REPORT OF

THE RIVER MASTER

OF THE DELAWARE RIVER

For the period
December 1, 1984 - November 30, 1985

by Francis T. Schaefer and William E. Harkness
with a section on water quality by L. DeWayne Cecil

U.S. GEOLOGICAL SURVEY

Open-File Report 86-606

Reston, Virginia

1986

UNITED STATES DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

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FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

Multiply inch-pound units	By	To obtain SI units
	LENGTH	
inch	25.4	millimeter (mm)
foot	0.3048	meter (m)
mile	1.609	kilometer (km)
	AREA	
square mile	2.59	square kilometer (km^2)
	VOLUME	
million gallons	3,785	cubic hectometer (hm^2)
billion gallons	3.785	cubic meter (m^2)
cfs-day	0.002447	cubic hectometer (hm^2)
	FLOW	
million gallons per day (mgd)	0.04381	cubic meter per second (m^3/s)
cubic foot per second (cfs)	0.02832	cubic meter per second (m^3/s)

Section I

RIVER MASTER LETTER OF TRANSMITTAL

and

SPECIAL REPORT

page 3 follows

OFFICE OF THE DELAWARE RIVER MASTER
United States Geological Survey
433 National Center, Reston, Virginia 22092

December 29, 1986

The Honorable
William H. Rehnquist
Chief Justice of the Supreme Court
of the United States

The Honorable
Michael N. Castle
Governor of Delaware

The Honorable
Thomas H. Kean
Governor of New Jersey

The Honorable
Mario M. Cuomo
Governor of New York

The Honorable
Richard L. Thornburgh
Governor of Pennsylvania

The Honorable
Edward I. Koch
Mayor of the City of New York

New Jersey v. New York et al
No. 5 Original, October Term 1950

Dear Sirs:

For the record and in compliance with the provisions of the Amended Decree of the Supreme Court of the United States entered June 7, 1954, I am transmitting herewith the thirty-second Annual Report of the River Master of the Delaware River for the year December 1, 1984 to November 30, 1985.

On November 27, 1984, contents of the three New York City reservoirs declined briefly into the drought warning zone, but precipitation averaging almost 2 inches on November 29-30 reversed the trend; and on December 1, the beginning of the report year, contents of Cannonsville, Pepacton, and Neversink Reservoirs totaled 111 billion gallons. This quantity was 19 billion gallons more than 1 year earlier when total contents were 92 billion gallons. By January 18, 1985, however, contents again dropped below the drought warning zone of the operating rule curve, figure 2. In accordance with procedures agreed upon by the River Master and the parties to the 1954 decree, this office directed a reduction in allowable diversions by New York City, effective January 23, to 680 mgd (million gallons per day). The corresponding flow objective for the Montague gaging station was reduced from 1,750 cfs (cubic feet per second) to 1,655 cfs. Also, the augmented conservation release rates for instream-environmental improvement were suspended and conservation releases were reduced to the basic conservation rates in effect prior to 1977. Because of dredging operations on the Delaware and Raritan Canal, no water was being diverted by New Jersey, so it was not necessary to place any restrictions on New Jersey diversions. By February 7, with continued below normal precipitation, contents declined into the lower half of the drought warning zone; so New York City diversions were reduced further to 560 mgd, and the Montague flow objective was targeted at 1,550 cfs, effective immediately. Indications were that a severe water-supply shortage was developing and that these conservation measures were necessary and prudent, particularly in view of the relatively light snow cover for this time of year.

By letter dated February 20, 1985, I informed the Advisory Committee that it appeared that storage would decline into the drought zone of the operation curves on or about February 25 and if that occurred, further reductions would be necessary. However, on February 22, in response to warmer temperatures and coincident runoff from snowmelt, the storage began a gradual increase averting the need to impose further restrictions at that time.

During the next 5 months, from February to June 1985, the water-supply situation worsened. The 5-month precipitation was about 4 inches below average, bringing the total shortage since August 1984 to almost 10 inches in the upper basin and in some local areas the deficit was much larger.

On April 17 Governor Kean of New Jersey declared that much of northeastern New Jersey was in drought status, and on May 16 he declared the emergency included the entire State. Varying limitations on water use were placed in effect depending upon the severity of the situation in different localities.

On April 26, with the New York City reservoirs at approximately 62 percent of capacity (165 billion gallons) contrasted with 101 percent a year earlier, Mayor Koch of New York City declared Stage I of a drought emergency and imposed mandatory restrictions on water use. On the same date Governor Thornburgh of Pennsylvania declared a drought emergency for 16 counties in eastern Pennsylvania, most of them in the Delaware River basin.

New Jersey began expediting the completion of a pumping plant to move water from Lake Hopatcong into the Rockaway River to bolster municipal supplies in that area. New Jersey also proceeded with plans for a 24-inch pipeline across the Hudson River on the George Washington Bridge to provide additional supplies from the New York City system to the Hackensack Water Company system.

Governor Castle of Delaware declared a drought warning on May 9 and requested voluntary restrictions on nonessential water uses.

The Delaware River Basin Commission officially declared a drought emergency on May 13 empowering the Commission, under Section 10.4 of the Delaware River Basin Compact, to order increases or decreases in diversions and releases required by the United States Supreme Court Decree of 1954 and to delineate the areas affected. The declaration also empowered the Commission to prescribe operational procedures for other reservoirs in the upper basin, such procedures to be designed and coordinated by the Deputy Delaware River Master. For the lower basin (downstream from Montague, New Jersey) reservoirs the coordinating function was to be handled by the Delaware River Basin Commission to maintain the flow at Trenton as close as possible to the desired target. As indicated earlier, this office ordered reductions in diversion and release requirements starting on January 23 in accord with operational procedures that had been agreed to by the Governors and the Mayor, with the concurrence of this office, in 1983. The Court was advised of this agreement by letter dated April 8, 1983, from the River Master.

The Delaware River Master Advisory Committee met in Milford, Pennsylvania, on May 30 to discuss the drought outlook and to review operational and conservation procedures. At the meeting, I suggested and the Advisory Committee approved, suspending release of the excess release quantity that was to begin June 15 for the duration of the drought. Also the installation of improved instrumentation using real time data-collection platforms was considered, and it was decided that the River Master office would provide alternative plans for later consideration by the Advisory Committee. In addition to the usual attendees, representatives of the Orange and Rockland Utilities, Inc., and the Pennsylvania Power & Light Company were present because their cooperation in releasing water from their hydroelectric facilities was necessary for the most efficient utilization of the waters of the upper basin. A representative of the Philadelphia Water Department also attended because the Philadelphia system derives a major share of its supply from the Delaware River at Torresdale, Pennsylvania.

On June 5, with the Delaware reservoirs still at only 62 percent of capacity, Mayor Koch declared that drought Stage II had been reached. Additional restrictions on water use were invoked and rather severe penalties for violations were imposed. This action was followed on July 10 by a declaration that drought Stage III had developed. Reservoir contents had decreased to 57 percent of capacity and restrictions on water use were tightened again. The restrictions on water use combined with widespread publicity about the need for conservation served to reduce New York City consumption by more than 100 mgd from the entire water-supply system (Catskill, Croton, Delaware). The Chelsea pumping plant on the Hudson River was also activated to provide some 60 to 100 mgd of additional water to the City system.

Governor Cuomo of New York declared a drought emergency for New York City and eight counties on July 10; and on July 11 Governor Kean, following scattered heavy rains, relaxed water-use restrictions in parts of New Jersey.

On July 25, with New York City reservoirs at 55 percent of capacity and decreasing, this office directed allowable diversions to New York City to be reduced to 540 mgd; and 3 days later, as an additional conservation measure, the Montague flow objective was set at 1,350 cfs. The thermal release quantity (3,500 cfs/days) that had been agreed to for the reduction of water temperatures in river channels downstream from the reservoirs was exhausted on August 15.

The reductions in diversions and releases that were put into effect coupled with near normal precipitation during the summer months served to reduce the rate of decline in storage in the reservoirs. Storage reached the normal zone of the operation curves (see figure 2) on September 4, 1985. On September 13, to ensure continued recovery from the drought, the Delaware River Basin Commission with the consent of all parties to the decree voted to continue the reduced levels of diversions, releases, and streamflow objectives until October 31, regardless of the storage conditions in the reservoirs.

In late September a frontal system combined with Hurricane Gloria, produced about 5 inches of precipitation over the upper basin. On October 2, in response to improved storage and streamflow conditions in the basin, the parties to the decree agreed to drop the amended schedule of reductions in diversions and streamflow objectives in effect and return to the levels specified for the upper half of the drought warning zone of the operation curves for the reservoirs.

During October, conditions in the basin continued to improve and on October 31, the Delaware River Basin Commission with the approval of the parties to the decree modified the schedule of diversions and streamflow objectives. Allowable New York City diversions were increased to 740 million gallons per day, the Montague flow objective was increased to 1,700 cfs, and the New Jersey diversions and Trenton flow objective were returned to normal levels. These levels of operation were continued through the end of the Rivermaster year.

Throughout the year, diversions for water supply for New York City and releases designed to maintain the flow of the Delaware River at Montague were made as directed by this office and as provided in the decree, or the emergency restrictions to combat the drought. Diversions by New York City from the Delaware River basin reservoirs did not exceed the limit specified by the decree or the limits imposed during the period of water-supply deficiency No water was diverted from the Delaware River basin by New Jersey during the year because of dredging of the Delaware & Raritan Canal. The dredging project was still ongoing at the end of the report year.

Current-meter measurements of the West Delaware Tunnel diversions were made by personnel of this office during November in conjunction with color-velocity measurements by the engineering staff of the New York City Bureau of Water Supply to verify the accuracy of the venturi flow-meter instruments. The results of measurements by the three methods agreed within acceptable limits at all flow rates.

During the report year, the River Master and staff participated in meetings of the Delaware River Basin Commission to assess water-supply conditions and to consider measures to ease the water-supply deficiencies. Upon invitation of the representatives of parties to the decree, the River Master or his assistants met frequently with those representatives as a member of the Flow Management Technical Advisory Committee. Discussions primarily centered on proposals for specific releases from reservoirs in the basin and other emergency measures to cope with streamflow deficiencies.

The U.S. Geological Survey continued the operation of its field office of the Delaware River Master at Milford, Pennsylvania. William E. Harkness, Deputy Delaware River Master, continued in charge of the office, assisted by Robert W. Baebenroth and Beverly A. Roberts. Mr. Baebenroth transferred to the Iowa District, Water Resources Division, November 1, 1985, and was not replaced by the end of the report year.

During the report year, the Milford office continued the weekly distribution of summary river data. These weekly reports contained preliminary data on releases from the New York City reservoirs to the Delaware River, diversions to the New York City water-supply system, reservoir contents, daily segregation of flow of the Delaware River at the Montague gaging station, diversions by New Jersey, and precipitation. The reports were made available to the State and City representatives on the Delaware River Master Advisory Committee and to other parties interested in the Delaware River operations. A special monthly summary of past hydrologic conditions, supplemented by an "outlook" of the river flow for the forthcoming month, was made available to the representatives on the Advisory Committee.

Section II of the report describes in detail Delaware River operations during the report year. As shown on page 19, the City of New York diverted a total of 212.244 billion gallons from the basin during the report year ending November 30, 1985, and released 31.918 billion gallons from Pepacton, Cannonsville, and Neversink Reservoirs to the Delaware River during the same period. The River Master directed releases to the Delaware River from these reservoirs totaling 19.922 billion gallons.

Section III of the report describes water quality at various sites in the Delaware River estuary. It was prepared by L. DeWayne Cecil, U.S. Geological Survey, Malvern, Pennsylvania. It contains data showing the extent of salinity encroachment and other water-quality characteristics in the estuary.

During the report year, the following individuals functioned as members of the River Master Advisory Committee:

Delaware	Dr. Robert R. Jordan
New Jersey	Dirk C. Hofman, P.E.
New York	Edward A. Karth, P.E.
New York City	Joseph T. McGough, Jr.
Pennsylvania	R. Timothy Weston

The appreciation of the River Master and staff is expressed for the continued excellent cooperation of all the representatives of the parties to the decree. Also, appreciation is extended to the Pennsylvania Power & Light Company and the Orange and Rockland Utilities, Inc., for their cooperation in regulating power generation and resulting releases as requested by this office. Without this cooperation, it would have been impossible to maximize the utilization of deficient water supplies that stressed the Delaware system this year. As usual, it is gratifying to report that New York City complied willingly with the terms of the decree, with the emergency reductions of diversions and releases, and with the directives of the River Master.

A draft of this report was furnished to the Advisory Committee members for comment.

