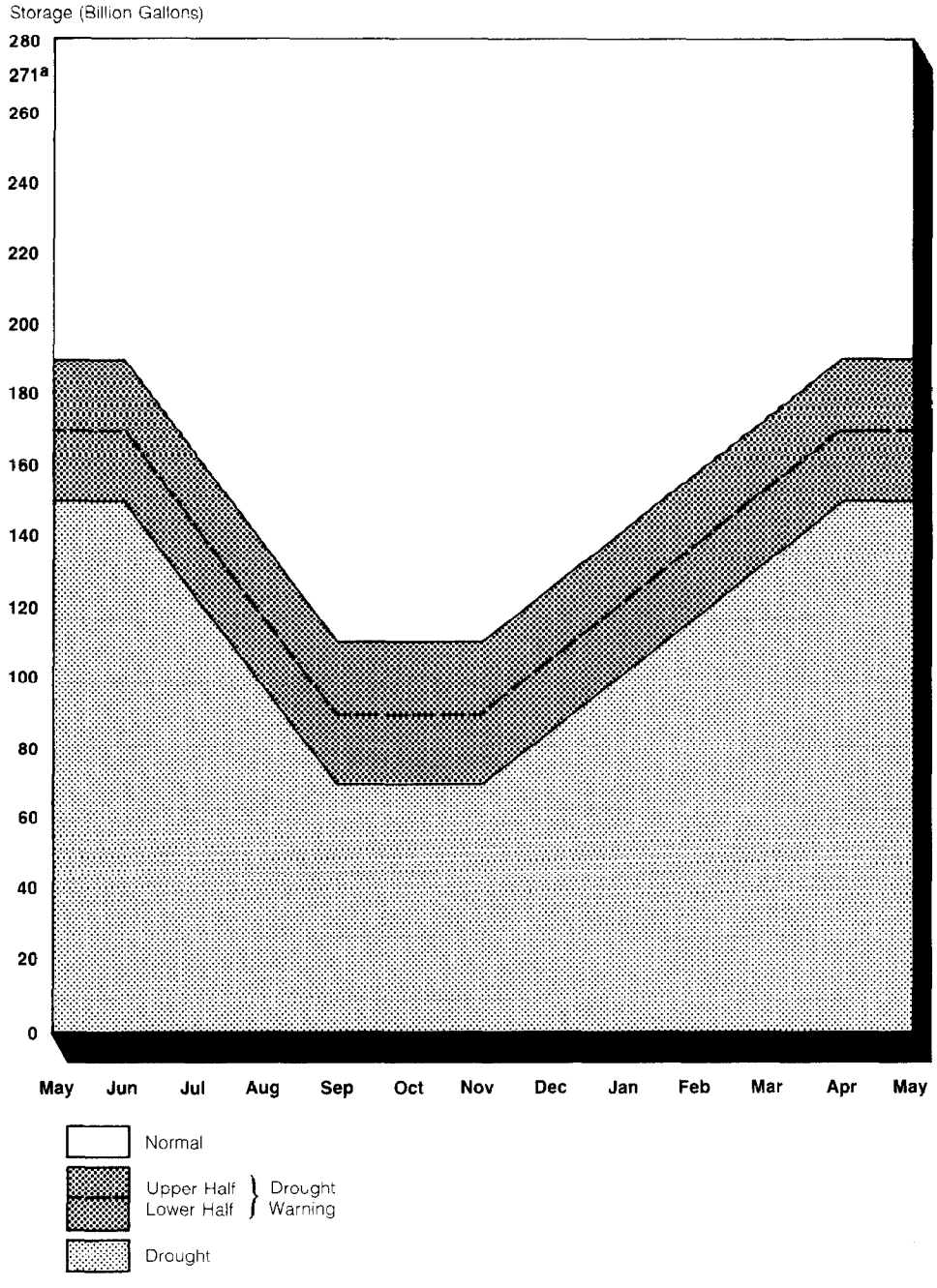
The parties to the Good Faith agreements use the combined storage level in these three reservoirs as a criterion of basin hydrology. Based on the drawdown and probability-of-refill statistics, a set of storage level curves was developed, varying by season during the water year, to identify normal, drought warning (which is separated between an upper half and a lower half warning), and drought emergency conditions. For example, the normal combined storage level for the three reservoirs is permitted to decline from 190 billion gallons in May and June to a low point of 110 billion gallons in October and November. Then, the storage levels must increase to 190 billion gallons by the following May and June. Thus, droughts are declared by DRBC whenever the combined storage level for the three New York City reservoirs drops below the established criterion. (See fig. 2.1.)

Irrespective of drought conditions, New York City and New Jersey are permitted to divert water from the Delaware River Basin. The 1954 U.S. Supreme Court decree permits New York City to divert 800 million gallons of water each day from the three upper Delaware River reservoirs in New York State. The 1954 decree also permits New Jersey to divert up to 100 million gallons each day from the Delaware Basin for the central and northeastern part of the state. The water for New York City is removed directly from the three reservoirs in New York, while most of

the water for New Jersey is removed about 20 miles north of Trenton via the Delaware and Raritan Canal.

Another factor which DRBC must deal with in a drought situation is saltwater intrusion in the estuary at the lower end of the Delaware River, where the river meets the Delaware Bay. The rising sea level has added to the tidal forces that drive salt water from the Atlantic Ocean up the estuary, thus affecting the underground aquifer that serves as the principal drinking water source for residents of Burlington, Camden, and Gloucester Counties in southern New Jersey. The potential dangers to users of the aquifer is that their drinking water could contain relatively high sodium concentration. Water releases from the three upper basin reservoirs have to maintain a minimum flow of 1,750 cubic feet per second (cfs) during normal storage conditions at the Montague, New Jersey, gauging station in order to keep the saltwater from advancing upstream.

Figure 2.1: Drought Criteria for the Cannonsville, Neversink, and Pepacton Reservoirs



[a]*Combined storage capacity.*
Source: DRBC.

Drought Measures

When a drought occurs, out-of-basin diversions to New York City and northeastern New Jersey are reduced in stages by up to 35 percent. Both New York City and New Jersey have agreed to these reductions. In addition, the minimum flow requirement is reduced at the Montague and Trenton gauging stations, which allows the salt front to move upstream. Table 2.1 shows the flow reductions that are triggered during a drought condition.

Table 2.1: Flow Reductions Triggered During Droughts in the Delaware River Basin

Diversion data/million gallons daily and flow objective/cfs

	Diversion		Flow objective	
NYC storage condition	New York City	New Jersey	Montague	Trenton
Normal	800	100	1,750	3,000
Drought warning				
-upper half	680	85	1,655	2,700
Drought warning				
-lower half	560	70	1,550	2,700
Drought	520	65	1,100–1,650[a]	2,500–2,900[a]

[a]Varies with time of year and location of the salt front.
Source: DRBC.

DRBC also coordinates releases from various lower basin reservoirs during drought periods to complement the operating formula for the New York City reservoirs in order to maintain reliable supplies for essential uses, conserve water, and control salinity.

The Level B study and Good Faith agreements concurred that water conservation should be emphasized most strongly during drought situations. Both documents contain emergency conservation measures and contingency plans to be enacted during periods of drought. For example, under the Good Faith agreements, each basin state submits to DRBC a drought contingency plan for a phased implementation of certain actions. The state plans submitted to DRBC in 1983 identified (1) the specific nonessential water uses to be restricted such as lawn watering and car washing, (2) the legal authority for fines and penalties for nonadherence to the restrictions, (3) phased-reduction contingency plans for large water users, and (4) information services to inform the public of its responsibilities during droughts.

During the 1985 drought period, DRBC claims to have conserved about 84 billion gallons of water through reductions in out-of-basin diversion (exportation) and reservoir releases. This amount approximates the

equivalent water diverted from the basin for 93 days to New York City and New Jersey.

Observations

To address the basin's water supply problems, DRBC has shifted its emphasis from structural solutions toward water conservation approaches, especially during droughts. It has instituted special drought emergency actions to reduce (1) out-of-basin diversions to New York City and New Jersey, (2) releases from the three New York State reservoirs, and (3) streamflow objectives at two New Jersey gauging stations. Also, the basin states have developed plans for reducing water use during droughts, including restricting nonessential water use and reducing the water use of large water users. DRBC claimed that during the 1985 drought, which lasted about a year, 84 billion gallons were conserved through reductions in out-of-basin diversions and in reservoir releases.

DRBC Is Working to Improve Water Use Forecasts

DRBC's 1980 population growth projection for the basin was generally accurate, but data on the amount of water used are not always collected or reliable. DRBC is in the process of obtaining better quality water use data from users and has begun using two mathematical models to improve its forecasting ability.

Basin Population Growth Forecast Was Generally Accurate

The 1980 population projection for the Delaware River Basin, which DRBC developed as part of the Level B study, was 7.245 million people. The 1980 U.S. census population for the basin was 7.01 million people, or 3.4 percent lower than DRBC's estimate.

Generally, DRBC determined the average rate of population change in each subbasin between 1950 and 1975, then projected this rate of change to the Department of Commerce's Bureau of Economic Analysis 1977 data in order to estimate the 1980 population. We believe the methodology DRBC used in making its projection was reasonable and resulted in a reasonably accurate population projection. There is no direct correlation, however, between the population and water use. For example, the use of steam (water)-generated electricity is dependent on demand factors outside the service area, and farm irrigation is dependent on the weather and changing farm economics.

Reliable Data to Forecast Water Use Not Always Collected

In order to forecast water use, DRBC must have accurate data on (1) the current amount of water withdrawn from the basin by all water users and (2) that portion of the water withdrawn that will not return to the basin—the depletive water use.

The DRBC staff engineer provided us with the forecasted 1985 daily water withdrawals and depletion, by each usage category. The data show that 11.4 billion gallons per day would be withdrawn from the basin and 5 percent of this amount (568 million gallons) would be depleted.

Table 3.1: Forecasted Daily Water Withdrawals and Depletion, 1985

Million gallons per day

Category	Daily water withdrawal	Daily water depletion
Industrial	1,860	186
Municipal	1,210	121
Irrigation	123	98
Steam electric	8,000	97
Golf courses	56	45
Livestock	10	10
Rural	70	7
Institutions	40	4
Total	**11,369**	**568**

Source: DRBC.

Water withdrawal includes both the surface and the groundwater taken from basin water supplies. DRBC's Water Resources Analyst told us that in some use categories, data on the actual amount of withdrawals are not collected or are not verified by DRBC. For example, groundwater withdrawals for irrigation and rural domestic uses are generally not metered and must be estimated by DRBC. Withdrawals reported by those industries that take surface water from the basin directly and do not buy it from an intermediary company, have not been verified by DRBC on a test basis.

To determine the portion of total water withdrawals that are depletive, DRBC generally estimates the amount for most usage categories on the basis of depletion percentages that are generally accepted by employees who monitor water supply. For example, the depletion of water used by irrigation and golf course users is about 90 percent, whereas the depletion for industrial and municipal users is about 10 percent.

Many factors influence the accuracy of these estimates. For example, the amount of municipal water depleted is higher in surburban areas because of increased outdoor use (for gardens, lawns, and filling pools). In addition, an unknown amount of water is lost owing to system leaks. The estimated irrigation depletion rate is based on the types of crops grown and the efficiency of the irrigation technique used (i.e., spray cannons lose more water through evaporation than drip irrigation hoses). The steam electric utilities have calculated what they consider an accurate depletion rate through a complex formula, which includes such factors as air temperature, humidity, power production and efficiency, and other technical elements.

Water Use Data and Forecasting Procedures Are Improving

To obtain a data base on the amount of water available in the basin, DRBC is using flow data from the droughts that occurred in the mid-1960's and has modified the data to reflect the changes in water releases and diversions since then. Regarding the water use in the basin, DRBC estimated an increase in use since 1965, on the basis of the number of water use permits it has granted since 1965. (See ch. 4.) DRBC recognized that not all water withdrawn has been permitted, principally because small water users (generally users of less than 100,000 gallons per day) do not have to obtain a permit and because water users who were withdrawing water before DRBC was formed in 1961 were not required to obtain a permit. To help overcome these data gaps and obtain more accurate data, DRBC has sent water use questionnaires to golf courses, polled industry users, and asked water suppliers to provide data on total water use and the population served.

New DRBC regulations require that effective January 1, 1987, the owner or operator of any surface or groundwater withdrawal that totals an average of 100,000 gallons per day in any 30-day period must install and maintain accurate metering or measuring devices. Such users must report that use to designated state agencies at least annually and DRBC will be using a computer to record the data. Also, DRBC planners and water sales staff have begun to gather more useful data through new reporting requirements. For example, they are currently asking companies that sell water for data on the quantities and types of unaccounted for water loss (i.e., leaks).

DRBC has developed two mathematical models—the daily flow model and the salinity intrusion model—to help improve its water use forecasting ability. The daily flow model was initially developed in the early 1980's by a consulting firm for the Army Corps of Engineers; it uses 50 years of stream flow data (1928 to 1977) as its primary data source. This model predicts streamflows at different points on the river and takes into account such factors as precipitation, reservoir releases, water withdrawals, and the time of year. The salinity intrusion model was developed in the late 1970's and was modified specifically for the Delaware River Basin. The model provides information on streamflow and releases required to keep salt intrusion at an acceptable level above Delaware River mile 98 at Camden, New Jersey.

Together, the two models, under a variety of assumptions, attempt to estimate the flow available for allocation to water users and to predict the impact of proposed changes in reservoir release schedules on the salt

front. For example, the models can estimate the location of the salt front on the basis of the reduced streamflows in the Camden area.

These data improvements will help DRBC input more reliable data into a depletive water use budget, which was recommended in November 1982 by the parties to the Good Faith agreements. The agreements recognized that a water use budget focusing on the amount of water not returned to the basin would help DRBC to approve permits that would not exceed water availability and help it meet its salinity objectives. The agreements stated that DRBC would not approve applications for new or expanded depletive water uses that would be in excess of the amount available for allocation, unless new storage capacity was brought on line, existing uses were proportionately reduced by conservation or abandonment, or the new or expanded uses were offset by water imported from outside the basin. As of July 1986, DRBC had not finalized the depletive water use budget.

Observations

DRBC's 1980 population growth forecast was generally accurate, but DRBC's data on the water availability, withdrawal, and depletion categories are not always reliable enough to allow DRBC to most effectively manage the basin's water resources. Such data are important in providing DRBC with a better basis on which to decide whether additional (1) water use permits should be approved, (2) storage capacity should be constructed, and/or (3) water conservation measures need to be adopted. DRBC has recognized the limitations of its data and has taken steps to obtain more accurate data of both supply and usage.

DRBC's Water Permits Process Affects Basin Streamflow

To better control water withdrawals from the Delaware River Basin, DRBC's water permit program has become progressively more restrictive within the past 6 years. However, except for major projects, DRBC approves individual permits on a local basis without considering their cumulative impact on streamflow for the entire basin.

Permitting Authority and Process

DRBC must approve permits for projects that withdraw water from the river basin. Its authority is derived from Section 3.8 of the Delaware River Basin Compact which states that:

"No project having a substantial effect on the water resources of the basin shall hereafter be undertaken by any person, corporation, or governmental authority unless it shall have been first submitted to and approved by the commission."

The Compact also requires that the project must substantially conform to DRBC's comprehensive plan.

Most permit applications receive state approval before being forwarded to DRBC for approval. New York's and Pennsylvania's nonpublic water supply users, such as agricultural and industrial users, apply directly to DRBC; these two states do not require state approvals for such users. Table 4.1 details the state water permit programs.

Table 4.1: State Water Permit Programs

Delaware	New Jersey	New York	Pennsylvania (ground and surface water)	Pennsylvania (surface water)
Permitting agency				
Div. of Water Resources, Dept. of Natural Resources and Environ. Control	Div. of Water Resources, Dept. of Environ. Protection	Div. of Water, Dept. of Environ. Conservation	Bureau of Community Environ. Control, Dept. of Environ. Resources	Bureau of Water Resources Management, Dept. of Environ. Resources
Applicants				
All surface and groundwater users	All surface and groundwater users	Public water supplies from both ground and surface water	Public water supplies from ground and surface water[a]	Public water supplies from surface water[b]
Permit expiration dates				
10 years in 1985, but expected to be 30 years in 1986	5 to 15 years	None[c]	None[c]	50 years with some exceptions

[a]Bureau only permits water quality health aspects for drinking water.

[b]For allocation of surface water to public supply agencies.

[c]Where no state expiration dates exist, DRBC uses 5 years.

Source: DRBC.