Sincerely yours,

Francis T. Schaefer
Delaware River Master

Section II

REPORT OF DELAWARE RIVER OPERATIONS

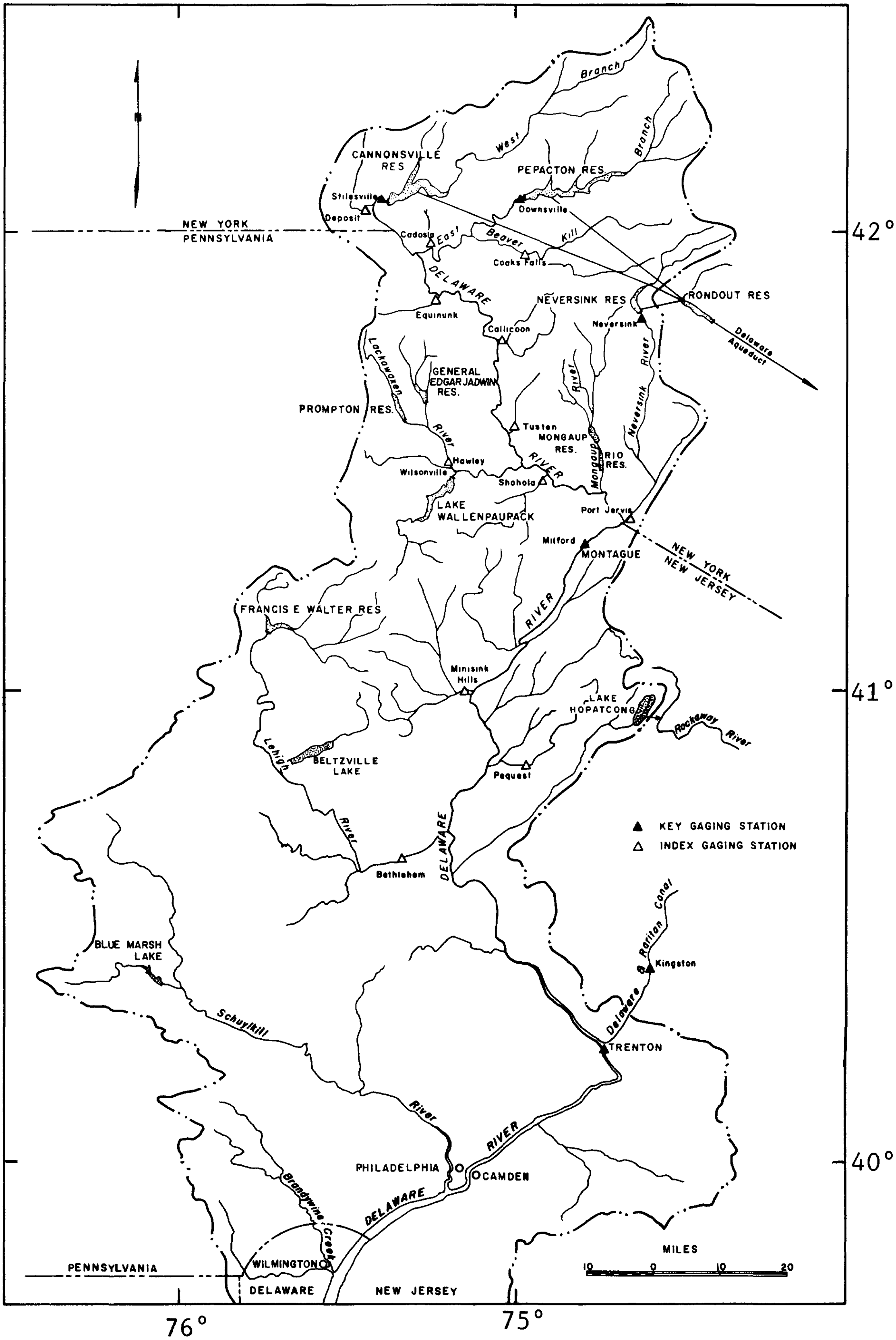

Figure 1.--Delaware River Basin Above Wilmington, Delaware.

Section II

REPORT OF DELAWARE RIVER OPERATIONS

by William E. Harkness

ABSTRACT

A Decree of the Supreme Court of the United States in 1954 established the position of Delaware River Master. The Decree authorizes diversions of water from the Delaware River basin (Figure 1) and requires compensating releases from certain reservoirs of the City of New York to be made under the supervison and direction of the River Master. Reports to the Court, not less frequently than annually, were stipulated.

During the 1985 report year, December 1, 1984, to November 30, 1985, precipitation and runoff varied from below average to above average in the Delaware River basin. For the year as a whole, precipitation was near average. Runoff was below average. Operations were under a status of drought warning or drought from January 23, 1984, through the end of the report year. Below normal precipitation the first half of the year resulted in decreased storage in the reservoirs to record low levels by March 1, 1985. Storage remained at record low levels from March through September. Above normal precipitation in September and November served to break the drought and increase storage into the normal zone of the operating curves for the reservoirs.

Diversions from the Delaware River basin by New York City did not exceed those authorized by the terms of the Amended Decree or those invoked by the several emergency conservation measures throughout the year. There were no diversions from the Delaware River basin by New Jersey during the year. Releases were made as directed by the River Master at rates designed to meet the Montague flow objective on 82 days between June 14 and September 28. Releases were made at conservation rates or at rates designed to relieve thermal stress in the streams downstream from the reservoirs at other times.

INTRODUCTION

The Amended Decree of the United States Supreme Court entered June 7, 1954 authorized diversions of water from the Delaware River basin and provided for releases of water from certain reservoirs of the City of New York to the Delaware River to be made under the supervision and direction of the River Master. The Decree also stipulated that reports be made to the Court not less frequently than annually. This report describes the River Master operations from December 1, 1984 to November 30, 1985.

Definitions of Terms and Procedures

The following definitions apply to various terms and procedures used in the operations described in this report. A table for converting inch-pound units to International System of Units (SI) is given on page v. The map of the Delaware River basin above Wilmington, Delaware (fig. 1), indicates the location of pertinent streams and reservoirs.

Time of day. - Time of day is expressed in 24-hour eastern standard time, which included a 23-hour day April 28 and a 25-hour day October 27.

Rate of flow. - Mean discharge for any stated 24-hour period, in cubic feet per second (cfs) or million gallons per day (mgd).

Rate of flow at Montague. - Daily mean discharge of the Delaware River at Montague, N.J., on a calendar-day basis.

Reservoir-controlled releases. - Controlled releases from reservoirs passed through outlet valves in the dams or through turbines in powerplants. This does not include spillway overflow at the reservoirs.

Uncontrolled runoff at Montague. - Runoff from the drainage area above Montague exclusive of the drainage area above the Downsville, Cannonsville, Neversink, Wallenpaupack, and Mongaup dams but including spillway overflow at these dams.

Point of maximum reservoir depletion. - Elevation at the top of the highest outlet, sometimes referred to as minimum full-operation level.

Storage or contents. - Usable volume of water in a reservoir. Unless otherwise indicated, volume is computed on the basis of level pool and above the point of maximum depletion.

Capacity. - Total usable volume between the point of maximum depletion and the elevation of the lowest crest of the spillway.

Diversions. - The City of New York diverts water from Pepacton, Cannonsville, and Neversink Reservoirs in the upper Delaware River basin through the East Delaware, West Delaware, and Neversink Tunnels, respectively, to its water-supply system.

The State of New Jersey diverts water from the Delaware River through the Delaware & Raritan Canal.

Excess quantity and seasonal period for its release. - As defined in the Decree, the excess quantity of water equals 83 percent of the amount by which the estimated consumption in New York City during the year is less than the City's estimate of continuous safe yield (1,665 mgd stipulated by 1954 Decree) from all its sources of supply obtainable without pumping, except that the excess quantity should not exceed 70 billion gallons. Each year the "seasonal period" for release of excess quantity begins on June 15. The design rate for that period becomes effective at Montague on that date and continues in effect until the following March 15, or until the cumulative total of excess-release credits becomes equal to the seasonal quantity, whichever occurs first.

Daily excess-release credits. - Daily credits and deficits during the seasonal period are equal to the algebraic difference between the daily mean discharge at Montague and 1,750 cfs; however, the daily credit cannot exceed the 24-hour period releases from Pepacton, Cannonsville and Neversink Reservoirs routed to Montague and made in accordance with direction, with the following exception. During the seasonal period, credits are also made for part or all of other releases from these reservoirs contributing to daily mean discharge at Montague between the excess-release rate and 1,750 cfs.

Precipitation

Precipitation observed on the basin above Montague for the 1985 report year was in the normal range, totaling 43.91 inches. However, the first half of the year was almost six inches below average and the second half of the year was about seven inches above average. Most of the excess precipitation occurred in September and November. The precipitation deficit during the first half of the year was preceded by an extremely dry fall, which accumulated a precipitation deficit during August through November of 4.22 inches. The monthly precipitation during the report year is shown in table 1.

Table 1.--Precipitation in inches,
Delaware River basin above Montague, N.J.

Month	December 1940 to November 1984 Average	December 1984 to November 1985			
		Amount	Percentage of average	Excess (+) or deficit (-) Month	Excess (+) or deficit (-) Cumulative
December	3.50	3.26	93	-0.24	-0.24
January	2.91	1.10	38	-1.81	-2.05
February	2.80	1.87	67	-.93	-2.98
March	3.32	2.33	70	-.99	-3.97
April	3.80	2.10	55	-1.70	-5.67
May	4.22	4.50	107	+.28	-5.39
June	3.95	3.72	94	-.23	-5.62
July	4.06	4.87	120	+.81	-4.81
August	3.92	4.05	103	+.13	-4.68
September	3.63	7.40	204	+3.77	-.91
October	3.33	2.45	74	-.88	-1.79
November	3.73	6.26	168	+2.53	+.74
12 months	43.17	43.91	102	+0.74	

Note: The precipitation deficit from August through November, 1984 was 4.22 inches.

These data were computed from records collected by the National Weather Service, New York City Department of Environmental Protection, Bureau of Water Supply and the River Master, at ten stations distributed over the basin area above Montague.

December to May is generally considered the normal time of year when surface- and ground-water reservoirs fill. During this period in 1984-85, precipitation totalling 15.16 inches was observed, which was 74 percent of the 44-year average. During June to November, 28.75 inches of precipitation was observed, which was 127 percent of the 44-year average. The maximum monthly precipitation listed during the year for any of the ten stations was 9.40 inches in September at Cadosia, N.Y.; the minimum monthly precipitation observed was 0.54 inches in January at Cannonsville Dam.

Acknowledgments

Part of the hydrologic data presented are records of U.S. Geological Survey gaging stations. These records were collected, computed and furnished by the Offices of the U.S. Geological Survey at Albany, New York, Malvern, Pennsylvania, and Trenton, New Jersey, in cooperation with the States of New York and New Jersey, the Commonwealth of Pennsylvania, and the City of New York.

The River Master daily operation records were prepared by the Milford Office of the Delaware River Master from hydrologic data collected principally on a day-to-day basis. Data for these records were collected and computed by the Milford Office or were furnished by agencies, as follows: Data from Pepacton, Cannonsville and Neversink Reservoirs by the New York City Department of Environmental Protection, Bureau of Water Supply; from Lake Wallenpaupack by the Pennsylvania Power & Light Company; and from Mongaup Reservoir by Orange and Rockland Utilities, Inc. Precipitation data and quantitative precipitation forecasts were provided by the National Oceanic and Atmospheric Administration, National Weather Service.

OPERATIONS

December to May

During the first half of the report year, precipitation was 5.4 inches below average. Precipitation during May, 4.50 inches,was the only month that was above average during the period. Precipitation during the last four months of the previous report year was also deficient, resulting in a deficit of almost 10 inches over the upper basin and in some areas, the deficit was even greater.

On December 1, 1984, Pepacton Reservoir contained 73.368 billion gallons of water in storage above the point of maximum depletion, or 52.3 percent of the reservoir's storage capacity of 140.190 billion gallons. Cannonsville Reservoir contained 25.536 billion gallons, or 26.7 percent of the reservoir's storage capacity of 95.706 billion gallons and Neversink Reservoir contained 12.432 billion gallons, or 35.6 percent of the reservoir's storage capacity of 34.941 billion gallons. The combined storage in the three reservoirs as of December 1 was 111.336 billion gallons, or 41.1 percent of their combined capacity. Daily storages in Pepacton, Cannonsville and Neversink Reservoirs are shown in tables 10, 11 and 12, respectively and the combined storage is shown graphically in figure 2.

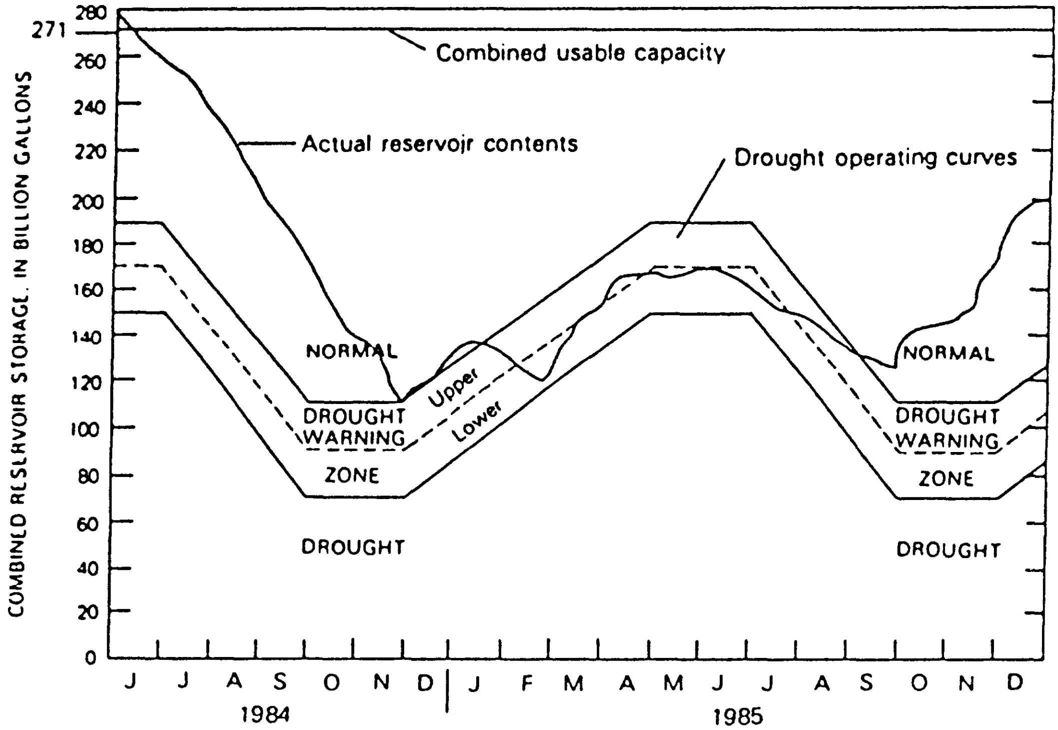

Figure 2. Operating curves for New York City reservoirs in the Delaware River basin compared with the actual contents of the reservoirs, June 1984 to December 1985. (Source: Operating curves from Interstate Water Management Recommendations of the Parties to the U.S. Supreme Court Decree of 1954; reservoir contents compiled by W.E. Harkness from New York City, Bureau of Water Supply data.)

On November 27, 1984, during the previous report year, the combined storage of Pepacton, Cannonsville and Neversink Reservoirs declined below the drought-warning level of the operation curves recommended by the parties to the Decree (See figure 2). Heavy rainfall over much of the upper basin on November 29-30, 1984, caused the storage to increase above the drought-warning zone and averted the need to impose restrictions on diversions and releases at that time. However, the low precipitation persisted and by January 18, 1985, reservoir storage again declined into the drought-warning zone of the operation curves. On January 23, 1985, the permissible diversion rate to the New York City Water-Supply System was reduced from 800 to 680 mgd and the design rate of flow of Delaware River at Montague, N.J. was changed from 1,750 to 1,655 cfs. Those rates were continued until February 6, 1985 when the combined storage declined into the lower half of the drought-warning zone requiring further reductions in diversions and releases. On February 7, the allowable diversion rate of 680 mgd and the Montague design rate of 1,655 cfs were reduced to 560 mgd and 1,550 cfs respectively.