DRBC sends out a public notice to potentially affected parties of all permit applications to solicit comment. A DRBC staff member reviews the permit application for conformance with four factors—water quality, salinity, perennial streamflows, and water supply. (See p. 33.) The staff prepares a draft docket containing the project description and DRBC's tentative findings and decision. The docket is sent to the DRBC commissioner from the applicant's state, who then reports back to DRBC with a recommendation for approval, approval with conditions, or deferral. DRBC then schedules a hearing and mails out hearing notices 10 days to 2 weeks before the hearing to the parties that have expressed an interest in DRBC activities. After evaluating the comments, DRBC approves, approves with conditions, holds over, or disapproves the permit application.

Water Permit Requirements Added

Within the past 6 years, DRBC has tightened its water permit requirements to better control water withdrawals from the basin, particularly groundwater. DRBC instituted these changes generally to protect water quality and limit groundwater withdrawals, particularly in areas of excessive water use.

In October 1980, DRBC made several changes in the permit requirements for groundwater users in the "protected area" in southeastern Pennsylvania. DRBC determined that groundwater levels were low in this area; water withdrawals were approaching or exceeding the normal or dry period recharge rates for the affected groundwater aquifers or basins. DRBC required the following:

- New applicants using at least 10,000 gallons per day (gpd) of ground water must obtain a permit. (This gpd amount is the estimated domestic use of about 25 to 30 houses, based on 3 to 3.5 persons per household.) Previously, only users of at least 100,000 gpd were required to obtain permits.
- Retail metering (water charges are based on metered use) is required for all new and extended public and private water supply systems with more than 250 connections or groundwater withdrawals greater than 10,000 gpd. Previously, only users of at least 100,000 gpd were metered.
- Existing users must register their groundwater withdrawal with the Pennsylvania Department of Environmental Resources.
- Users of existing, new, or expanded groundwater withdrawals greater than 10,000 gpd must adopt conservation requirements, including metering, charging, leakage control, interconnections with adjacent water systems, and drought emergency plans.

For withdrawals outside the protected area, the head of DRBC's Project Review Branch told us that in November 1980, DRBC made the criteria for groundwater withdrawals much more restrictive. He said the former criteria did not define water withdrawal limits and did not relate to streamflow impacts. The new criteria stated that withdrawals must be limited to the maximum amount of water removed from a groundwater basin that can be sustained without rendering supplies unreliable or causing long-term, progressive lowering of groundwater levels, water quality degradation, permanent loss of storage capacity, or substantial impact on low flows of perennial streams (flows that continue throughout the year.)

DRBC also required in November 1980 that (1) all groundwater users in the basin with withdrawals greater than 10,000 gpd register their use with the designated state agency, (2) new users of at least 1 million gpd adopt conservation techniques, and (3) the permits in states that issue them be renewed consistent with the expiration date the state assigns. DRBC assigns a 5-year expiration date for permits it issues in other states.

DRBC also proposed a requirement in October 1984 that all new and existing groundwater withdrawals throughout the basin greater than 100,000 gpd be metered and recorded at the source. In June 1986 DRBC finalized this requirement, which will go into effect on January 1, 1987.

Individual Permits Approved Without Considering the Impact on Basin Streamflow

In approving permits, DRBC considers the impact of an individual permit on the immediate geographic area surrounding the user. These impacts include interferences with existing wells, changes in water quality, and depleted streamflows. However, DRBC does not have data showing to what extent all approved permits affect water use throughout the Delaware River Basin. DRBC recognizes that these data would allow it to manage the basin water resource more effectively because they would provide a basis to deny a permit application that would adversely affect water availability. DRBC believes that the depletive water use budget will close the data gap.

What Is Adequate Streamflow?

DRBC considers four factors that affect streamflow in deciding whether to approve a permit:

- Maintaining water quality: DRBC's Water Quality Basin Regulations provide quantifiable measures of water quality. For example, trout streams need cold water (58 degrees or lower) and water temperatures that do not change very quickly.
- Keeping salinity levels low enough at specific points in the mainstream of the Delaware River to protect public water supplies: DRBC's Water Code gives minimum streamflows needed at specific locations depending on the time of year. For example, the minimum streamflow needed at Trenton, N.J., from December to April is 2,500 cfs.
- Maintaining perennial streamflows: DRBC attempts to maintain a streamflow greater than its defined standard for an intermittent stream, which flows at the rate of 0.1 cfs for 7 consecutive days.
- Sustaining water supply: DRBC makes water permit decisions on the basis of local conditions such as groundwater levels in the area, local streamflows, and the existence of other users and their proximity to the permit applicant. Each decision is also based on the effect on existing downstream users who are protected by the comprehensive plan.

The Head of DRBC's Project Review Branch, which reviews permit applications and prepares dockets for DRBC approval, told us that these four

factors are reasonable measures of "adequate streamflow" in any river or stream body.

Permit Decisions Are Based on Local Conditions

The Head of the Project Review Branch told us that, except for major projects, the effect of DRBC water permit decisions on streamflow for the entire Delaware River Basin is not considered. He said that on specific sites and on some small subbasins, DRBC considers the effects of water withdrawal locally. The October 24, 1984, permit to the Northampton Bucks County Municipal Authority is an example of how DRBC considered the local conditions in approving the permit. The permit stipulated that when water supply storage in a nearby reservoir fell below a certain minimum or when streamflow in a nearby creek fell below a certain minimum, water withdrawals from the permitted well must cease until specific hydrologic conditions returned.

DRBC temporarily stops new groundwater withdrawals in the southeastern Pennsylvania protected area by its predrilling notification program. The protected area regulations require an applicant proposing a groundwater withdrawal in excess of 10,000 gpd to provide a 30-day notice that includes information on all wells within a certain radius of the drilling location. The Head of DRBC's Project Review Branch told us that after the notice is received, DRBC or the applicant might instigate a meeting to determine the necessary hydrologic information that would support a permit application. He said that during this 30-day screening period, DRBC advises many potential applicants that the permit application would not be supportable.

DRBC has not denied a permit in the last 10 years, although the DRBC Executive Director told us that the Commission approved many permits with reduced water allocations. He also mentioned the case involving the diversion of water from an abandoned strip mine pit into a local river, in which the applicant withdrew the permit application when the draft docket DRBC prepared proposed that the permit be denied.

The Head of the Project Review Branch told us, however, that not all water use data are captured by the permit program and mentioned four categories of water users that are not granted water permits:

- Groundwater users with withdrawals of less than 10,000 gpd.
- Groundwater users outside the southeastern Pennsylvania protected area with withdrawals of less than 100,000 gpd.
- Surface water users with withdrawals of less than 100,000 gpd.

- Pre-Compact groundwater users with no additions or revisions to their withdrawals. However, a May 1985 DRBC resolution requires that these users must register their uses with the appropriate state agency.

Depletive Water Use Budgeting

The DRBC Executive Director, the Pennsylvania representative to DRBC, and the Head of the Project Review Branch told us that DRBC is not yet at the point where it can determine if the next permit it approves will deplete water in the basin to such an extent that it would jeopardize the amount of available water in the basin. DRBC is currently developing a depletive water use budget (see ch. 3, p. 29) to help it make better water permit decisions. The budget is scheduled for completion in 1986.

In generating depletive water use data for the budget, DRBC has developed information on 857 permits it has issued in the 20-year period from 1965 through 1984. It has issued 436 permits for community water withdrawal projects, 332 permits for irrigation water withdrawal projects, and 89 permits for industrial water withdrawal projects. The maximum amount authorized to be withdrawn is shown on the permit, and DRBC staff estimate that portion of the withdrawal that will be depleted, i.e., will not return to the river basin. DRBC's Executive Director believes the impact on basinwide hydrology can be determined with each new withdrawal for both surface and groundwater.

Observations

Approving new water withdrawal permits is a key decision that DRBC makes in its overall mission of managing the basin's water resources. Its policy has been more restrictive in recent years and has served to help protect groundwater supplies in the basin and in the southeastern Pennsylvania protected area in particular.

DRBC approves individual permit applications on the basis of local water conditions. Because of the absence of reliable water availability and usage data basinwide, however, we could not determine the relationship between permit approvals and streamflow adequacy. Also, DRBC is not in a position to determine the cumulative effects of the individual permit approvals on water resources in the entire basin. DRBC is in the process of obtaining more reliable water availability and usage data. (See ch. 3.)

Public Input Considered in DRBC Decisions

DRBC routinely asks the public for input on all its project and policy decisions. The public, however, has provided little or no input on most issues. Where they had, however, we did identify four instances during a 1-year period in which DRBC changed the docket or resolution to reflect suggestions made by the public.