During the next four months the water supply situation worsened and on May 13, 1985, the Delaware River Basin Commission, in consultation with the parties to the Decree and this office, declared a Water Supply Emergency in the basin based on powers vested in the Commission by Section 10.4 of the Compact. In addition, several conservation orders were adopted which were designed to conserve water supply in the basin and to provide for essential water uses throughout the period of drought.

On May 30, the Rivermaster, with the approval of the parties to the Decree, suspended the release of the excess release quantity for the duration of the drought.

From December 1 to May 31 the anticipated discharge at Montague, exclusive of water released from the City reservoirs, fell below the applicable design rate on 39 days and releases were directed to meet the Montague flow objective. During this period, directed releases totalled 13,404 cfs-days, 8.665 billion gallons. In addition to the Rivermaster directed releases, New York City made releases for conservation purposes at rates set forth in the Interstate Water Management Recommendations of the Parties to the Decree. Releases were made at the augmented conservation rates December 1 to January 22 and at the basic conservation rates thereafter. The conservation release rates are shown in table 2.

Table 2.--Conservation release rates for New York City Delaware River Basin reservoirs.

Reservoir	Operative dates	Conservation releases rates	
		Basic (cfs)	Augmented (cfs)
Neversink	April 1-7	5	45
	April 8 to October 31	15	45
	November 1 to March 31	5	25
Pepacton	April 1-7	6	70
	April 8 to October 31	19	70
	November 1 to March 31	6	50
Cannonsville	April 1-15	8	45
	April 16 to June 14	23	45
	June 15 to August 15	23	325
	August 16 to October 31	23	45
	November 1-30	23	33
	December 1 to March 31	8	33

There were nine days during the December to May period when the observed discharge at Montague was less than the prevailing design rate. (See table 15.) These deficiencies were usually the result of difficulty in predicting travel time and the effect of precipitation on the uncontrolled flow during cold weather.

Inflow to the City's reservoirs during the December through May period generally exceeds draft rates and therefore increases storage. The average inflow to Pepacton, Cannonsville, and Neversink Reservoirs for these six months during the 44-year period, December 1940 to May 1984, was 306.8 billion gallons. During the corresponding six months of the current report year, inflow to the three reservoirs totaled 173.1 billion gallons. Evaporation loss was not included in the computation. Storage in the three reservoirs increased from 110.248 billion gallons on November 30, 1984 to 166.398 billion gallons May 31, 1985.

June to November

Precipitation during the previous 10 months was almost 10 inches below average, but during the June to November period, precipitation was above average all months except June and October, which were 94 percent and 74 percent of average respectively. Precipitation during September and November was almost twice the average for those months and served to break the drought and to bring the total precipitation for the report year to slightly above average.

Because of the water supply emergency in the basin, the target flow for the Montague gaging station was 1,550 cfs on June 1, 1985. On July 27, the target was reduced to 1,350 cfs in response to DRBC Resolution No. 85-21 (Revised), Conservation Order No. 6 (Revised). This resolution, enacted July 24, established the Montague and Trenton target flows to be dependent on the time of the year and the location of the 7-day average 250 milligrams per liter (mg/L) chloride concentration in the Delaware estuary (the "Salt front"). It also reduced the allowable diversion by New York City from 560 million gallons per day (mgd) to 540 mgd. The allowable diversion to New Jersey was also reduced from 70 mgd to 68 mgd but this was of little significance because New Jersey was not diverting water from the Delaware River due to a restoration project on the Delaware and Raritan Canal. Conservation Order No. 6 also stipulated that the savings in storage achieved by the reduction of the Montague flow objective would be allocated as follows:

Savings	Allocated to
25 percent	Thermal Emergency Bank (Conservation order No. 7)
25 percent	New Jersey Diversion Bank (Conservation order No. 5 revised)
50 percent	Basin Bank (to be allocated and used as determined by the parties)

Conservation Order No. 7, which was also enacted July 24, 1985, increased the Emergency thermal release bank from 2,000 cfs-days to 3,500 cfs-days. This bank was to be released at the discretion of New York State Department of Environmental Conservation in consultation with New York City and the River Master for the prevention of fishkills in the streams immediately downstream from the three reservoirs. The 3,500 cfs-days contained in this bank was released in addition to the River Master directed releases between July 9 and August 15 (See table 16). Conservation order No. 5 (revised) [DRBC Resolution 85-18 revised] enacted July 24, 1985 authorized New Jersey to obtain a portion of its allowable diversion via a proposed pipeline across the George Washington bridge from the City of New York Water-Supply System to communities in Northern New Jersey. This order authorized the City to increase its out-of-basin diversions by the amount being transferred to New Jersey and allowed a reduction in the downstream release by an equivalent amount, subject to certain limitations. It also established a release account called the New Jersey Water Bank to account for these transfers.

Table No. 16, pages 65-67, summarizes the savings, thermal releases, thermal release paybacks, and the New Jersey Water Bank accounting which was required by DRBC Conservation orders Nos. 5 (Revised), 6 (revised) and 7.

Diversions to Rondout reservoir June 1 to November 30 totaled 109.136 billion gallons. The equivalent diversion rate did not exceed the limits specified by the Parties to the decree.

When the Delaware River Basin Commission with the consent of the parties to the decree declared a water supply emergency in the basin, they also passed a resolution placing the waters stored in the Power company reservoirs under Commission control and requested the River Master office to coordinate the release of water from the power reservoirs with the directed release from the City reservoirs to ensure maximum conservation of water supply. Therefore, throughout the period from June 1 through October 2, the River Master directed the releases from the power company reservoirs in addition to directing releases from New York City reservoirs.

During June 1 to November 30, releases were directed from the City reservoirs to meet the prevailing Montague design rate on 82 days (table 14). Due to the high volume of storage in the power reservoirs and the very good cooperation of the power companies, the directed release from the City reservoirs was equal to or less than the basic conservation rate on 27 of the 82 days. After the passage of Hurricane Gloria on September 27, no releases were required to meet the Montague design rate. During the June to November period, there were 37 days when the observed discharge was below the prevailing design rate (table 15).

The hydrographs of plate 1, show the total discharge at Montague; the portion derived from uncontrolled runoff downstream from the reservoirs; the portion contributed by the power reservoirs; and the portion contributed by Pepacton, Cannonsville and Neversink Reservoirs. In analyzing the water budget at Montague, the uncontrolled runoff downstream from the reservoirs was computed as the residual of observed flow less releases from all reservoirs and therefore was subject to all the errors in observations, transit times, and routing of the several components of flow. All of these uncertainties are contained in the computed hydrograph of uncontrolled runoff.

The advance estimate of flow of the Delaware River at Montague exclusive of the releases from the New York City reservoirs was less than the design rate on 82 days during the period from June 14 to September 28, 1985 and releases were directed. The table below compares the advance estimates of the various contributions to the flow at Montague to the observed operations during the June 14 to September 28, 1985 period.

	Advance estimates (cfs-days)	Observed operations (cfs-days)
New York City releases		
Directed	[a] 17,427	[b] 17,416
Other		[c] 5,185
Power releases		
Lake Wallenpaupack	30,523	33,241
Mongaup Reservoir	13,534	14,191
Runoff from uncontrolled area	[d] 103,664	[d] 118,195
Flow at Montague		[d] 184,850

[a] Directed release as designed.
[b] Actual release in response to direction.
[c] Includes 3,500 cfs-days released for thermal protection.
[d] June 14 to September 26, 1985.

Summary

From December 1, 1984, to November 30, 1985, diversions to Rondout Reservoir totaled 212.244 billion gallons, and all releases from the New York City reservoirs to the Delaware River totaled 49,377 cfs-days (31.918 billion gallons).

During the year, maximum storage in Pepacton Reservoir was 89.651 billion gallons, or 64 percent of capacity, on April 24-27. Maximum storage in Cannonsville Reservoir was 70.496 billion gallons, or 74 percent of capacity, on November 30. Maximum storage in Neversink Reservoir was 26.536 billion gallons, or 76 percent of capacity, November 30. The maximum combined storage in the three reservoirs during the year was 179.361 billion gallons, or 66 percent of capacity, on November 30.

Minimum storage during the year in Pepacton Reservoir was 50.011 billion gallons, or 36 percent of capacity on September 17. The minimum storage in Cannonsville Reservoir was 25.536 billion gallons, or 27 percent of capacity on December 1. Minimum storage in Neversink Reservoir was 11.773 billion gallons, or 34 percent of capacity on December 19, 1984. Minimum combined storage in the three reservoirs was 111.336 billion gallons, or 41 percent of capacity December 1, 1984.

A resume' of the combined storage of the three reservoirs on the first day of the month June 1967 to December 1985 is shown in figure 3. Storage was above the median November 1, below the median all other months and was the lowest storage of record for the first day of the month for seven consecutive months beginning March 1.

On November 30, combined storage in the three reservoirs was 179.361 billion gallons, or 66 percent of their combined capacity. During the year, combined storage increased 69.113 billion gallons, or 26 percent of capacity.

SUPPLEMENTARY RELEASE FROM WALLENPAUPACK POWERPLANT

An agreement between Pennsylvania Power & Light Company and the City of New York provides for supplementary releases from Wallenpaupack hydroelectric powerplant if the Delaware River Basin Commission requests compensation for water consumed at the Company's Martins Creek steam-electric generating station. Releases may be requested if the flow of the Delaware River at Trenton, N.J. is expected to be less than 3,000 cfs for more than three consecutive days. No supplementary releases were requested during the year based on the this agreement because of the drought and the emergency operating procedures enacted to manage the water supplies in the basin.

WATER BUDGET, DELAWARE RIVER AT MONTAGUE, N.J.

The data and computations of the water budget formed the basic operational records required to carry out the River Master's specific responsibilities with respect to the Montague Formula, the Interstate Water Management Recommendations and the DRBC Conservation Orders 1-7 during the report year. The water budget has two parts: (1) advance estimates of the daily average flow at Montague, exclusive of controlled releases from New York City's reservoirs (table 14) and (2) segregation of the daily average flow at Montague among its various source components (table 15). The time intervals required for water to travel from the various sources to Montague were taken into account.

Discharge of the Delaware River at Montague was composed of the following source components:

1. Controlled releases from Lake Wallenpaupack on Wallenpaupack Creek in the production of hydroelectric power.
2. Controlled releases from Mongaup Reservoir on Mongaup River in the production of hydroelectric power.
3. Runoff from the uncontrolled area upstream from Montague.
4. Controlled releases from Pepacton, Cannonsville and Neversink Reservoirs of the City of New York.

The release from the City's reservoirs necessary to maintain the applicable rate of flow at Montague was computed from the advance estimates of flow at Montague, exclusive of controlled releases from the City's reservoirs.

TIME OF TRANSIT

The average times for the effective transit of water from the various sources of controlled supply to Montague used for discharge routing during the 1984 report year are as follows:

Source	Hours
Pepacton Reservoir	60
Cannonsville Reservoir	48
Neversink Reservoir	33
Lake Wallenpaupack	16
Mongaup Reservoir	12

This schedule was developed from reservoir and powerplant operations and gaging-station records of prior years and was found generally suitable. At times, noticeable exceptions occur, e.g., when a large release from Cannonsville Reservoir follows a small one, a large part of the release is expended in filling the channel en route, and the remainder may appear at Montague as much as 18 hours late. During the winter, the cold weather causes ice to form in the stream, which, together with the low streamflow, gradually increases the resistance to streamflow and lengthens the time of transit. During January 18-23 the travel time from the New York City reservoirs was increased by 24 hours for computational purposes.

SEGREGATION OF FLOW AT MONTAGUE

The River Master daily operation record of reservoir releases and daily segregation of flow among the various source components contributing to the flow of the Delaware River at Montague is shown in table 15 on page 53. The arrangement of data conforms with the downstream movement of water from the various sources to Montague. A horizontal summation of data in the table is equivalent to routing the various contributions to Montague, using the schedule for travel time of water discussed previously. The uncontrolled runoff was computed by subtracting the contributions of the several other sources from the observed discharge at Montague.

COMPUTATION OF DIRECTED RELEASES

In the daily operations, it was necessary that the River Master utilize: (1) discharges computed from recorded or reported stream gage heights for various 24-hour periods without current information about changes in stage-discharge relations that might have occurred; (2) daily discharge from New York City's three reservoirs obtained from venturi meters; (3) rainfall reports for the previous 24 hours; (4) actual powerplant operations converted to daily discharge; (5) advance estimates of power demand converted to daily discharge; (6) advance estimates of uncontrolled runoff at Montague; and (7) average times for routing of water from the several sources. Variable errors of estimate occur in projecting data, but these data must be used in the daily design and direction of releases from the reservoirs.

The time of transit of water from Pepacton Reservoir to Montague was greater than that from any other reservoir above Montague, therefore, the time of daily directed releases to maintain prescribed rates of flow at Montague was based on time of transit from Pepacton Reservoir. Releases from Cannonsville and Neversink Reservoirs were timed to arrive at Montague concurrently with releases from Pepacton Reservoir. To allow for the actual differences in transit times, daily directed releases began at Pepacton at 1200, at Cannonsville at 2400, and at Neversink Reservoir at 1500 the following day.

The determination of the amount of release required from the City's reservoirs to maintain specified rates of flow at Montague was based on estimates of releases from Lake Wallenpaupack and Mongaup Reservoir and an estimate of the uncontrolled runoff at Montague. Taking into account the time of transit from these sources to Montague, this determination required that advance estimates of the following components be made on the morning of each day: (1) the expected release of water from Lake Wallenpaupack for power production for a 24-hour period, beginning at 0800, two days later; (2) expected release of water from Mongaup Reservoir for power production for a 24-hour period two days later, beginning at 1200; and (3) expected uncontrolled runoff at Montague three days later. The River Master daily operation record for computing daily directed release from the City's reservoirs during the periods of low flow is shown in table 14.

The electric power companies cooperated fully in furnishing advance estimates of powerplant release prior to the declaration of Water Supply Emergency and in releasing the amounts requested by the Rivermaster during the period of Water Supply Emergency (table 14). As the hydroelectric plants were used chiefly for meeting peak-power demands of the system, advance estimates were subject to many modifying factors such as the influence of the vagaries of weather upon peak-power demand and unpredictable transmission and mechanical difficulties in electric-system operation. As a result, the actual use of water for power generation was at times at considerable variance with the advance estimates that were used by the River Master's office in design computation.