Public Input Process

The Delaware River Basin Compact requires the Commission to provide opportunity for public input in specific instances, such as when adopting rules and regulations, approving many types of projects, and setting rates. Our review of 142 actions that DRBC considered from October 1984 to October 1985 showed that DRBC met the public input requirements stipulated by the Compact. DRBC held public hearings on major decisions and project approvals, either as part of the regular business meetings or, for more controversial issues, in separate meetings.

Hearing notices are widely distributed to the media, interested parties, and government agencies. The current mailing list for hearing notices has about 1,800 recipents. Commissioners receive copies of all written public input, and oral testimony is maintained on tapes. DRBC attempts to hold hearings in geographic areas potentially affected by the pending decision.

DRBC uses five advisory committees to provide it with more information on the issues it considers. The Ground Water, Conservation, and Project Financing Committees are comprised of representatives from government agencies, interest groups, concerned citizens, and experts in the area. The Water Quality and the Flow Management Technical Advisory Committees are comprised of representatives of the signatory parties and are not open to the public. These committees make recommendations to the Commission through DRBC's Executive Director.

We spoke with five individuals who have closely monitored DRBC activities for as long as 16 years. (See app. II.) Three individuals told us that prior to 1976, the public perceived DRBC as unreceptive to public input but that the Level B study heavily emphasized the importance of public input and participation in the process. Most individuals also said that DRBC has been more open to public input since the appointment in 1977 of the current Executive Director. Since his appointment, DRBC has expanded its mailing list for hearing notices and routinely sends out such documents as Notices of Applications Received and meeting agendas. Also, DRBC has begun placing extra sets of documents related to controversial pending actions in the geographic areas most directly

affected, so that concerned citizens can review applications in their local public library instead of traveling to the DRBC offices.

We analyzed all public input considered as part of the official hearing record from October 1984 through October 1985. Generally, the groups that provided public input on proposed DRBC actions fell into three categories:

- Organized groups with interests in a broad variety of issues concerning the environment, growth, and/or welfare of the basin.
- Single-issue, special-interest groups or individuals.
- Individuals or businesses who may be directly affected by a single proposed action.

We found that, in general, the groups interested in a broad variety of issues, such as the League of Women Voters of New Jersey, tended to work closely with DRBC (they served on DRBC advisory committees and attended meetings frequently), and provided constructive suggestions for improvement.

The hearing record showed that special interest groups were frequently critical of DRBC when the groups anticipated that the DRBC decision would not support their particular goals. Their expectations and suggestions frequently went beyond DRBC's legal jurisdiction. For example, antinuclear groups demanded that DRBC deny water to nuclear facilities on the grounds that nuclear facilities should not be constructed, although the Nuclear Regulatory Commission had already approved projects to be constructed, and DRBC had no jurisdiction over the approvals.

Individuals or businesses affected by a specific action usually provided comment only on that action. For example, a private well owner was concerned about how the approval of additional groundwater wells in the proximate area would affect the quality of his water supply.

Little or No Public Input Received on Most Actions

From October 1984 through October 1985, DRBC acted on 142 dockets and resolutions relating to policy decisions or water projects. The official hearing record showed that the public commented on only 22 of these actions.

Table 5.1: Public Comments on DRBC Actions, October 1984 Through October 1985

Number of actions	Public comments
120	0
16	1 to 10
4	11 to 25
2	26 to 60
Total 142	

Source: GAO analysis of DRBC data.

The 120 actions that received no public comment were generally for routine actions, such as a permit application to use ground- or surface water.

Of the six actions receiving 11 or more comments, 3 were major policy actions.

- DRBC began requiring the registration of all new or existing wells withdrawing more than 10,000 gpd (14 comments).
- DRBC declared a basinwide drought emergency (24 comments).
- The commissioners voted to ask the Congress to amend the Compact by eliminating the "grandfather clause" (section 15.1(b)), which prohibits DRBC from charging fees to water users who were withdrawing water before the effective date of the Compact (60 comments).

The remaining three actions related to controversial water use projects.

- In two actions, DRBC approved requests from the Philadelphia Electric Company to adjust its permit for the Limerick Nuclear Generating Station in order to increase the available supply of water to the station (50 and 11 comments).
- DRBC approved a request for groundwater withdrawal that private well owners feared would interfere with their water supply (14 comments).

Two other dockets requesting water for the Limerick Station received a high volume of comments (24 and 47, respectively). DRBC did not take action on these dockets because Philadelphia Electric withdrew them.

Rationale for Most Decisions Documented

On 13 of the 22 dockets or resolutions receiving public comment, the commenters generally opposed the position ultimately adopted by DRBC; in the other 9 cases, the commenters agreed with the position later

adopted by DRBC. To determine whether DRBC established and then documented a rationale for its decisions, we reviewed the hearing record documentation for all 22 actions. The dockets contained detailed staff analysis and recommendations for Commission action, and the resolutions contained the rationale and background for the policy. In 7 of the 22 cases, the commissioners voted in accordance with special reports or expert testimony from a third party. These reports or recommendations were usually discussed at Commission meetings and included in the official hearing record. In 16 of the 22 actions, the minutes from official meetings documented the commissioners' reasons for their decisions, but in the other 6 actions, the minutes did not explain the reasons. In four of these six cases, DRBC's position was the same as the commenters' position; in the two remaining cases, the commenters did not agree with the final DRBC position.

We discussed this matter with the DRBC Executive Director, who agreed that such documentation would be helpful to the public's understanding and told us that he has encouraged the commissioners to provide the basis for their decisions in the hearing record.

Public input has influenced DRBC's decisions. For example, when DRBC staff received comments on a permit application from nearby well owners, the staff in some cases changed or adjusted the draft application before it was submitted to the commissioners for approval. In 4 of the 22 actions, DRBC changed the docket or resolution as a direct result of public input. For example, after considerable public testimony on the effects of changing a water quality standard in Philadelphia Electric's permit for the Limerick Nuclear Generating Station, DRBC approved the revision but required Philadelphia Electric to perform water quality monitoring at additional locations in order to measure the effect on water quality.

Observations

DRBC's public input process allows the public and other interested parties an opportunity to provide their views on DRBC policy and project decisions. During the October 1984-October 1985 period, DRBC received public input on only 15 percent of the issues being considered. These issues, however, were generally controversial and significant in terms of impact on the basin's water resources. On 4 of the 22 issues receiving public comment, DRBC changed the docket or resolution to reflect suggestions the public made.

Federal Interests Represented by the U.S. Commissioner to DRBC

The U.S. Commissioner has wide latitude in determining the specific federal interests he should be representing in deciding DRBC matters. The commissioner sees his role as representing the current administration's general philosophy of limiting the federal involvement in state matters and in requiring users to pay for the services the federal government provides. The commissioner's voting record over the October 1984-October 1985 period indicated that he had generally carried out this role.

We contacted 20 federal departments and agencies that had provided input to the commissioner on specific DRBC matters. Officials of 16 of them told us that the commissioner was adequately representing their interests. The other four agencies cited instances where more frequent consultation with the commissioner was needed.

Federal Interests Generally Defined

Both Delaware River Basin Compact and Office of Management and Budget (OMB) executive guidelines generally describe the role and responsibilities of the federal commissioner as to the "federal interests" that should be represented in DRBC matters.

OMB's guidelines for federal representatives on interstate water compact commissions briefly spell out the duties of the federal representative and identify the federal agencies normally having an interest in interstate compact activities. The guidelines provide that as the President's representative, the commissioner should

- avoid identifying with any agency, program, local faction, or sectional interest;
- maintain a completely neutral position in all matters of purely state concern; and
- actively pursue and promote the federal (national) interest, and not become solely a referee of state or sectional disputes.

The guidelines encourage the federal representative to consult with federal agencies for information and keep abreast of their views on Compact matters, either through their Washington offices or through their designated field officials.

The commissioner told us that he perceived his role as supporting the current administration's philosophy of embracing the following concepts: (1) state and local issues should be resolved with minimal federal

intervention, (2) state and local governments should share a larger portion of the expense for developing water projects, and (3) the value of water should be determined by the "free market" system, ensuring that all users pay a fair price.

U.S. Commissioner's Views on His Role as Federal Representative

The U.S. Commissioner told us that the members from the federal community are well informed regarding DRBC hearings, notices of application received, and minutes of DRBC meetings. He said that federal agencies are free to contact DRBC staff members, his administrative officer in Washington, D.C., and himself directly. He said that since his vote represents the entire community of federal agencies and departments, he solicits and reviews agency comments and weighs the merits of each action before formalizing his vote at DRBC business meetings. In matters where a federal agency's position is contrary to policies established by the administration, he stated that he votes in support of the President's philosophy.