For computation purposes during periods of low flow, the estimate of uncontrolled runoff at Montague three days in advance was treated as two items: (1) present runoff and (2) estimated increase in runoff from precipitation. The present runoff was computed for 2,156 square miles of uncontrolled drainage area above Montague based on conditions over the drainage area as of 0800 on the morning the estimate was made. The estimated increase in runoff was computed from precipitation which was forecast to occur on the day the estimate was made and the two following days. Estimated quantities for these items are shown in table 14.

During the winter period, the advance estimate of the uncontrolled runoff (present conditions) was based on flows at nearby gaging stations and on the recession curve of the uncontrolled flow at Montague projected to the design date, three days hence.

During open-river conditions, the present runoff portion of the advance estimate of uncontrolled runoff was based on discharges as of 0800 at gaging stations listed below:

Station	Drainage area (square miles)
Beaver Kill at Cooks Falls, N.Y.	241
Cadosia Creek at Cadosia, N.Y.	17.9
Oquaga Creek at Deposit, N.Y.	67.6
Equinunk Creek at Equinunk, Pa.	56.3
Callicoon Creek at Callicoon, N.Y.	110
Tenmile River at Tusten, N.Y.	45.6
Lackawaxen River at Hawley, Pa.	290
Shohola Creek near Shohola, Pa.	83.6
Neversink River at Port Jervis, N.Y.	336

The procedure for computing the advance estimate combined a routing and recession (as applicable) of the 0800 discharges of the Beaver Kill, Oquaga, Equinunk, Callicoon and Shohola Creeks and Tenmile, Lackawaxen, and Neversink Rivers gaging stations to Montague, with a computed yield from the remaining ungaged, uncontrolled drainage area. Releases from Neversink Reservoir were deducted from discharge of the Neversink River site. The yield from the ungaged, uncontrolled drainage area was estimated on the basis of the yield of Cadosia, Oquaga, Equinunk, and Callicoon Creeks, and Tenmile and Lackawaxen Rivers with routing and recession by individual gaging stations.

The advance estimate of increase in runoff from precipitation is shown in table 14 under the heading of "Weather Adjustment." The National Weather Service Office, Philadelphia, Pa., cooperated throughout the low-flow periods by furnishing quantitative forecasts of average precipitation over the drainage area above Montague and air temperatures for each day of the three-day period. During the winter, the probable increase in runoff was estimated from the current state of snow and ice and from forecasted temperature and precipitation for the several days under consideration. During open-river conditions, runoff from the forecasted precipitation was estimated from previously established relationships.

The total anticipated flow at Montague, exclusive of releases from the City's reservoirs (table 14), was the sum of the forecasted releases from the power reservoirs, the estimated uncontrolled runoff under then current conditions, and the weather adjustment. The amount by which this computed flow was less than the prescribed Montague rate indicated the expected deficiency at Montague, which would have to be made up by corresponding releases from New York City reservoirs.

There were times when revised forecasts of weather or powerplant release in substantial amount became available before the completion of the required release from New York City reservoirs. At such times, the release required from New York City reservoirs was recomputed on the basis of the revised information, and the release required was changed to revised indicated deficiency. Usually this procedure resulted in a reduced release requirement from New York City reservoirs and the conservation of water. Only the final figures are shown in table 14.

DIVERSIONS TO NEW YORK CITY WATER SUPPLY

Table 13 shows diversions from Pepacton, Cannonsville and Neversink Reservoirs to the New York City water-supply system during the report year. The tabulation includes a running account of the average rates of the combined diversions from the reservoirs, computed as prescribed by the Decree December 1 to January 22, the Interstate Water Management Recommendations of the Parties to the Decree January 23 to July 24 and the equivalent rate as prescribed by DRBC resolutions, approved by the Parties to the Decree July 25 to November 30. The tabulation shows that the allowable maximum equivalent diversion rates were not exceeded at any time.

STORAGE IN NEW YORK CITY RESERVOIRS

The New York City Board of Water Supply determined the "point of maximum depletion" and other pertinent reservoir levels and contents of Pepacton, Cannonsville and Neversink Reservoirs as follows:

Reservoir level	Pepacton Res.		Cannonsville Res.		Neversink Res.	
	Elev. (feet)	Contents (billion gallons)	Elev. (feet)	Contents (billion gallons)	Elev. (feet)	Contents (billion gallons)
Full pool or spillway crest	1,280.00		1,150.00		1,440.00	
		*140.190		*95.706		*34.941
Point of maximum depletion	1,152.00		1,040.00		1,319.00	
		*3.511		*1.020		*0.525
Sill of diversion tunnel	1,143.00		+1,035.00		1,314.00	
		*4.200		*1.564		
Sill of river outlet tunnel	1,126.50		1,020.5		1,314.00	
Dead storage		1.800		0.328		1.680

*Contents shown are quantities stored between listed elevations.
+Elevation of mouth of inlet channel of diversion works.

Tables 10, 11 and 12 show storage in Pepacton, Cannonsville and Neversink Reservoirs, respectively, above "point of maximum depletion" or minimum full-operating level.

The advance estimate of flow of the Delaware River at Montague exclusive of the releases from the New York City reservoirs was less than the design rate on 82 days during the period from June 14 to September 28, 1985.

On December 1, 1984 combined storage in the three reservoirs was 111.336 billion gallons, which was 1.3 billion gallons above the drought warning level as defined by the Interstate Water Management Recommendations. Storage increased gradually until January 9 but remained very close to the drought warning level. Storage fell below the drought-warning level on January 18 and reductions in diversions and releases called for by the Interstate Water Management Recommendations were instituted January 23, when storage had remained below drought-warning level for five consecutive days.

Storage continued to decrease throughout the winter dropping into the lower half of the drought-warning zone on February 7 and reached a combined minimum storage of 118.062 billion gallons on February 23. Storage increased seasonally during March and April but remained within the drought-warning zone (figure 2). However, the combination of near-normal precipitation from May through August coupled with below normal releases to meet the reduced Montague design rates and reduced diversions for New York City water supply, storage reached the normal zone on September 4. Heavy precipitation occurred during September and November and storage increased to 179.361 billion gallons, the maximum level for the year on November 30.

ANALYSIS OF FORECASTS

Forecasts of the flow at Montague based on the anticipated flow of the several components (exclusive of the release from the City's reservoirs) vary somewhat with those actually experienced on most days even under the most favorable conditions. The daily variations in the several components are often largely compensating with the resulting forecast being fairly accurate. Forecasts were compared with actual uncontrolled runoff and powerplant releases from June 14 to September 28, which included most of the days for which releases were directed.

A comparison of the hydrographs on figure 3 of forecast uncontrolled runoff and the actual uncontrolled runoff indicate that the forecasting procedures were generally adequate. The forecast included anticipated uncontrolled runoff under then-existing conditions plus the weather adjustment based on forecast precipitation. The total uncontrolled runoff during June 14 to September 26 (Montague dates) was 118,195 cfs-days, (See table on page 19.) The forecast of uncontrolled runoff for those days was 103,664 cfs-days, or 12 percent less than actual runoff.

During this same period, the total actual release from the powerplants was 47,432 cfs-days. The advance estimate of powerplant releases for those days was 44,057 cfs-days, or 8.1 percent less than actual releases.

On the basis of the observed discharges at Montague, exact forecasting of releases required from the City's reservoirs during the release period June 14 to September 28, would have totaled 14,746 cfs-days. The releases, as designed, totaled 17,416 cfs-days, or 18 percent more than for exact forecasting.

COMPARISONS OF RIVER MASTER OPERATION DATA AND OTHER STREAMFLOW RECORDS

It has been explained that the River Master operations are, in effect, day-to-day operations, for which it is necessary to use preliminary records of streamflow. The following summaries show comparison of records used in the River Master operations and Geological Survey records. In the comparison of releases approximating conservation rates only, data were used in units of million gallons per day and converted to cubic feet per second in the summaries.

Releases from New York City Reservoirs

The River Master operations data on the controlled releases from Pepacton, Cannonsville and Neversink Reservoirs, to the Delaware River were obtained from calibrated instruments connected to venturi meters installed in the outlet conduits.

The Geological Survey gaging station on the East Branch Delaware River at Downsville, N.Y., is 0.5 mile downstream from Pepacton Reservoir dam. The discharge shown in table 3 includes releases and spillage from Pepacton Reservoir. It also includes a small amount of seepage, which enters the channel between the dam and gage site and, a small amount of runoff, which originates between the dam and gage site. The drainage area at the dam is 372 square miles.

Releases were made at conservation or other rates by New York City during the year. For flows of approximately 7.0, 20, 50 and 65 cfs at the gaging station, the venturi meter instruments indicated -10.5, +.5, -.2 and +5.5 percent difference, respectively, in rates of release from the reservoir than those shown by the gaging-station records.

The Geological Survey gaging station on the West Branch Delaware River at Stilesville, N.Y. is 1.4 miles downstream from Cannonsville Dam. The discharge shown in table 4 includes releases and spillage from Cannonsville Reservoir and the runoff from 2 square miles of drainage area between the dam and the gage site. The drainage area at the dam is 454 square miles, and that at the gaging station is 456 square miles.

Releases were made in a range from conservation to high rates during the year. For flows of approximately 14, 30 and 55 cfs at the gaging station, the venturi meter instruments indicated 35, 15 and 35 percent less water, respectively, being released from the reservoir than those shown by the gaging-station records. The venturi indicated 4.3 percent more discharge than that shown by the gaging-station records at flows of approximately 140 cfs and 13 percent more discharge for flows in the 310 cfs range.

The Geological Survey gaging station on the Neversink River at Neversink, N.Y., is 1,650 feet downstream from Neversink Dam. The discharge shown in table 6 includes releases and spillage from Neversink Reservoir and, during storms, a small amount of runoff, which originates between the dam and gage site. The drainage area at the dam is 92.5 square miles and that at the gaging station is 92.6 square miles.

Releases were made at conservation or other low flows by New York City during the year. For flows of approximately 5, 15, 23 and 50 cfs at the USGS gaging station, the venturi meter instrument indicated -6.3, +5.4, +8.3 and +3.9 percent difference, respectively, in rates of release from the reservoir than those shown by the gaging-station records.

The above comparisons indicate good agreement between the data from the venturi meters and U.S. Geological Survey gaging stations at all stations for all ranges of flow except for flows at Cannonsville Reservoir. The gaging station records show significantly more water at low flows and less water at high flows than the venturi meter records for this site.

Releases from Lake Wallenpaupack

In the River Master operations December 1 to November 30, records of daily discharge through the Wallenpaupack powerplant were furnished by the Pennsylvania Power & Light Company. Daily discharges were computed on an 0800 to 0800-time basis to allow for the 16-hour average transit time to Montague.

The records of daily mean discharges for Wallenpaupack Creek at Wilsonville, Pa., published by the Geological Survey, were also furnished by the Company. These discharges, shown in table 5, represent the flow through the turbines of the powerplant and are computed on a midnight to midnight basis.

During December 1984 through November 1985, the River Master's record based on computations by Pennsylvania Power & Light Company, indicated 0.6 more discharge than the Geological Survey record. This difference was due to the difference in the time frame of the computations. The very high flows at the end of the year accounted for most of the difference.

Delaware River at Montague, N.J.

The River Master's operation record indicated 0.8 percent less discharge for the year than the Geological Survey record, and daily records were generally in good agreement.

Diversion Tunnels

Records of diversions through the East Delaware, West Delaware, and Neversink Tunnels were furnished to the River Master's office by the City of New York. These records were obtained from New York City's calibrated instruments connected to venturi meters installed in the tunnel conduits. Current-meter measurements were made by the River Master's office to verify the accuracy of the reported diversions. The current-meter measurements were made in the outlet channels downstream from the tunnels.

Water diverted from Pepacton Reservoir discharges through the East Delaware tunnel into Rondout Reservoir. The conditions in the outlet channel, which is used for measuring discharge from the tunnel by current meter were unfavorable for much of the year. The results of three current-meter measurements showed on the average that the venturi-meter instruments gave higher figures by 6.5 percent for the totalizer, 5.7 percent for the manometer and 6.1 percent for the indicator needle.

The powerplant that used the water diverted through the tunnel operated most days of the year. On days when the powerplant was not in operation, there was a small amount of leakage through the wicket gates, which was not recorded on the totalizer. Results of a current-meter measurement March 4, 1982, indicated a rate of 10.9 cfs from cooling water and leakage. No measurements of the leakage were made during the year.

Based upon measurements obtained this year and in previous years, the record of quantity of water diverted through the East Delaware Tunnel should be substantially correct.

The West Delaware tunnel is used to divert water from Cannonsville Reservoir into Rondout reservoir. Eight current-meter measurements were made during the year to compare with venturi measurements. The average of the difference between these measurements indicated that the venturi instruments gave higher results by 7.4 percent for the totalizer, 14 percent for the manometer and 7.1 percent for the indicator needle. Inspections of the channel downstream from the outlet, when valves were closed showed negligible leakage.

A series of measurements of flows through the West Delaware Tunnel was made November 13-14 to check the accuracy of the venturi-meter instruments. Measurements at flows of approximately 290 and 490 mgd were made by the color-velocity method by personnel of New York City and by current--meter method by personnel from the River Master office.

There was good agreement between the results of the color velocity tests, venturi-meter totalizer and the current meter measurements. At 488 mgd and 290 mgd by color-velocity method, the venturi-meter totallizer gave 483 mgd and 288 mgd respectively and the current meter method showed 452 mgd (-7.4 percent) and 270 mgd (-6.9 percent) respectively. The results of these tests and other current meter checks indicate that the reported record of the quantity of water diverted through the West Delaware Tunnel was substantially correct.

The Neversink Tunnel is used to divert water from Neversink reservoir into Rondout reservoir. Results of the comparative data showed that the venturi measurements and four current-meter measurements made during the year agreed fairly well. The average difference between the two methods showed the venturi higher by 4.2 percent for the totalizer, 9.2 percent for the manometer, and 10.6 percent for the indicator needle.

DIVERSIONS BY NEW JERSEY

According to the terms of the Decree, the State of New Jersey may divert for use outside the Delaware River basin from the Delaware River or its tributaries in New Jersey, without compensating releases, a quantity of water not to exceed 100 mgd (154.7 cfs), as a monthly average, with the diversion on any day not to exceed 120 mgd (185.6 cfs).

In order to increase the carrying capacity of the Delaware & Raritan Canal, the New Jersey Water Supply Authority began dredging the canal in March 1984. The canal was closed at about noon on March 16, 1984 near Washington Crossing, New Jersey and remained closed throughout the 1985 report year.