The U.S. Commissioner characterized his voting record as staunchly supporting the elimination of the free water entitlements provided under the Compact (see p. 38), and the reduction of federal contribution for DRBC projects, studies, and administrative expenses. We reviewed the minutes of the DRBC meetings between October 1984 and October 1985 to determine the commissioner's voting record. We noted that he generally voted in accordance with the new federalism philosophy. For example, he consistently supported fining violators of DRBC regulations and opposed federal grants and basin studies.

Views on How the Commissioner Represented Federal Interests

Federal departments and agencies provide information and views to the U.S. Commissioner on specific DRBC projects and policy decisions. The 20 federal agencies and departments we contacted generally considered their federal interests to be related solely to their individual agency's unique mission or program objectives, not to the broader viewpoint of the entire federal government.

Of the 20 agencies surveyed, 16 generally believe that their interests were being adequately represented by the U.S. Commissioner. The other four agencies generally indicated that the commissioner was not always representing their interests because he was not providing what they considered to be adequate consultation with their agencies on some matters.

The agency officials generally described their own federal interests in the Delaware River Basin in terms of their programming missions. EPA's federal interests included water treatment, sewage treatment for municipal and industrial waste water, water quality standards and actual conditions, groundwater protection, and solid hazardous waste disposal. The National Marine Fisheries Service's federal interests included fisheries of interstate significance—usually ocean or interstate rivers. The Soil Conservation Service's federal interest included technical assistance to local soil and water conservation districts. The Federal Emergency Management Agency's federal interests included flood insurance studies, flood-warning programs, and disaster assistance.

Officials from 7 of the 20 departments or agencies told us that they were periodically consulted by the U.S. Commissioner or his office. Officials from three agencies said they were rarely consulted, and 10 said they were not consulted. However, none of these 10 officials indicated that their interests were not being adequately represented by the U.S. Commissioner.

Officials from four entities perceived that, in some instances, their interests were not being adequately represented by the U.S. Commissioner. The instances generally related to inadequate consultation. We did not independently assess the legitimacy of these instances. The problems cited by Fish and Wildlife Service officials were inadequacies in the (1) consultation for DRBC decisions on withdrawals, (2) replies to their input, and (3) explanations for the U.S. Commissioner's vote. According to Fish and Wildlife Service officials, the U.S. Commissioner could alleviate these problems by alerting the Service to upcoming issues, having regular meetings every quarter or semiannually to show a willingness to meet while giving the agencies the option of attending, and making channels of communication more two-way than one-way. A Fish and Wildlife Service official noted that consultation with the U.S. Commissioner's office had improved in the latter half of 1985.

The problems cited by a National Park Service official were inadequate consultation for DRBC decisions in which the Service has special interest, such as river flow management, water allocation, reservoir releases, and site inspection where a controversial television cable crossing would be located. This official suggested to us that the U.S. Commissioner could consult with the Service on the telephone and make site visits.

The Soil Conservation Service and the National Weather Service officials cited the need for periodic meetings between federal agency field personnel and the U.S. Commissioner. Such meetings of the federal agency field personnel had been held monthly before the present commissioner took office in April 1982. The commissioner told us that he cancelled these meetings because of excessive time and cost, little productivity, and minimal input from the federal agencies. The Soil Conservation Service official cited the need for the commissioner to solicit input on DRBC's future policy direction either quarterly or at semiannual meetings. The National Weather Service official also cited the need for the commissioner to meet with federal agency field personnel, although not as frequently as before, in order to exchange useful information with other federal agencies in a formal setting.

Observations

The U.S. commissioner appears to have represented the new federalism philosophy in DRBC matters. Officials from most of the 20 departments or agencies we contacted indicated that the commissioner was adequately representing their interests.

Request Letter

PETER H. KOSTMAYER
8TH DISTRICT, PENNSYLVANIA

Congress of the United States
House of Representatives
Washington, DC 20515

August 15, 1985

The Honorable Charles Bowsher, Comptroller General
U.S. General Accounting Office
441 G St. NW
Washington, D.C. 20548

Dear Mr. Bowsher:

The Delaware River Basin Commission, established by a federal-interstate compact, manages the water resources of the Delaware River Basin in Pennsylvania, New Jersey, New York, and Delaware. Under the the compact the different governments have cooperatively established a comprehensive plan which addresses their varying concerns. GAO last reported on the Commission's activities in 1981.

I have a number of questions about the DRBC's activities. They are:

1. To what extent has the DRBC encouraged and implemented residential, commercial, and industrial water conservation techniques and strategies in order to maintain adequate streamflow in the Delaware River? Does the Commission emphasize non-structural alternatives to river management?

2. How accurate have DRBC forecasts been for population growth and anticipated water use in the River Basin?

3. How effectively has the DRBC used its permitting process and its authority to limit water withdrawals to ensure adequate streamflow in the Delaware River? What effect will DRBC permits for depletive water use have on future river streamflow?

4. To what extent have public input and comments been incorporated into DRBC policy-making?

5. What are the "federal interests" that the Secretary of Interior's appointee to the DRBC represents and how well are those interests represented?

capabilities of resolving problems that formerly fell to the Federal Government. Examples include grants for interstate water quality efforts and NOAA support for interstate studies on resource issues in the coastal zone. We have had the odd experience of Federal agencies soliciting DRBC's partnership and participation in programs developed and funded under laws enacted by Congress, and signed by the President, only to be faced with opposition by the Federal Alternate Commissioner. We fail to understand why "new federalism" means that one region (with 20 million residents) should be rendered ineligible for participation in Federal programs made available to the remainder of the Nation.

I hope these comments are of assistance to you in preparing the final GAO report. Should you have any questions, or if I can be of further help, please feel free to call on me.

Sincerely,

R. Timothy Weston

R. Timothy Weston
Associate Deputy Secretary
for Resources Management

Name and Affiliation of Individuals GAO Contacted Concerning Public Input

Name	Group Represented
Ms. Peggy Haskin	League of Women Voters New Jersey Water Supply Authority
Ms. Gretchen Leahy	Environmental Coordinator, Borough of Morrisville, Pa. Pollution Control Group of Lower Bucks County, Pa. (no longer active)
Mr. Thomas Iezzi	Pollution Control Group of Lower Bucks County, Pa. (no longer active)
Ms. Mary Ellen Noble	Watershed Association of the Delaware River
Mr. Bruce Stewart	Water Resources Association of the Delaware River Basin

Federal Departments and Agencies Surveyed, and Principal Contacts

1. Environmental Protection Agency:
Basin Commissions' Coordinator
Water Management Division
Region 3, Philadelphia, Pa.

Head, Water Planning and Standards Branch
Water Management Division
Region 2, New York, N.Y.

2. Department of Housing and Urban Development
Regional Environmental Officer
Region 3, Philadelphia, Pa.

3. National Marine Fisheries Service,
National Oceanic and Atmospheric Administration
Department of Commerce
Ecologist, Habitat Conservation Branch
Sandy Hook Laboratory, Highlands, N.J.

4. U.S. Geological Survey
Department of the Interior
Assistant Regional Hydrologist
USGS NE Region
Reston, Va.

5. Maritime Administration
Department of Transportation
Program Manager, Port Planning
Office of Port and Intermodal Development
Washington, D.C.

6. U.S. Army Corps of Engineers,
Department of the Army
Chief, Planning Branch
Philadelphia District

7. Department of Energy
Director, Philadelphia Support Office

8. Soil Conservation Service
Department of Agriculture
State Conservationist
Somerset, N.J.

9. Office of Surface Mining Reclamation and Enforcement
Department of the Interior
Director, Harrisburg Field Office
Harrisburg, Pa.

10. Federal Energy Regulatory Commission
Acting Regional Engineer
New York, N.Y.

11. Fish and Wildlife Service
Department of the Interior
Fishery Biologist
Fish and Wildlife Biologist
State College Field Office
Division of Ecological Services
State College, Pa.

12. Office of the Solicitor
Department of the Interior
Assistant Solicitor for Water and Power
Division of Energy and Resources
Washington, D.C.

13. National Weather Service
National Oceanic and Atmospheric Administration
Department of Commerce
Assistant Hydrologist
Eastern Region
Garden City, N.Y.

14. Nuclear Regulatory Commission
State Liaison Officer—Region 1
King of Prussia, Pa.

15. Department of Justice
Acting Chief, Environmental Enforcement Section
Land and Natural Resources Division
Washington, D.C.