CONFORMANCE OF OPERATIONS AS PROVIDED UNDER AMENDED DECREE OF THE U.S. SUPREME COURT, DATED JUNE 7, 1954

At the beginning of the report year, operations were being conducted as prescribed by the Decree. However, on January 23, conservation measures including reductions in allowable diversions from the basin and rates of flow of the Delaware River at Montague were instituted because of the threat of a drought. Conservation measures designed to combat the water supply shortage in the basin continued throughout the report year.

Diversions from the Delaware River basin to the water-supply system of the City of New York were less than the 800 mgd authorized by the Decree. Diversions during the drought-warning and drought period also were less than the permissible rates in effect for those periods. Allowable and actual diversions are shown in the following table:

Effective dates	Allowable diversions Equivalent rate not to exceed (mgd)	Actual diversions (mgd)
June 1, 1984 to Jan. 22, 1985	800	692
Jan. 23 to Feb. 6, 1985	680	679
Feb. 7 to July 24, 1985	560	560
July 25 to Oct. 2, 1985	540	538
Oct. 3 - 31, 1985	680	674
Nov. 1-30, 1985	740	684

Under Compensating Releases of the Montague Formula, the City released water from its reservoirs at rates designed by the River Master to maintain the minimum basic rate of flow of 1,750 cfs at Montague December 1 to January 22. Releases from the reservoirs, under the reduced rates provided in the Interstate Water Management Recommendations, DRBC Conservation Orders, and in accordance with the design data of the River Master, were made to provide 1,655 cfs at Montague, N.J. January 23 to February 6; 1,550 cfs, February 7 to July 27; 1,350 cfs, July 28 to August 31; 1,300 cfs September 1-12; 1,500 cfs minus the thermal release payback September 13 to October 4; 1,655 cfs, October 5-31; and 1,700 cfs, November 1-30.

There were no diversions from the Delaware River basin by the State of New Jersey during the year.

Table 3. - Daily discharge, in cubic feet per second, of East Branch Delaware River at Downsville, N.Y. (0141700) for the year ending November 30, 1985. Preliminary
U.S. Geological Survey record.
Mean values

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	53	52	49	6.8	6.8	18	18	18	19	19	19	19
2	49	52	53	6.9	6.7	18	18	42	19	19	19	19
3	48	52	49	6.9	6.8	18	18	68	19	18	19	19
4	49	52	49	6.9	6.8	18	18	67	30	19	19	19
5	51	52	48	7.0	6.7	18	18	82	45	42	20	19
6	53	52	52	6.9	6.8	18	18	83	45	59	19	19
7	55	52	50	6.8	9.3	18	18	66	47	51	19	19
8	54	53	48	6.9	16	18	18	66	43	51	19	19
9	54	52	50	6.9	16	18	18	43	46	36	19	19
10	54	51	50	6.9	17	18	18	18	55	18	19	19
11	54	118	50	7.0	18	18	18	44	56	18	19	19
12	54	117	50	7.9	18	18	18	68	47	18	19	19
13	53	48	47	7.5	18	18	18	46	32	43	19	19
14	53	48	29	7.4	18	18	18	19	18	45	19	19
15	53	47	6.4	7.4	18	18	18	19	23	18	19	19
16	53	48	6.8	7.3	18	39	18	19	36	18	19	20
17	54	89	7.2	7.3	18	61	18	19	19	18	19	21
18	53	120	7.2	7.0	18	30	18	42	33	18	19	20
19	52	133	27	7.0	18	17	18	68	47	18	19	19
20	52	126	50	7.0	18	17	40	68	42	18	19	19
21	52	73	29	6.9	18	17	66	68	36	18	18	20
22	53	57	6.5	6.7	18	17	66	64	34	18	19	20
23	52	52	6.8	6.7	18	17	66	54	53	18	19	20
24	53	50	6.9	6.7	18	17	66	37	37	18	19	20
25	58	52	7.0	6.7	18	32	66	35	18	18	19	19
26	52	49	6.9	6.7	18	54	66	52	19	18	19	20
27	52	53	7.0	6.7	18	35	66	52	19	22	19	20
28	54	51	7.0	6.8	18	18	66	53	24	19	19	20
29	52	48		6.7	18	17	43	53	25	19	19	20
30	52	49		6.7	18	17	18	47	19	19	19	20
31	51	45		6.8		17		39	19		19	
Total	1,632	1,993	855.7	215.8	458.9	692	971	1,519	1,024	751	589	583
Mean	52.6	64.3	30.6	6.96	15.3	22.3	32.4	49.0	33.0	25.0	19.0	19.4

Year total 11,284.4 cfs-days   Mean 30.9 cfs

Table 4. - Daily discharge, in cubic feet per second, of West Branch Delaware River at Stilesville, N.Y. (01425000) for the year ending November 30, 1985. Preliminary U.S. Geological Survey record.

Mean values

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	51	44	200	19	13	28	32	34	61	35	29	28
2	48	43	266	13	12	29	29	28	45	27	29	28
3	48	42	218	13	12	28	29	433	45	28	29	28
4	48	42	234	13	12	27	28	250	45	27	29	28
5	47	42	227	14	12	27	28	620	128	91	29	29
6	48	42	351	13	12	28	28	681	133	180	29	28
7	47	42	377	13	11	27	28	321	135	139	28	28
8	46	42	592	14	12	27	28	304	135	111	28	28
9	47	41	574	14	11	27	28	321	163	101	28	28
10	48	41	648	13	11	27	27	198	136	34	28	29
11	49	89	552	13	11	27	27	460	134	27	28	30
12	50	69	468	23	11	27	29	684	135	27	28	30
13	52	42	361	20	11	27	28	361	115	28	29	31
14	53	41	245	18	11	27	28	306	39	76	29	32
15	54	41	20	16	13	27	28	308	40	33	29	34
16	55	41	12	18	29	51	28	246	45	27	29	33
17	55	41	12	15	29	41	28	148	31	27	29	41
18	56	41	12	14	28	44	29	146	28	28	28	35
19	57	42	12	14	29	31	28	119	42	42	31	32
20	59	41	34	14	29	29	28	290	45	123	29	31
21	59	41	164	14	29	27	271	207	44	112	28	30
22	64	90	60	13	28	27	426	162	126	100	28	31
23	64	200	15	13	27	27	179	139	322	75	28	30
24	62	509	16	14	27	27	163	60	286	34	29	30
25	62	414	17	13	27	29	80	47	71	71	29	29
26	61	301	15	13	27	40	67	130	31	70	29	32
27	62	219	14	13	27	38	267	147	30	72	29	34
28	64	111	14	13	27	29	612	147	37	52	29	38
29	69	128		11	27	27	328	145	40	36	29	36
30	74	143		11	27	28	64	151	82	33	28	34
31	65	188		12		28		147	113		28	
Total	1,724	3,253	5,730	444	592	933	3,023	7,740	2,862	1,866	889	935
Mean	55.6	105	205	14.3	19.7	30.1	101	250	92.3	62.2	28.7	31.2

Table 5. - Daily discharge, in cubic feet per second, of Wallenpaupack Creek at Wilsonville, Pa. (01432000) for the year ending November 30, 1985. Record furnished by Pennsylvania Power & Light Company.

Mean values

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	0	0	0	252	0		0	0	469	325	1,620	231
2	0	0	0	0	0		357	170	481	198	1,570	0
3	0	0	0	0	0		828	284	0	236	1,460	0
4	0	0	343	0	0		485	0	0	290	1,460	484
5	767	0	243	0	0		940	290	463	295	1,460	456
6	1,170	0	0	464	0		956	0	469	426	1,460	469
7	0	166	0	458	0		940	0	469	294	358	0
8	0	255	227	475	237		0	309	347	231	26	0
9	0	249	0	0	329		0	0	385	352	0	0
10	0	236	0	0	0		471	281	0	0	0	0
11	0	224	0	473	0		453	548	0	0	0	468
12	0	0	0	705	0		474	662	360	0	0	474
13	0	0	0	735	0		0	0	391	0	0	0
14	0	242	0	774	0		226	0	374	0	0	0
15	0	227	0	720	15		417	0	452	0	0	457
16	0	236	0	0	0		497	0	471	279	0	135
17	0	240	0	0	0		469	0	349	357	0	0
18	0	239	0	700	0		472	62	333	305	0	932
19	0	0	0	0	0		122	0	396	284	0	953
20	0	220	0	715	0		181	0	492	353	0	950
21	0	1,280	0	587	0		262	0	581	296	0	944
22	0	717	0	674	0		0	467	385	313	226	939
23	0	306	0	0	0		0	552	863	374	218	708
24	0	260	0	0	99		29	693	354	417	230	780
25	0	237	0	732	0		945	1,170	354	396	225	946
26	0	0	0	0	0		607	1,320	572	911	0	946
27	0	0	0	0	0		321	0	408	960	0	942
28	281	22	0	0	0		167	0	411	1,630	232	1,150
29	0	0		5.0	0		381	46	419	1,640	232	1,630
30	0	0		0	0		0	515	473	1,630	239	1,630
31	0	0		0				447	366		254	
Total	2,218	5,356	813	8,469.0	680	0	11,000	7,816	11,887	12,792	11,270	16,624
Mean	71.5	173	29.0	273	22.7		367	252	383	426	364	554

Year total 88,925.0 cfs-days Mean 244 cfs

Table 6. - Daily discharge, in cubic feet per second, of Neversink River at Neversink, N.Y. (01436000) for the year ending November 30, 1985. Preliminary U.S. Geological Survey record.

Mean values

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	23	24	11	5.2	4.8	15	15	14	17	15	15	15
2	23	24	22	5.1	4.8	15	15	14	17	15	15	15
3	23	23	22	5.0	4.8	15	15	25	17	15	15	15
4	23	24	22	5.2	4.7	14	15	47	17	15	15	15
5	23	23	22	5.3	4.7	14	15	54	19	15	15	15
6	23	23	23	5.2	4.8	15	14	59	21	24	15	15
7	22	23	22	5.2	7.7	14	15	42	24	37	15	15
8	23	22	22	5.2	15	14	15	44	21	29	15	15
9	23	22	22	4.8	14	14	15	46	21	23	15	15
10	23	22	22	4.8	15	14	15	46	22	16	15	15
11	23	22	22	4.8	15	14	15	45	22	15	15	15
12	23	22	23	6.0	14	14	15	44	22	15	15	15
13	23	22	23	5.0	14	14	15	51	19	15	15	15
14	24	22	15	4.9	14	14	15	60	20	24	15	15
15	24	22	5.2	4.8	14	14	15	54	15	32	15	15
16	24	22	5.2	4.8	14	15	15	31	15	15	16	15
17	24	23	5.2	4.8	14	23	15	15	18	15	15	15
18	24	23	5.2	4.8	14	25	14	29	15	15	15	15
19	23	23	5.2	4.7	14	14	15	44	15	15	15	15
20	23	23	10	4.7	14	14	15	45	19	15	15	15
21	24	22	22	4.7	14	14	26	47	20	15	15	15
22	24	23	13	4.7	14	14	52	31	20	15	15	15
23	24	23	5.2	4.7	14	14	51	15	24	15	15	15
24	24	23	5.2	4.8	14	15	49	15	29	15	15	15
25	23	23	5.2	4.6	14	14	47	15	25	15	15	15
26	23	22	5.2	4.7	14	24	42	25	15	15	15	16
27	23	23	5.1	4.7	14	32	42	26	15	16	15	15
28	23	22	5.1	4.8	15	16	34	26	15	15	15	16
29	23	22		4.7	15	15	25	24	20	15	15	15
30	23	22		4.7	15	15	27	21	25	15	15	15
31	24	16		4.8		15		20	15		15	
Total	722	695	395.0	152.2	364.3	493	693	1,074	599	531	466	452
Mean	23.3	22.4	14.1	4.91	12.1	15.9	23.1	34.6	19.3	17.7	15.0	15.1

Table 7. - Daily discharge, in cubic feet per second, of the Delaware River at Montague, N.J. (01438500) for the year ending November 30, 1985. Preliminary U.S. Geological Survey record.

Mean values

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	5,180	5,470	1,600	5,910	3,370	1,940	3,120	1,720	2,140	1,750	9,020	2,300
2	4,270	5,050	1,500	5,150	4,900	1,940	3,760	1,400	2,870	1,580	7,480	2,380
3	3,970	4,920	1,400	4,290	4,930	4,160	3,660	1,390	2,650	1,340	6,690	1,890
4	4,090	4,340	1,500	3,820	4,500	6,100	3,390	1,380	1,530	1,180	6,180	1,830
5	4,050	3,910	1,950	3,590	4,250	4,510	3,090	1,140	1,240	1,200	6,600	2,790
6	4,870	3,330	1,750	4,450	4,110	3,660	3,470	1,690	1,860	1,230	13,100	3,400
7	3,740	3,270	1,550	4,490	3,790	3,510	3,230	1,550	1,890	1,300	9,070	4,160
8	2,520	3,450	1,450	4,270	4,280	3,390	3,050	1,910	1,990	1,220	6,040	3,370
9	2,260	2,700	1,750	4,350	4,970	3,010	1,890	1,970	1,890	1,370	4,780	2,930
10	2,350	2,000	1,650	4,030	4,590	2,680	1,760	1,440	1,860	4,210	4,020	2,440
11	2,350	1,800	1,750	4,090	3,980	2,290	2,260	1,650	1,420	3,720	3,590	2,410
12	2,410	2,400	2,100	6,990	3,760	2,100	2,110	1,760	1,380	2,450	3,170	3,640
13	2,660	2,000	2,400	16,500	3,430	1,980	2,040	2,050	1,560	1,720	2,930	5,470
14	2,880	2,300	2,900	12,900	3,050	1,960	1,510	2,520	1,560	1,360	2,980	6,270
15	3,370	2,400	2,900	10,300	3,040	1,730	1,670	2,280	1,570	1,130	3,260	8,800
16	3,350	2,200	2,700	8,210	3,080	1,570	1,880	2,890	1,760	1,010	3,220	10,100
17	3,190	2,100	2,300	6,540	2,940	1,520	2,080	3,280	1,570	1,510	3,070	17,600
18	3,100	1,900	1,900	6,140	2,850	2,060	1,950	2,420	1,240	1,540	2,790	22,400
19	2,890	1,900	1,700	5,590	2,620	3,440	1,900	1,990	1,180	1,450	2,560	16,600
20	3,080	1,600	1,750	4,580	2,720	3,540	1,450	1,520	1,330	1,380	2,390	12,800
21	3,660	1,750	1,650	4,970	2,840	2,880	1,400	1,240	1,350	1,370	2,610	10,700
22	3,960	3,200	1,550	4,560	2,710	2,450	1,350	2,560	1,280	1,220	2,690	9,250
23	7,050	2,200	1,950	4,290	2,580	2,100	1,080	3,820	1,120	1,280	2,750	9,080
24	6,260	2,000	4,400	3,630	2,480	1,910	1,460	3,020	1,480	1,380	2,660	8,430
25	5,000	2,000	9,600	3,620	2,570	1,740	1,920	2,520	1,070	1,320	3,130	7,440
26	4,260	2,400	11,400	3,750	2,560	1,600	1,920	3,700	1,490	1,330	3,590	7,210
27	3,710	2,000	8,790	2,890	2,480	1,530	1,850	2,860	1,830	12,600	3,060	9,920
28	3,620	1,700	7,030	2,770	2,210	1,900	1,510	1,900	1,500	50,700	2,690	14,500
29	4,660	1,900		2,750	2,040	4,410	1,490	1,660	1,380	20,700	2,940	17,900
30	6,760	1,700		2,800	2,020	4,290	1,890	1,420	1,310	12,200	2,770	14,700
31	6,560	1,650		2,650		3,300		1,840	1,540		2,550	
Total	122,080	81,540	84,870	164,870	99,650	85,200	65,140	64,490	49,840	137,750	134,380	242,710
Mean	3,938	2,630	3,031	5,318	3,322	2,748	2,171	2,080	1,608	4,592	4,335	8,090

Year total 1,332,520 cfs-days Mean 3,651 cfs

Table 8. - Daily discharge, in cubic feet per second, of Delaware & Raritan Canal at Kingston, N.J. (01460500) for the year ending November 30, 1985. Preliminary U.S. Geological Survey record.

Mean values

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	72	31	38	33	34	0	42	.10	22	6.8		0
2	72	9.4	38	33	35	0	48	0	25	8.6		0
3	72	0	39	34	33	8.2	47	0	8.0	9.3		0
4	72	18	39	34	33	9.7	46	0	5.3	6.1		6.8
5	71	18	39	34	32	2.6	46	1.2	4.6	6.8		0
6	76	17	39	34	32	12	47	0	0	5.4		0
7	75	17	39	34	32	23	46	0	0	2.7		0
8	72	20	37	34	35	28	43	0	19	.20		0
9	70	0	38	35	40	35	40	0	21	4.2		0
10	70	24	37	38	40	40	29	0	18	6.2		0
11	69	39	37	39	40	41	33	0	9.5	.20		0
12	69	33	35	46	40	35	31	0	0	0		0
13	68	32	25	45	39	26	25	0	0	0		0
14	59	32	32	44	39	17	14	0	0	0		0
15	49	32	36	45	39	21	8.5	0	0	0		0
16	47	40	36	55	38	25	20	0	0	0		0
17	54	38	37	48	38	25	35	2	0	0		0
18	42	40	37	45	46	35	43	0	0	0		0
19	23	45	36	45	60	46	42	0	0	0		0
20	32	29	35	44	61	43	40	0	0	0		0
21	29	40	36	44	63	36	34	0	5.2	0		0
22	27	42	38	45	64	47	25	0	4.2	0		0
23	27	42	34	36	61	47	9.2	0	3.2	0		0
24	25	42	35	33	37	46	8.4	0	.8	0		0
25	28	42	35	34	6.1	35	17	0	1.3	0		0
26	25	41	33	38	4.0	31	27	16	10	0		0
27	30	42	32	38	1.6	33	26	25	22	0		0
28	30	41	34	38	0	33	17	22	22	0		0
29	32	40		37	.1	32	6.3	12	6.8	0		0
30	32	38		37	0	22	.6	5.3	7	0		0
31	31	38		38		23		4.2	6.1	0		0
Total	1,550	962.4	1,006	1,217	1,022.8	857.5	896.0	87.8	221.0	56.5	0	6.8
Mean	50.0	31.0	35.9	39.3	34.1	27.7	29.9	2.83	7.13	1.88	0	.23

Year total 7,883.80 cfs-days Mean 21.6 cfs

Note: All flow is from the Millstone River. There were no diversions by New Jersey from the Delaware River during the year.

Table 9. - Daily discharge, in cubic feet per second, of Delaware River at Trenton, N.J. (01463500) for the year ending November 30, 1985. Preliminary U.S. Geological Survey record.

Mean values

Day	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	7,230	12,100	3,830	12,900	6,530	4,280	7,890	4,270	5,800	3,390	26,700	5,560
2	8,620	11,600	3,900	11,200	7,550	4,260	8,490	4,440	5,720	3,570	18,900	5,380
3	7,050	11,200	3,780	10,200	8,950	10,100	7,920	4,210	5,930	3,620	16,700	6,680
4	7,330	10,500	3,560	9,050	9,610	19,700	7,750	3,960	5,650	3,410	15,000	6,600
5	7,110	9,860	3,180	8,580	8,890	18,400	7,650	3,640	4,820	3,080	13,800	7,080
6	8,090	9,000	3,180	8,850	8,300	14,600	8,050	3,440	4,080	2,500	13,500	8,550
7	9,140	8,020	3,920	8,720	8,220	12,400	8,510	3,460	3,470	2,360	19,600	9,760
8	8,150	7,570	4,090	9,320	7,930	10,800	7,490	4,310	3,980	2,690	16,600	10,200
9	6,050	7,380	3,470	8,870	8,420	9,610	7,040	4,200	4,530	3,030	12,900	8,760
10	5,280	6,220	3,140	8,770	8,970	8,640	6,300	4,620	4,000	3,040	10,300	7,050
11	5,040	5,410	3,060	8,290	8,810	7,690	5,200	4,330	3,910	3,600	8,870	6,220
12	5,100	5,340	5,380	8,280	7,950	7,060	4,980	3,780	3,920	5,880	8,020	5,840
13	5,040	5,220	12,800	12,000	7,440	6,570	4,960	3,920	3,430	4,670	7,570	6,860
14	5,090	5,420	10,600	23,300	7,100	6,310	4,660	4,800	3,280	3,640	7,100	9,160
15	5,270	5,070	8,820	18,500	6,630	5,490	4,380	5,650	3,090	2,980	6,880	10,900
16	5,770	5,830	7,870	15,400	6,410	5,010	5,050	6,720	2,960	2,550	7,020	14,200
17	6,070	4,600	7,070	13,200	6,340	4,740	8,680	7,180	2,890	2,290	6,730	37,800
18	5,890	4,570	6,560	11,200	6,140	8,220	8,780	6,760	3,070	2,100	6,410	45,900
19	5,640	4,490	6,010	10,300	5,960	8,240	8,620	5,430	3,180	2,710	6,080	39,800
20	5,640	4,800	5,580	9,930	5,730	8,030	7,190	4,430	2,950	2,970	5,940	30,900
21	5,670	4,170	5,270	8,600	5,720	8,010	5,790	3,880	2,830	2,990	5,880	25,000
22	7,540	3,110	5,200	8,860	5,830	7,640	4,920	3,330	2,710	2,950	5,680	22,400
23	10,200	3,240	5,770	8,420	5,690	7,000	4,580	3,280	2,700	2,970	5,570	22,900
24	11,400	4,990	7,220	8,310	5,380	6,050	4,490	4,960	2,600	2,790	5,410	20,200
25	11,900	5,530	10,100	7,610	5,280	5,420	4,570	5,140	2,590	2,810	5,770	18,200
26	9,780	4,550	16,700	7,240	5,250	4,930	4,730	5,070	4,160	2,750	6,640	16,800
27	8,740	4,390	19,000	7,790	5,240	4,550	4,790	7,870	3,500	22,900	6,970	21,000
28	7,910	4,200	15,200	6,500	5,140	4,330	4,590	8,020	3,510	65,400	6,750	28,200
29	7,970	4,040		6,070	4,920	4,330	4,470	5,650	3,390	62,500	6,080	38,000
30	9,490	3,860		6,040	4,520	6,230	4,160	4,630	2,940	38,000	5,840	35,900
31	11,900	3,820		6,110		7,690		4,340	2,980		5,740	
Total	231,100	190,100	194,260	308,410	204,850	246,330	186,680	149,720	114,570	270,140	300,950	531,800
Mean	7,455	6,132	6,938	9,949	6,828	7,946	6,223	4,830	3,696	9,005	9,708	17,730

Year total 2,928,910 cfs-days — Mean 8,024 cfs

Table 10. - Storage in Pepacton Reservoir, N.Y., for year ending November 30, 1985
(Storage in millions of gallons above elevation 1,152.00 ft. Add 7,711 million gallons for total contents above sill of outlet tunnel, elevation 1,126.50 ft.)
(River Master daily operations record; gage reading at 0900)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	73,368	75,175	67,127	65,225	80,124	89,344	83,710	75,454	66,436	54,050	54,809	63,078
2	73,641	75,241	66,782	65,531	80,671	89,272	83,766	75,110	66,117	53,659	55,147	63,318
3	73,836	75,268	66,424	65,726	81,154	89,169	83,640	74,702	65,788	53,393	55,461	63,510
4	74,085	75,255	66,008	65,873	81,581	89,082	83,499	74,308	65,409	53,105	55,742	63,665
5	74,203	75,189	65,653	66,399	82,037	88,952	83,345	73,888	65,031	52,884	56,060	63,725
6	74,295	75,110	65,274	66,992	82,635	88,837	83,136	73,485	64,619	52,575	57,458	63,821
7	74,321	75,018	64,922	67,399	83,025	88,620	82,955	73,316	64,208	52,310	58,167	63,917
8	74,269	74,847	64,534	67,821	83,640	88,317	82,747	72,977	63,833	52,025	58,513	64,063
9	74,203	74,637	64,123	68,320	84,243	88,100	82,552	72,613	63,438	51,773	58,697	64,147
10	74,098	74,400	63,749	68,744	84,791	87,797	82,287	72,266	63,006	51,697	58,858	64,413
11	74,019	74,137	63,342	69,172	85,244	87,466	81,995	71,957	62,588	51,532	58,939	64,740
12	74,006	73,810	63,006	69,789	85,684	87,180	81,692	71,545	62,161	51,302	59,020	65,018
13	73,980	73,537	62,899	71,122	86,080	86,880	81,457	71,957	61,722	51,052	59,321	65,494
14	74,032	73,329	62,779	72,060	86,451	86,594	81,181	71,828	61,297	50,781	59,717	66,105
15	74,059	73,094	62,636	72,925	86,823	86,265	80,864	71,699	60,921	50,509	60,066	67,288
16	74,085	72,782	62,493	73,628	87,180	85,910	80,575	71,622	60,534	50,259	60,252	68,358
17	74,111	72,471	62,268	74,256	87,509	85,599	80,315	71,455	60,112	50,011	60,334	70,333
18	74,111	72,137	62,078	74,847	87,811	85,627	80,042	71,237	59,705	50,033	60,404	72,278
19	74,072	71,815	61,877	75,401	88,086	85,726	79,769	70,919	59,251	50,065	60,451	73,537
20	74,151	71,429	61,627	75,892	88,533	85,684	79,441	70,588	58,824	50,076	60,921	74,518
21	74,164	71,020	61,380	76,329	88,923	85,570	79,060	70,231	58,375	50,097	61,262	75,308
22	74,256	70,651	61,145	76,689	89,242	85,429	78,681	69,889	57,972	50,108	61,403	76,051
23	74,597	70,308	61,015	77,038	89,534	85,216	78,289	69,499	57,515	50,119	61,485	76,837
24	74,768	69,965	61,344	77,360	89,651	85,032	77,896	69,121	57,081	50,140	61,544	77,534
25	74,296	69,650	62,529	77,668	89,651	84,791	77,507	68,744	56,717	50,162	61,758	78,086
26	74,926	69,310	63,534	77,937	89,651	84,496	77,105	68,382	56,354	50,162	61,936	78,587
27	74,926	68,958	64,292	78,194	89,651	84,215	76,689	68,121	55,946	50,433	62,280	79,523
28	74,900	68,619	64,837	78,451	89,607	84,103	76,276	67,747	55,517	52,873	62,576	80,425
29	74,860	68,245		78,776	89,490	84,103	76,011	67,325	55,124	53,827	62,719	81,416
30	75,044	67,859		79,209	89,432	83,921	75,772	66,992	54,686	54,384	62,863	82,329
31	75,123	67,498		79,619		83,696		66,584	54,417		62,994	
Change	+2,068	-7,625	-2,661	+14,782	+9,813	-5,736	-7,924	-9,188	-12,167	-33	+8,610	+19,335
Equiv. mgd	+66.7	-246.0	-95.0	+476.8	+327.1	-185.0	-264.1	-296.4	-392.5	-1.10	+277.7	+644.5
Equiv. cfs	+103	-381	+147	+738	+506	-286	-409	-459	-607	-1.70	+430	+997

Change for year +9,274 million gallons   Equiv. for year + 25.4 mgd   Equiv. for year +39.3 cfs