16. Federal Emergency Management Agency:
Director, Natural and Technological Hazards Divison
Chief, Emergency Management and National Preparedness Programs Division
Chief, Disaster Assistance Programs Division
Region 3, Philadelphia, Pa.

17. National Park Service, Department of the Interior
Superintendent, Upper Delaware National Scenic and Recreation River
Narrowsburg, N.Y.

Superintendent, Delaware Water Gap National Recreation Area
Bushkill, Pa.

18. U.S. Coast Guard
Department of Transportation
Port Safety Officer
USCG Base
Gloucester City, N.J.

19. Office of Management and Budget
Budget Analyst, Natural Resources
Washington, D.C.

20. Office of the Assistant Secretary for Water and Science
Department of the Interior
Deputy Assistant Secretary
Washington, D.C.

Comments From the Delaware River Basin Commission

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

DELAWARE RIVER BASIN COMMISSION
P. O. BOX 7360
WEST TRENTON, NEW JERSEY 08628

(609) 883-9500

HEADQUARTERS LOCATION
25 STATE POLICE DRIVE
WEST TRENTON, N. J.

GERALD M. HANSLER
EXECUTIVE DIRECTOR

July 16, 1986

Dear Mr. Peach:

This is in response to your letter of June 18, 1986, which we received on June 23, 1986, concerning GAO's draft report entitled Delaware River Basin Commission Efforts to Manage Water Activities.

See comment 1.

First, the title of the report may be misleading since five rather narrow issues are discussed. Certainly, the wide-range of water resource management activities conducted by the DRBC were not considered in your investigation. It is not to say that the five issues considered are not important. They certainly are. Perhaps a more accurate description of the report might be: "Delaware River Basin Commission Efforts in Specific Areas of Water Resources Management."

See comment 2.

There are a few inaccuracies in the draft report for which corrections are offered. Certain parts of the report could use some amplification, and this has been suggested. They are a few in number, but I feel they are important to give a fair picture. For instance, in "CHAPTER 1, INTRODUCTION." it is important for Congress and the public to realize that the minimum release requirements placed on New York City to meet the Montague flow objective of 1,750 cfs is ten times greater than the historic natural minimum flow of 175 cfs.

See comment 3.

Both suggested corrections and amplications are as shown by hand-written printing on the enclosed original draft copy. I have submitted one copy of the "marked-up" version to each of my Commissioners and labeled them "Administrative/Confidential." They may comment to you individually, since this review represents DRBC staff views.

In general, the report is well written and gives a fair assessment of the DRBC's activities in the four areas concerning the DRBC. I will not comment on the accuracy or emphasis developed for the "Federal Interests..." chapter.

Finally, I wish to especially commend Mr. Ron Leporati and Ms. Kay Brown for their polite and professional conduct in dealing

with staff and the subject matter in general. I believe they accomplished the task fairly and thoroughly.

Respectfully,

Jerry Hansler

General M. Hansler

Mr. J. Dexter Peach, Director
Resources, Community, and Economic
Development Division
U.S. General Accounting Office
Washington, D. C. 20548

GMH:CFD

Enc.

cc: Commissioner R. Wayne Ashbee (w/enc.)
Commissioner Richard T. Dewling (w/enc.)
Commissioner George J. Kanuck, Jr. (w/enc.)
Mr. Irwin H. King (w/enc.)
Commissioner R. Timothy Weston (w/enc.)
Mr. Dirk C. Hofman (w/enc.)

The following are GAO's comments on the Executive Director's letter dated July 16, 1986.

GAO Comments

1. The title has been revised to more clearly reflect the report's issues.

2. The information regarding the historic minimum flow was not considered relevent to the issues discussed, and no change was considered necessary.

3. The copy of the draft report that the Executive Director returned to us is not included in the appendix. We made several of the suggested changes to improve our final report.

Comments From the Department of Environmental Conservation, State of New York

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

HENRY G. WILLIAMS
COMMISSIONER

STATE OF NEW YORK
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233-0001

JUL 15 1986

Dear Mr. Peach:

We have reviewed your proposed report entitled Delaware River Basin Commission Efforts to Manage Water Activities. The report is well written and adequately responds to the inquiries of Representative Peter H. Kostmayer.

Some specific comments are as follows:

Now on p. 20. See comment 1.

P. 21, line 7 - The State of New York is not committed to enlarge the Cannonsville Reservoir. Currently, the feasibility study and the draft environmental impact statement reports have been completed and being reviewed.

Now on p. 21. See comment 1.

P. 22, par. 2 - DRBC does not provide water for New York City. The operations of the City reservoirs are governed by the 1954 U.S. Supreme Court Decree. However DRBC has provided a forum for the parties to the Decree to discuss and agree on any changes in operations.

Sincerely,

Henry G. Williams

Mr. J. Dexter Peach
Director
U.S. General Accounting Office
Washington, D.C. 20548

The following is GAO's comment on the Department's letter of July 15, 1986.

GAO Comments

1. Clarifications have been made to the text of the report.

Comments From the Department of Environmental Resources, Commonwealth of Pennsylvania

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Post Office Box 1467
Harrisburg, Pennsylvania 17120

Deputy Secretary for Resources Management

(717) 783-5338

July 17, 1986

J. Dexter Peach, Director
Resources, Community and Economic
Development Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

I appreciate the opportunity to review and provide comments upon the draft GAO report entitled Delaware River Basin Commission Efforts to Manage Water Activities.

In general, I believe the GAO staff has done a very professional analysis of the Commission's current programs, for which they should be commended. The issues raised in the original request for this study involve a complex of programs and activities spanning several decades, and are not easy to evaluate even for those most familiar with the materials. From the interviews and document reviews undertaken by the researchers, they appear to have gained a fair perspective on the mission of the Commission and its efforts to reach those objectives.

I would offer the following comments and observations regarding the details of the report:

Now on p. 12.
See comment 1.

Page 9 - Major Provisions of the Delaware River Basin Compact: The discussion of voting requirements is not entirely accurate. Under Compact §3.3, DRBC may only take an action affecting the rights, obligations or privileges provided under the 1954 U.S. Supreme Court Decree with the unanimous consent of the parties to the Decree, including the City of New York. This requirement for unanimous consent impacts DRBC actions on such issues as out-of-basin diversions, releases from the New York reservoirs, and some drought management programs. Section 3.3(a) further provides that, after consultation with the River Master, the Commission may declare a drought emergency and affect diversions or releases under the Decree with the unanimous vote of the Commission members.

Now on p. 13.
See comment 2.

Page 12 - Funding for DRBC: Table 1.1, displaying the average State and Federal contributions to DRBC over the past 5 years is interesting. However, even more revealing would be graph or chart displaying the trend in funding percentages in each of the past 6 years. What that trend would show is the increasing share borne by the States, and the decreasing contribution from the Federal Government. In 1985-86, for example, the Federal contribution of $275,000 to the Commission's

general operations budget represented only 16% of the total member contributions. The Federal Member has recommended this share be reduced to $200,000 (or 11.6%) in FY 86-87. The issue is whether this level of investment and sharing of responsibilities to support the interstate work of the Commission is reasonable, in light of the Federal interests in this populated, multi-State region.

Now on p. 18.

See comment 1.

Page 17 - Tocks Island Dam: The text of the first paragraph states that the Tocks Island Dam was "rejected in 1975 by the basin's states." This statement is not accurate. In 1975, a majority of the Basin's Governors voted to defer the Tocks project; however, they tabled a resolution which would have sought to deauthorize the project. The Commonwealth of Pennsylvania's Governor at that time voted in favor of immediate construction. To avoid potential misinterpretations, the word "deferred" should be substituted for "rejected" in the statement.

Now on p. 21.

See comment 1.

Page 22 - Declaring a Drought: The second paragraph is somewhat misleading. DRBC does not deliver or provide water to either New Jersey or New York City; it only may take regulatory actions which may affect the diversions of those entities. It would be more accurate to state that DRBC, in undertaking drought management actions, recognizes that it cannot terminate diversions from the Basin. In addition to rights provided under the 1954 Supreme Court Decree, the fact is that the New York and Northern New Jersey service areas are substantially dependent on Delaware Basin water to meet essential needs. Suspension of all diversions would present serious health and safety problems for the service area, and the region as a whole.