Table 11. - Storage in Cannonsville Reservoir, N.Y., for year ending November 30, 1985
(Storage in millions of gallons above elevation 1,040.00 ft. Add 2,584 million gallons for total contents above sill of outlet tunnel, elevation 1,020.50 ft.)
(River Master daily operations record; gage reading at 0900)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	25,536	44,811	48,859	50,041	57,862	59,499	63,345	65,103	61,957	60,964	61,231	59,340
2	26,183	45,490	48,570	50,647	58,094	59,523	63,701	65,179	62,059	61,001	61,333	59,120
3	26,711	46,168	48,314	51,091	58,265	59,560	63,982	64,962	62,123	61,014	61,396	58,851
4	27,289	46,791	48,092	51,464	58,558	59,499	64,224	64,695	62,161	60,622	61,345	58,595
5	27,800	47,280	47,769	51,569	58,876	59,486	64,428	64,542	62,135	60,463	61,294	58,387
6	28,217	47,680	47,514	51,872	59,083	59,486	64,466	64,198	62,097	60,243	61,651	58,204
7	28,810	48,114	47,024	51,989	59,291	59,547	64,670	64,058	61,995	60,048	61,868	57,924
8	29,237	48,503	46,646	52,059	59,413	59,743	64,810	63,918	61,881	59,865	61,932	57,716
9	29,709	48,848	46,346	52,187	59,608	59,889	64,975	63,943	61,804	59,743	61,893	57,484
10	30,182	49,015	46,023	52,327	59,706	60,036	65,115	63,778	61,740	59,767	61,817	57,215
11	30,636	49,247	45,701	52,455	59,755	60,158	65,230	63,587	61,702	59,853	61,689	57,057
12	31,230	49,434	45,456	52,759	59,767	60,304	65,383	63,116	61,638	59,914	61,511	57,069
13	31,823	49,679	45,345	54,428	59,718	60,427	65,268	63,027	61,588	59,865	61,333	57,264
14	32,537	49,936	45,056	55,555	59,670	60,390	65,395	62,963	61,588	59,743	61,294	57,850
15	33,232	50,041	44,811	56,458	59,584	60,219	65,510	62,886	61,600	59,584	61,180	58,803
16	33,992	50,157	44,645	57,081	59,450	60,011	65,663	62,861	61,549	59,450	61,078	59,926
17	34,577	50,321	44,422	57,569	59,315	60,109	65,764	62,912	61,562	59,303	60,964	61,651
18	35,201	50,472	44,166	57,924	59,144	60,451	65,943	62,670	61,575	58,888	60,744	63,740
19	35,746	50,671	43,966	58,168	58,937	60,854	66,083	62,581	61,588	58,461	60,573	64,975
20	36,360	50,858	43,733	58,302	58,913	61,180	65,955	62,556	61,575	57,936	60,610	65,854
21	36,984	50,998	43,533	58,449	58,839	61,486	65,981	62,454	61,575	57,411	60,597	66,516
22	37,628	51,103	43,340	58,473	58,754	61,524	65,777	62,403	61,371	56,959	60,500	66,949
23	38,696	51,161	43,288	58,449	58,595	61,613	65,637	62,352	61,205	56,385	60,378	67,370
24	39,484	50,963	43,744	58,436	58,717	61,791	65,675	62,148	61,014	55,970	60,414	67,702
25	40,199	50,531	45,501	58,400	58,839	61,957	65,612	62,059	61,014	55,457	60,366	67,900
26	40,871	50,216	47,258	58,253	58,986	62,123	65,637	62,059	61,040	54,944	60,366	68,033
27	41,428	49,936	48,403	58,131	59,132	62,225	65,370	62,110	61,091	55,091	60,268	68,470
28	41,953	49,784	49,329	57,985	59,267	62,479	65,103	62,059	60,964	58,754	60,097	69,225
29	42,542	49,620		57,924	59,364	62,861	64,937	62,021	60,964	60,451	59,963	69,834
30	43,319	49,457		57,862	59,438	63,154	64,988	61,957	60,927	60,976	59,755	70,496
31	44,144	49,015		57,826		62,976		61,791	60,952		59,535	
Change	+19,340	+4,871	+314	+8,497	+1,612	+3,538	+2,012	-3,197	-839	+24	-1,441	+10,961
Equiv. mgd	+623.9	+157.1	+11.2	+274.1	+53.7	-114.1	+67.1	-103.1	-27.1	+.80	-46.5	+365.4
Equiv. cfs	+965	+243	+17.3	+424	+83.1	+177	+104	-160	-41.9	+1.24	-71.9	+565

Change for year +45,692 million gallons Equiv. for year +125.2 mgd Equiv. for year +193.7 cfs

Table 12. - Storage in Neversink Reservoir, N.Y. for year ending November 30, 1985
(Storage in millions of gallons above elevation 1,319.00. Add 525 million gallons for total contents above sill of outlet tunnel, elevation 1,314.00 ft.)
(River Master daily operation record; gage reading at 0900)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	12,432	12,335	12,912	14,797	18,366	19,239	19,752	18,907	19,862	19,854	21,329	23,067
2	12,427	12,381	12,956	14,911	18,412	19,235	19,756	18,889	20,016	19,844	21,389	23,016
3	12,381	12,427	12,995	15,022	18,388	19,253	19,745	18,853	20,083	19,818	21,443	22,968
4	12,369	12,447	13,019	15,123	18,395	19,289	19,734	18,810	20,098	19,785	21,469	22,905
5	12,335	12,456	13,039	15,232	18,391	19,300	19,715	18,746	20,113	19,759	21,538	22,866
6	12,295	12,432	13,078	15,412	18,412	19,304	19,708	18,668	20,127	19,748	21,711	22,902
7	12,258	12,424	13,111	15,522	18,518	19,362	19,668	18,604	20,127	19,708	21,791	22,909
8	12,153	12,435	13,140	15,632	18,568	19,322	19,642	18,547	20,172	19,653	21,841	22,902
9	12,085	12,378	13,155	15,752	18,675	19,308	19,624	18,479	20,227	19,606	21,876	22,874
10	12,037	12,292	13,182	15,853	18,750	19,300	19,602	18,412	20,235	19,726	21,907	22,839
11	11,972	12,241	13,215	15,962	18,832	19,289	19,569	18,342	20,231	19,752	21,926	22,823
12	11,922	12,187	13,226	16,212	18,886	19,279	19,525	18,275	20,220	19,745	21,938	22,847
13	11,871	12,136	13,238	17,063	18,936	19,289	19,504	18,636	20,198	19,719	21,973	22,953
14	11,860	12,087	13,397	17,322	18,997	19,319	19,475	18,771	20,176	19,682	22,015	23,052
15	11,854	12,127	13,409	17,587	19,037	19,322	19,435	18,864	20,153	19,635	22,054	23,262
16	11,832	12,187	13,451	17,781	19,062	19,315	19,409	18,994	20,150	19,591	22,166	23,413
17	11,801	12,241	13,496	17,963	19,091	19,308	19,388	19,098	20,120	19,551	22,217	23,785
18	11,787	12,298	13,544	18,130	19,102	19,402	19,377	19,130	20,098	19,522	22,260	24,348
19	11,773	12,364	13,592	18,250	19,109	19,554	19,362	19,127	20,068	19,471	22,283	24,662
20	11,793	12,421	13,647	18,395	19,130	19,617	19,319	19,112	20,035	19,431	22,353	24,912
21	11,790	12,458	13,668	18,501	19,174	19,650	19,286	19,087	20,005	19,380	22,377	25,085
22	11,801	12,502	13,692	18,472	19,184	19,668	19,231	19,311	19,957	19,344	22,412	25,209
23	11,941	12,563	13,759	18,426	19,217	19,671	19,174	19,380	19,917	19,289	22,431	25,341
24	12,026	12,597	13,835	18,359	19,250	19,671	19,127	19,388	19,862	19,250	22,509	25,449
25	12,062	12,635	14,095	18,331	19,271	19,668	19,069	19,377	19,847	19,210	22,819	25,520
26	12,054	12,690	14,352	18,246	19,217	19,661	19,008	19,388	19,865	19,159	23,059	25,587
27	12,028	12,725	14,514	18,197	19,231	19,635	18,932	19,536	19,895	19,206	23,059	25,808
28	12,023	12,769	14,671	18,158	19,231	19,631	18,868	19,602	19,858	20,806	23,067	26,110
29	12,056	12,801		18,208	19,250	19,719	18,846	19,620	19,836	21,120	23,095	26,371
30	12,212	12,833		18,303	19,242	19,734	18,904	19,620	19,800	21,249	23,139	26,536
31	12,275	12,866		18,363		19,726		19,613	19,840		23,103	
Change	-114	+591	+1,805	+3,692	+879	+484	-822	+709	+227	+1,409	+1,854	+3,433
Equiv. mgd	-3.68	+19.1	+64.5	+119.1	+29.3	+15.6	-27.4	+22.9	+7.32	+47.0	+59.8	+114.4
Equiv. cfs	-5.69	+29.5	+99.7	+184	+45.3	+24.1	-42.4	+35.4	+11.3	+72.7	+92.5	+177

Change for year +14,147 million gallons Equiv. for year +38.8 mgd Equiv. for year +60.0 cfs

Table 13. - Diversions to New York City water supply
Million gallons per day for 24-hour period beginning 0900 local time
(River Master daily operation record)

Date 1984	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date June 1, 1984 to date	Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date June 1, 1984 to Jan. 22 or Jan. 23-31, 1985
Dec. 1	453	202	115	728	Jan. 1	451	0	117	709
2	452	201	121	728	2	445	0	117	708
3	449	201	119	728	3	450	0	113	707
4	448	201	113	729	4	451	0	124	707
5	449	202	113	729	5	452	0	124	706
6	451	1	98	728	6	452	0	107	705
7	451	0	149	727	7	451	0	110	705
8	450	0	120	726	8	451	0	111	704
9	450	0	91	725	9	450	0	123	703
10	449	0	120	725	10	450	0	113	703
11	449	0	118	724	11	450	0	119	702
12	448	0	103	723	12	450	0	109	702
13	449	0	116	722	13	449	0	107	701
14	450	0	113	721	14	450	163	26	701
15	451	0	114	721	15	451	47	0	700
16	451	0	126	720	16	451	0	0	699
17	451	0	115	719	17	449	0	0	698
18	450	0	118	718	18	449	0	0	697
19	450	0	115	718	19	449	0	0	695
20	450	0	121	717	20	448	0	0	694
21	450	0	136	716	21	449	0	0	693
22	450	0	117	715	22	451	0	0	692
23	451	0	90	715	23	452	178	0	630
24	451	0	116	714	24	451	214	0	648
25	450	0	113	713	25	451	216	0	654
26	450	0	120	712	26	450	216	0	657
27	451	0	116	712	27	450	215	0	659
28	451	0	120	711	28	450	213	0	659
29	451	0	120	710	29	450	213	0	660
30	451	0	129	710	30	449	364	0	679
31	451	0	114	709	31	449	210	0	677
Total	13,958	1,008	3,609			13,951	2,249	1,520	

Table 13. - Diversions to New York City water supply
Million gallons per day for 24-hour period beginning 0900 local time
(River Master daily operation record)

Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date Jan. 23 to Feb.6 or Feb. 7-28	Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date Feb. 7, 1985 to date
Feb. 1	451	210	0	675	Mar. 1	338	212	0	554
2	451	210	0	674	2	338	212	0	554
3	451	209	0	673	3	326	213	0	554
4	450	210	0	672	4	95	471	0	554
5	448	211	0	671	5	4	475	0	551
6	450	349	0	679	6	0	475	0	549
7	450	99	0	549	7	0	473	0	546
8	450	0	0	500	8	0	476	0	544
9	450	0	0	483	9	0	476	0	541
10	450	0	0	475	10	0	476	0	539
11	367	0	0	453	11	0	476	0	538
12	336	0	0	434	12	0	477	0	536
13	354	230	0	455	13	0	478	49	535
14	330	357	0	484	14	0	480	8	534
15	330	331	0	504	15	0	480	5	533
16	330	324	0	519	16	0	481	2	532
17	330	323	0	531	17	0	481	0	530
18	330	322	0	541	18	0	482	0	529
19	351	325	0	551	19	0	482	0	528
20	338	322	0	559	20	0	482	0	527
21	339	209	0	558	21	0	482	144	529
22	338	210	0	558	22	0	481	158	532
23	338	210	0	557	23	0	481	196	535
24	338	210	0	557	24	0	481	137	537
25	336	212	0	556	25	0	481	164	539
26	329	214	0	556	26	0	481	149	541
27	331	214	0	555	27	0	481	143	543
28	333	212	0	555	28	0	480	153	544
29					29	0	478	145	546
					30	0	477	136	547
					31	0	477	199	550
Total	10,579	5,723	0			1,101	14,038	1,788	

Table 13. - Diversions to New York City water supply
Million gallons per day for 24-hour period beginning 0900 local time
April 1 to May 1, 1985; 0800 May 2-31, 1985
(River Master daily operation record)

Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date Feb. 7, 1985 to date	Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date Feb. 7, 1985 to date
Apr. 1	0	478	133	551	May 1	280	167	66	555
2	0	478	175	553	2	302	169	68	555
3	0	358	152	552	3	297	170	62	554
4	15	326	153	551	4	296	170	57	554
5	75	446	166	553	5	297	169	64	554
6	0	479	158	555	6	454	171	66	555
7	0	480	155	556	7	452	0	62	555
8	0	481	68	556	8	450	0	68	554
9	0	481	66	556	9	450	0	64	554
10	0	482	65	556	10	450	0	63	554
11	0	482	67	555	11	451	0	69	553
12	0	482	71	555	12	451	0	65	553
13	0	481	66	555	13	450	192	67	554
14	0	481	78	555	14	452	281	64	557
15	0	479	91	556	15	449	286	67	559
16	0	478	92	556	16	450	0	74	559
17	0	479	90	556	17	450	0	65	559
18	0	478	95	556	18	450	0	66	558
19	2	478	89	556	19	450	0	64	558
20	0	478	91	557	20	451	0	66	557
21	0	478	90	557	21	451	195	67	559
22	20	475	64	557	22	450	76	65	559
23	259	169	70	556	23	448	0	70	559
24	299	164	67	556	24	449	0	69	558
25	330	168	140	557	25	449	0	72	558
26	292	168	65	556	26	449	0	69	558
27	296	167	68	556	27	450	0	73	557
28	312	167	62	556	28	452	0	72	557
29	306	170	65	556	29	451	0	74	557
30	302	171	65	555	30	451	371	75	560
					31	452	27	73	560
Total	2,508	11,582	2,877			13,184	2,444	2,086	

Table 13. - Diversions to New York City water supply
Million gallons per day for 24-hour period beginning 0800 local time
(River Master daily operation record)

Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date Feb. 7, 1985 to date	Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date Feb. 7 to July 24 or July 25 - 31, 1985
June 1	451	0	74	559	July 1	449	0	66	558
2	452	0	75	559	2	452	224	72	559
3	448	0	69	559	3	451	81	66	560
4	449	0	73	558	4	451	0	66	559
5	448	167	71	560	5	451	0	71	559
6	449	0	71	559	6	451	0	70	559
7	447	0	67	559	7	451	0	64	558
8	447	0	68	558	8	447	0	67	558
9	446	0	68	558	9	446	0	66	558
10	453	0	72	558	10	449	201	75	559
11	455	0	84	557	11	449	102	68	559
12	452	267	52	559	12	451	0	69	559
13	451	0	68	559	13	451	0	65	559
14	451	0	70	559	14	451	0	70	559
15	450	0	75	559	15	450	0	67	558
16	451	0	74	558	16	449	0	70	558
17	448	0	73	558	17	450	264	69	559
18	449	0	66	558	18	450	78	72	560
19	449	283	68	559	19	450	0	71	559
20	450	0	70	559	20	450	0	71	559
21	450	0	64	559	21	451	0	69	559
22	450	0	77	559	22	450	0	74	559
23	450	0	66	558	23	450	250	68	560
24	450	0	69	558	24	449	64	71	560
25	451	0	65	558	25	451	0	71	522
26	450	285	68	559	26	450	0	69	520
27	451	0	66	559	27	450	0	69	520
28	450	0	70	559	28	450	0	69	520
29	450	0	68	559	29	393	0	70	508
30	449	0	63	558	30	451	152	69	536
					31	450	37	68	538
Total	13,497	1,002	2,084			13,894	1,408	2,142	