Further, in discussing the 1954 Decree, note should be made that the Decree both allows an 800 mgd diversion by New York City, but also requires as a condition of diversion that the City provide compensating releases from its reservoirs sufficient to maintain a flow of 1750 cfs at the Montague gaging station. These twin provisions of the Decree were predicated on the yield capability of the New York reservoirs assuming a repetition of the then record drought of the 1930's. Subsequent experience, underscored by the 1962-65 drought has shown that those original yield calculations are approximately 40% over-optimistic. In a repeat of the 1960's drought, the New York reservoirs cannot maintain both 800 mgd diversion and release to maintain 1750 cfs at Montague. It was a recognition of this hydrologic fact that led to the decision of the Decree parties to establish the drought management program outlined in the 1983 Good Faith Agreement. The schedule of operations under the Agreement calls for cutbacks in both diversions and release/flow objectives in order to meet essential in-basin and out-of-basin needs within the capabilities of the available storage reservoirs.

Now on p. 24.

See comment 1.

Page 25 - Drought Measures: I believe it is important to note that when a drought occurs, DRBC reduces both out-of-basin diversions and flow objectives in stages. Those stages include actions triggered during several levels of drought warning and drought emergency conditions. It would helpful for the reader to understand that we don't just jump from normal to drought operations. Table 2.1 should be revised to reflect the full array of stages as provided in the Good Faith Agreement and DRBC Resolution 83-13.

Now on p. 24.

See comment 1.

Page 26 - Drought Conservation: It is probably accurate to state that the 84 billion gallons saved in the 1985 drought is equivalent to only 8 days of withdrawal within the Basin, but that statement tends to underestimate the

significance of the savings. A large portion of the withdrawals in the basin are non-consumptive, and are returned for reuse by others or for flow into the estuary (where the fresh water helps to control salinity intrusion). It would be more useful to compare the 84 billion gallon savings with the average consumptive or depletive use in the Basin (approximately 1.5 billion gallons, including the New York and New Jersey diversions). Even more striking, the 84 billion gallons saved in 1985 equates to two and half times the total combined storage of the Francis E. Walter and Prompton Reservoir Modification Projects. That fact alone should put to rest the notion that DRBC's management plan is based on projects; clearly, conservation is and will continue to be the cornerstone of the DRBC program.

Now on p. 26.

See comment 1.

Page 27 - Basin Population Growth Forecast: It may be correct to state that there is no direct correlation between population and water use, but the rationale offered is not entirely accurate. The latest water use figures compiled by the Commission and the State water planning agencies indicate that the largest consumptive water uses in the Basin are (in order of importance): farm irrigation, industrial use, municipal water systems, and steam electric generation. Municipal water use is fairly well correlated to population. Electric generation and consumptive is related to population in the service area; however, with the interconnections of the PJM grid and locations of the plants inside and outside the Basin serving electric needs in the region, the population/electric plant water use correlation is not as strong. Industrial water use forecasting is complicated by the impacts of changing technologies and the dependence of industrial use upon the region's economic conditions and productivity. Similarly, farm irrigation is highly dependent on the weather, and the changing economics of eastern farming. During wet years, irrigation is low, while farms may be expected to fully utilize their irrigation capacity during droughts and dry years.

Now on p. 27.

See comment 3.

Page 29 - Accuracy and Verification of Use Figures: The statements attributed to the DRBC Chief Engineer regarding the collection of water use data are not entirely accurate. In the past, DRBC largely relied on the States to collect water withdrawal and use data. In some States, such as New Jersey, this data was collected pursuant to State permit requirements which mandated user recording and reporting of usage. In other jurisdictions, including Pennsylvania, water withdrawal data was gathered by the State Water Plan through user surveys of industries, annual reports by public water suppliers and similar vehicles. I would note that the Pennsylvania industrial water use survey included actual visits to sites. Thus, although DRBC itself may not have collected or verified the data, that does not mean the water use data is inherently unreliable for the purposes of Basin planning.

I am not clear what GAO intends in its references to lack of "verified" data. In contrast to water utilities and municipal water systems, there are few if any water planning and regulatory agencies that "verify" water use by having their own employees read meters. In a basin as large as the Delaware, with as many individual users, it would be a bureaucratic impossibility for DRBC to visit every site, and "verify" daily measurements of water use. Of necessity, agencies such as DRBC must rely on the honest reporting by water users of the quantities of their respective withdrawals, return flows and consumption. What DRBC can do (and has done with the recent passage of the monitoring and reporting regulations) is to impose mandatory metering or measurement rules with specified levels

of accuracy, and to establish systems for users to record and report their withdrawals to the States and Commission. This data may not necessarily "verified" by an independent agent, but such submissions under regulatory mandate (with appropriate penalties for violations) are likely to provide a more accurate and complete data base for the future.

Now on p. 27.

See comment 1.

Page 29 - Consumptive Use Calculations: The last sentence of the third paragraph could be expanded to explain that the "complex formula" used by the electric utilities to calculate consumptive losses from cooling towers and once-through processes includes consideration of a number of factors, including air temperature, humidity, power production and efficiency, and other technical elements.

Now on pp. 28-29.

See comment 1.

Page 30-31 - Data and Forecasting Improvements: DRBC recently completed rulemaking for new regulations mandating metering, monitoring and reporting of use by operators of significant ground and surface water withdrawals throughout the Basin. Since the visits of the GAO researchers, the Commission expanded its proposed rules to including monitoring of surface as well as ground water withdrawals. Under the new regulations, effective January 1, 1987, the owner or operator of any surface or ground water withdrawal (from one or more sources operated as a system) which totals an average of 100,000 gallons per day in any 30 day period, must install and maintain accurate metering or measuring devices. Such users must record their usage and report that use to designated State agencies at least annually. Additional amendments to the Southeastern Pennsylvania Ground Water Protected Area Regulations require similar metering and reporting of use by old and new ground water withdrawals exceeding 10,000 gallons per day.

Now on p. 29.

See comment 1.

Page 31 - Observations on Forecasting: GAO's conclusion that DRBC does not have reliable data on water availability, withdrawals and depletion, is somewhat overstated. Some of the data compiled by DRBC and the States is both accurate and reliable. Other information, such as irrigation and industrial use, is subject to a series of variables, including economic conditions, which cause fluctuations in year-to-year use and complicate any forecasting of future use levels. Based on my contacts around the country, I would tend to believe that DRBC has more accurate data on water use that most water planning agencies around the country. Significant improvements can be made to assure that data base is kept current, and that data has increased degrees of accuracy; and as the GAO report indicates, DRBC has taken steps to implement those improvements.

Now on pp. 30, 33-35.

See comment 1.

Pages 32, 36-39 - Consideration of Streamflow Impact in Individual Permits: As a Commissioner, I have serious problems with the assertion that DRBC does not consider the impact of projects on streamflows. The statement, I believe, is both historically inaccurate and misleads the reader regarding the real challenge confronting the Commission.

Where DRBC has reviewed major projects which might individually have a significant effect on streamflows, I believe the record will show that the Commission has indeed considered streamflow impacts. For example, the dockets for all of the major power plants constructed in the Basin since the mid-1960's contain conditions requiring those plants to curtail their significant consumptive uses when flows on the mainstem at Trenton fall below 3000 cfs. The purpose of these limitations is to help maintain flows needed for salinity control. Similarly, in

the Limerick Nuclear Generating Station dockets, extensive consideration was given to flow impacts on the Schuylkill River, Perkiomen Creek and Delaware River, and appropriate flow triggers were established limiting withdrawals under certain streamflow conditions. The project review for the Marsh Creek Reservoir including close scrutiny of impacts on the downstream flow of the Brandywine River, and particularly on the ability of that stream to meet the water supply needs of the Wilmington area. Conditions on the Marsh Creek docket establish conservation and flow augmentation release requirements to satisfy those downstream flow needs.

The more difficult problem confronting the Commission is how to consider the cumulative impact of many smaller actions upon the capability of the basin system to both control salinity and sustain reliable water supply. Most projects coming before DRBC individually have no measurable impact on streamflows or salinity control. Even a consumptive use of 1 million gallons per day represents less than .06 percent of the Delaware's sustainable low flow at Trenton. The impact of such a depletion could not be measured within the accuracy of a USGS streamgage, and its salinity impact would not likely show up on the DRBC salinity model. It is the accumulated affect of many such consumptive uses on our ability to maintain adequate flows for salinity control that the depletive water use budget aims to gauge.

Now on p. 31.

See comment 1.

Page 33 - State Water Permit Programs: It is not clear whether Table 4.1 is intended to describe all State permit programs, or only those which address water quantity issues. If the focus of the table is State programs which regulate water withdrawals and amounts of use, then the listing for Pennsylvania incorrect. The Commonwealth only administers an allocation or water use permit program regulating surface water withdrawals by public water supply agencies. That program is implemented by the Bureau of Water Resources Management. The Bureau of Community Environmental Control administers the State Safe Drinking Water Program, which requires permits for public water supply sources and treatment. Those safe drinking water permits, however, do not regulate the amount of either surface or ground water withdrawals by public water supply agencies.

Now on p. 32.

See comment 1.

Page 34 - Ground Water Protected Area: The rationale behind designation of the Southeastern Pennsylvania Ground Water Protected Area was not that groundwater levels were low in the area. The problem was that over a significant portion of protected area, water withdrawals were approaching or exceeded the normal or dry period recharge rates for the affected ground water aquifers or basins. Such stresses were evidenced by increasing conflicts between water users, depressed streamflows, and in some areas groundwater mining.

Now on p. 36.

See comment 4.

Page 41 - Public Input: I am pleased that the documentation compiled by the GAO researchers confirms what those of us who are Commissioners believe - we do listen to the public. Much of DRBC's work involves regulatory and quasi-judicial actions, requiring decisions to be based on the facts and applicable rules. Organized groups and individual witnesses who present cogent arguments backed by the facts are most likely to gain the Commission's favorable attention. The Commission is not, however, in a "popular" business. Requiring metering of water use, regulating drought consumption, reviewing individual projects, resolving conflicts between water users, and collecting water charges to pay for

basin storage projects often places DRBC in controversial and unpopular positions. We can't please everyone, but we do try to listen to everyone.

Now on p. 40.

See comment 5.

Page 48 - Federal Interests: As noted in the third paragraph on page 48, the "federal interest" in the Delaware River Basin Commission is defined and described in a number of documents. Yet, the discussion focuses on just one of those documents, and perhaps the narrowest of all: the OMB executive guidelines. I would think that more pertinent and important would be the official statement of that interest by Congress and the President, as contained in the "law of the land" - Public Law 87-328, ratifying the Delaware River Basin Compact. The preamble to the Compact recognizes the water and land related resources of the Delaware Basin are "regional assets vested with ... National interests, for which [the Signatory Parties, including the United States] have a joint responsibility." The preamble further recognizes that prior to the Compact duplicating, overlapping and uncoordinated administration by multiple State agencies, and "nineteen Federal agencies" resulted in a splintering of authority and responsibilities." For these reasons, Congress and the State legislatures declared in Compact §1.3 that the "planning, conservation, utilization, development, management and control [of the Basin's water resources], under appropriate arrangements for intergovernmental cooperation, are public purposes of the respective signatory parties [including the Federal Government]." Congress found that a "single administrative agency" was "essential for effective and economical direction, supervision and coordination of efforts and programs of federal, state and local governments and of private enterprise."

The Federal interest in the Delaware Basin is fundamentally founded on the Federal responsibility for interstate commerce and stewardship for interstate resources. The waters of the Basin are shared by over 20 million people in four States. The interstate nature of the resources, coupled with the intensity of use in the Northeast Corridor, presents difficult challenges for accommodating competing demands and interests. As shown by historical experience, the Delaware faces critical quantity and quality problems that cannot be resolved by the States alone. In the absence of an interstate institution to manage those resources and resolve conflicts between the respective States, those challenge and problems would of necessity rise to the Federal level.

It is for this reason, I believe, the Federal Government in 1961 recognized its stake in establishing and maintaining the "partnership" embodied in the Delaware River Basin Commission. In contrast to the expensive Federal solutions demanded by many Western U.S. basins, DRBC offers an opportunity for the Federal Government to invest - along with the States - in a joint institution which can plan ahead, conserve and manage the resources in a cost-effective manner.

Now on p. 41.

See comment 6.

Page 50 - U.S. Commissioner Views: I would question whether the Federal Commissioner has truly voted in accordance with the "new federalism philosophy." Pennsylvania's Administration strongly supports the President and endorses the concepts of "new federalism." But, we understand that concept envisions a strengthened partnership of the States and Federal Government, not an abrogation of Federal participation in and support for activities which involve interstate commerce, resources, and problems. We have difficultly understanding the Federal Alternate Commissioner's opposition to all Federal grants or basin studies. More than a few of the grants and studies arise under programs which are supported by both the President and Congress designed to strengthen State and interstate

I am requesting that you obtain information and review these issues for the purpose of determining if they require closer attention. When you have done so, please brief me and my staff, at which time a decision can be made whether to proceed further.

Sincerely,

Peter H. Kostmayer

PHK/dw

The following are GAO's comments on the Department's letter dated July 17, 1986.

GAO Comments

1. Clarifications have been made to the text of the report.

2. The portion of the federal share to DRBC in relation to the total funds provided from all sources declined slightly, from 18.8 percent in 1981 to 17.5 percent in 1985. The federal share to DRBC has remained fairly constant over the 5-year period, increasing from $266,000 in 1981 to $279,500 in 1985.

3. Regarding the comments about the collection of water use data, we are relying on information provided by the DRBC chief engineer about groundwater withdrawals for irrigation and rural domestic uses.

Our position that DRBC did not verify water use data was based on the concept that some independent verification of the data should be made. We did not anticipate DRBC's visiting every site every day, but rather some form of testing on a periodic basis. We have modified the report accordingly.

4. This additional information does not require a change to the text of the report.

5. The purpose of our discussion of the OMB guidelines was to establish the role and responsibilities of the federal commissioner. The comments of the Pennsylvania official are directed to the purpose of DRBC, not to the commissioner's role.

6. The U.S. Commissioner told us that he believed the new federalism concept involved having state and local governments share a larger portion of the expense for developing water projects. In line with this reasoning, he voted in opposition to federal grants and basin studies.

Comments From the Department of Environmental Protection, State of New Jersey

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

Let's protect our earth

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
RICHARD T. DEWLING, Ph.D., P.E., COMMISSIONER
CN 402
TRENTON, N.J. 08625
609 - 292 - 2885

July 28, 1986

Mr. J. Dexter Peach
Director
US General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

In response to your request for review and comment on the US General Accounting Offices (GAO) draft of its report, Delaware River Basin Commission Efforts to Manage Water Activities, we offer some observations.

This report is quite informative in that it gives general background material about the Delaware River Basin Commission and then discusses five issues of water resource management. Since we are in agreement with the GAO remarks on DRBC public participation processes and the role of the DRBC Federal representative, our comments on the first three issues are as follows:

1. Water Conservation

See comment 1.

The discussion is not sharply focused between demand management in drought as compared to normal periods. To give it more substance, the report should describe the goals of DRBC Resolution No. 81-9. This resolution requires that all public authority, municipal, or private water works suppliers and industrial and agricultural users of over a million gallons a day prepare conservation plans.

A description of this requirement would better illustrate that the conservation program to which DRBC is committed includes long-term water conservation as well as the drought emergency curtailments which the draft report mentions.

2. Forecasting Tools

See comment 1.

The report should refer to the fact that a computerized data base for water use metering and recording will be implemented under the new regulations approved by the Commission on June 25, 1986

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under Resolutions 86-12 and 86-13. The Commission expects to obtain more complete aggregates since all withdrawals over 100,000 gallons a day by public or industrial users will be recorded to within 10 per cent accuracy.

3. Permitting and Streamflows

See comment 2.

The report questions whether the DRBC permitting process considers the impact of water withdrawals on streamflow. When DRBC permits are granted for surface or ground water withdrawals, hydraulic and water quality determinations are made to assure that the water use will not have a detrimental effect on other permitted uses. Permits include information about the predicted ratio of depletive to non-depletive use. To avoid stream degradation, wastewater discharge permits establish the potential impact of discharge on water quality at times of low flow.

Chapter 4 of the draft report tries to make the point that long range conditions are not adequately taken into account when permits are granted. The discussion in this chapter would benefit from integrating the specific findings of the Level B study and the commitments of the DRBC signatory parties in the Good Faith Agreement to comprehensive management of the water resources of the basin. The depletive water use budget, the salinity objectives and flow augmentation goals, the commitment to expanded storage capacity, the nonstructural approaches to flood control, water quality standards and fishery maintenance could be given explicit attention in the report. Narratives on DRBC procedures and techniques for achieving these goals and review via advisory committees would add to the substance of the report and give a better picture of DRBC's effectiveness.

We greatly appreciate the opportunity to comment on this draft report.

Sincerely,

Richard T. Dewling

The following are GAO's comments on the Department's letter dated July 28, 1986.

GAO Comments

1. Clarifications have been made to the text of the report.

2. The major thrust of this information was included in the draft report, and no changes are considered necessary.

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