Table 13. - Diversions to New York City water supply
Million gallons per day for 24-hour period beginning 0800 local time
(River Master daily operation record)

Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date July 25, 1985 to date	Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date July 25, 1985 to date
Aug. 1	450	0	67	536	Sept. 1	453	0	63	536
2	450	0	77	535	2	300	0	65	532
3	450	0	71	533	3	299	453	64	539
4	450	0	71	532	4	265	185	63	538
5	448	0	62	530	5	337	174	65	539
6	451	0	69	530	6	310	174	65	540
7	448	129	69	538	7	271	174	68	539
8	451	32	70	539	8	271	173	66	538
9	450	0	66	538	9	318	171	67	539
10	450	0	69	536	10	319	175	63	539
11	451	0	68	535	11	313	50	63	537
12	450	0	67	534	12	302	148	64	536
13	451	0	70	534	13	297	182	62	536
14	451	0	69	533	14	297	181	67	537
15	449	74	69	536	15	297	181	63	537
16	449	0	79	535	16	301	174	64	537
17	448	0	54	534	17	0	450	62	536
18	448	0	67	533	18	0	463	67	536
19	447	0	64	532	19	0	483	63	536
20	445	0	65	532	20	0	482	72	537
21	446	200	67	538	21	0	482	64	537
22	448	0	65	537	22	0	481	68	537
23	445	0	65	536	23	0	480	64	537
24	447	0	63	535	24	0	480	66	537
25	447	0	68	535	25	0	480	70	537
26	454	0	63	534	26	0	479	65	538
27	455	171	65	539	27	0	482	66	538
28	454	11	63	539	28	0	483	63	538
29	454	0	64	538	29	0	483	64	538
30	454	0	64	537	30	0	485	66	538
31	454	0	65	537	31				
Total	13,945	617	2,075			4,950	9,288	1,952	

Table 13. - Diversions to New York City water supply
Million gallons per day for 24-hour period beginning 0800 local time
(River Master daily operation record)

Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date July 25 to Oct. 2 Oct. 3-31, 1985	Date 1985	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average to date Nov. 1-30, 1985
Oct. 1	0	484	65	538	Nov. 1	0	486	144	630
2	0	484	64	538	2	0	485	137	626
3	0	485	86	571	3	0	485	139	625
4	0	484	46	550	4	193	482	140	673
5	0	485	64	550	5	193	482	120	697
6	0	485	62	549	6	207	482	121	716
7	226	485	68	595	7	168	482	121	724
8	226	486	66	626	8	184	483	133	733
9	225	485	63	647	9	0	482	116	718
10	225	485	63	662	10	0	482	127	707
11	226	485	65	675	11	185	482	119	715
12	0	486	68	663	12	189	482	126	721
13	0	486	60	652	13	189	362	119	717
14	0	486	63	644	14	192	446	121	720
15	222	487	63	654	15	190	474	124	725
16	226	486	65	662	16	0	474	124	717
17	224	485	63	670	17	0	475	124	710
18	226	465	68	675	18	193	489	120	715
19	0	485	67	668	19	189	490	118	719
20	0	485	61	661	20	191	491	116	723
21	226	486	63	667	21	30	492	123	720
22	223	485	62	672	22	0	492	114	714
23	226	290	0	665	23	0	492	114	710
24	226	485	0	667	24	0	492	114	705
25	225	489	0	669	25	0	492	116	702
26	0	508	177	670	26	0	492	72	696
27	0	488	132	668	27	0	492	92	692
28	132	488	75	669	28	0	492	123	689
29	121	487	74	669	29	0	493	124	687
30	122	486	128	672	30	0	493	122	684
31	122	486	139	674	31				
Total	3,649	14,862	2,140			2,493	14,418	3,623	

Table 14.-- New York City Reservoir release design data

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack cfs	Powerplant release forecasts: Mongaup Reservoir cfs	Uncontrolled runoff: Present conditions cfs	Uncontrolled runoff: Weather adjustment cfs	Date	Discharge cfs	Directed release cfs
1984/85	1	2	3	4		5	6
MONTAGUE DESIGN RATE 1,750 CFS DECEMBER 1, 1984 TO JANUARY 22, 1985 AND 1,655 CFS JANUARY 23 TO FEBRUARY 6							
Nov. 28	0	0	538	489	Dec. 1	1,027	723
December 2, 1984 to January 12, 1985 estimated Montague discharge was greater than the design rate							
Jan. 10	0	0	1,560	0	Jan.13	1,560	190
11	0	54	1,450	0	14	1,504	246
January 15-20 estimated Montague discharge was greater than the design rate							
Jan. 17	223	0	1,327	0	21	1,550	200
18	239	130	1,206	0	22	1,575	175
19	239	130	1,150	0	23	1,519	231
20	239	130	1,130	0	23	1,499	156
21	239	130	1,101	0	24	1,470	185
22	239	130	950	0	25	1,319	336
23	239	130	631	0	26	1,000	655
24	0	0	1,143	0	27	1,143	512
25	0	43	1,191	0	28	1,234	421
26	0	194	1,180	0	29	1,374	281
27	0	194	1,270	0	30	1,464	191
28	0	194	1,250	0	31	1,444	211

Col. 1 - Furnished by power company.
Col. 2 - Furnished by power company.
Col. 3 - Computed from index stations.
Col. 4 - Computed increase in runoff based on weather forecasts.

Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4.
Col. 6 = Design rate - Col. 5 but not less than zero.

Note: Computational transit time from New York reservoirs to Montague was increased 24 hours Jan. 18-23 (Montague dates); Some data adjusted to preserve budget balance.

Table 14.-- New York City Reservoir release design data - continued

(River Master daily operation record)

Date of advance esti-mate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack cfs	Mongaup Reservoir cfs	Uncontrolled runoff: Present conditions cfs	Weather adjustment cfs	Date	Dis-charge cfs	Directed release cfs
1985	1	2	3	4		5	6
Jan. 29	0	194	1,200	0	Feb. 1	1,394	261
30	0	151	1,292	0	2	1,443	212
31	0	0	1,300	0	3	1,300	355
Feb. 1	0	76	1,200	0	4	1,276	379
2	0	270	1,100	0	5	1,370	285
3	0	270	1,000	0	6	1,270	385
MONTAGUE DESIGN RATE = 1,550 CFS FEBRUARY 7 TO JULY 27							
4	0	270	950	0	7	1,220	330
5	0	270	800	0	8	1,070	480
6	0	194	850	0	9	1,044	506
7	0	0	790	0	10	790	760
8	0	0	820	0	11	820	730
9	0	0	760	0	12	760	790
10	0	0	850	0	13	850	700
11	0	0	950	0	14	950	600
12	0	0	1,050	0	15	1,050	500
13	0	0	1,280	0	16	1,280	270
14	0	0	1,550	0	17	1,550	0
15	0	0	1,630	0	18	1,630	0
16	0	0	1,600	0	19	1,600	0
17	0	0	1,550	0	20	1,550	0
18	0	0	1,550	0	21	1,550	0
19	0	0	1,440	0	22	1,440	110
20	0	0	1,250	0	23	1,250	300
February 24 to May 17 estimated Montague discharge was greater than the design rate							

Col. 1 - Furnished by power company.
Col. 2 - Furnished by power company.
Col. 3 - Computed from index stations.
Col. 4 - Computed increase in runoff based on weather forecasts.

Col. 5 - Col. 1 + Col. 2 + Col. 3 + Col. 4.
Col. 6 = Design rate - Col. 5 but not less than zero.

Table 14.-- New York City Reservoir release design data - continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases						Directed release
	Powerplant release forecasts		Uncontrolled runoff		Date	Discharge	
	Lake Wallenpaupack cfs	Mongaup Reservoir cfs	Present conditions cfs	Weather adjustment cfs		cfs	cfs
1985	1	2	3	4		5	6
May 15	0	0	1,271	189	May 18	1,460	90
16	0	0	1,179	238	19	1,417	133
17	0	0	1,278	178	20	1,456	94
18	0	0	3,170	0	21	3,170	0
19	0	0	2,771	12	22	2,783	0
20	0	0	2,559	171	23	2,730	0
21	0	0	2,167	38	24	2,205	0
22	0	0	1,830	0	25	1,830	0
23	0	0	1,585	0	26	1,585	0
24	0	0	1,489	0	27	1,489	61
25	0	0	1,328	86	28	1,414	136
26	0	0	1,213	233	29	1,446	104
	May 30 to June 13 estimated Montague discharge was greater than the design rate						
June 11	0	259	1,128	117	14	1,504	46
12	212	194	1,070	15	15	1,491	59
13	409	0	1,082	0	16	1,491	59
14	411	0	1,041	40	17	1,492	58
15	470	0	942	413	18	1,840	0
16	470	0	1,059	182	19	1,711	0
17	117	0	1,263	155	20	1,535	15
18	176	0	1,339	0	21	1,515	35
19	255	0	1,236	0	22	1,491	59
20	0	0	1,009	33	23	1,042	508
21	0	0	876	57	24	933	617
22	470	0	820	0	25	1,290	260
23	470	0	790	0	26	1,260	290
24	540	130	681	37	27	1,388	162
25	470	130	776	0	28	1,376	174
26	528	97	763	0	29	1,388	162
27	0	0	726	34	30	760	790

Col. 1 - Furnished by power company.
Col. 2 - Furnished by power company.
Col. 3 - Computed from index stations.
Col. 4 - Computed increase in runoff based on weather forecasts.

Col. 5 - Col. 1 + Col. 2 + Col. 3 + Col. 4.
Col. 6 = Design rate - Col. 5 but not less than zero.

Table 14.-- New York City Reservoir release design data - continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack cfs	Mongaup Reservoir cfs	Uncontrolled runoff: Present conditions cfs	Weather adjustment cfs	Date	Discharge cfs	Directed release cfs
1985	1	2	3	4		5	6
June 28	0	65	668	209	July 1	942	608
29	0	173	827	521	2	1,521	29
30	181	173	1,113	24	3	1,491	59
July 1	300	173	959	59	4	1,491	59
2	0	173	719	0	5	892	658
3	294	108	812	0	6	1,214	336
4	0	0	693	0	7	693	857
5	0	0	608	65	8	673	877
6	294	0	612	197	9	1,103	447
7	294	0	784	8	10	1,086	464
8	294	0	721	60	11	1,066	484
9	558	0	674	83	12	1,315	235
10	646	0	640	20	13	1,306	244
11	0	0	646	0	14	646	904
12	0	0	613	311	15	924	626
13	0	0	1,472	181	16	1,653	0
14	0	0	1,072	255	17	1,327	223
15	0	0	1,425	347	18	1,772	0
16	0	259	2,089	0	19	2,348	0
17	0	194	1,593	0	20	1,787	0
18	0	0	1,316	0	21	1,316	234
19	0	0	1,036	33	22	1,069	481
20	470	0	873	0	23	1,343	207
21	558	0	700	38	24	1,296	254
22	705	0	3,104	0	25	3,809	0
23	1,235	275	1,840	0	26	3,350	0
24	705	0	1,446	169	27	2,320	0
MONTAGUE DESIGN RATE 1,350 CFS JULY 28 TO AUGUST 31							
25	0	0	1,127	444	28	1,571	0
26	0	0	1,042	532	29	1,576	0
27	0	0	1,389	0	30	1,389	0
28	471	0	1,310	0	31	1,781	0

Col. 1 - Furnished by power company.
Col. 2 - Furnished by power company.
Col. 3 - Computed from index stations.
Col. 4 - Computed increase in runoff based on weather forecasts.

Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4.
Col. 6 = Design rate - Col. 5 but not less than zero.

Table 14.-- New York City Reservoir release design data - continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack cfs	Powerplant release forecasts: Mongaup Reservoir cfs	Uncontrolled runoff: Present conditions cfs	Uncontrolled runoff: Weather adjustment cfs	Date	Discharge cfs	Directed release cfs
1985	1	2	3	4		5	6
July 29	471	0	1,013	0	Aug. 1	1,584	0
30	471	0	835	469	2	1,775	0
31	471	0	759	464	3	1,694	0
Aug. 1	0	0	1,723	0	4	1,723	0
2	0	0	1,290	0	5	1,290	60
3	472	324	1,084	0	6	1,880	0
4	472	389	939	0	7	1,800	0
5	472	389	804	51	8	1,716	0
6	354	389	742	41	9	1,526	0
7	354	259	582	51	10	1,246	104
8	0	389	753	0	11	1,107	243
9	0	389	765	0	12	1,154	196
10	354	216	704	0	13	1,274	76
11	354	281	627	7	14	1,269	81
12	354	259	577	0	15	1,190	160
13	413	259	570	48	16	1,290	60
14	473	227	568	7	17	1,275	75
15	355	130	615	147	18	1,247	103
16	355	162	688	85	19	1,290	60
17	413	259	659	22	20	1,353	0
18	413	259	568	0	21	1,240	110
19	590	130	526	0	22	1,246	104
20	590	130	519	0	23	1,239	111
21	651	130	488	0	24	1,269	81
22	355	130	285	0	25	770	580
23	355	130	516	0	26	1,001	349
24	414	130	423	326	27	1,293	57
25	414	130	530	219	28	1,293	57
26	415	130	699	49	29	1,293	57
27	415	130	737	0	30	1,282	68
28	474	130	634	14	31	1,252	98

Col. 1 - Furnished by power company.
Col. 2 - Furnished by power company.
Col. 3 - Computed from index stations.
Col. 4 - Computed increase in runoff based on weather forecasts.

Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4
Col. 6 = Design rate - Col. 5 but not less than 0.

Table 14.-- New York City Reservoir release design data - continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases						Indicated deficiency	Thermal release payback	Directed release
	Powerplant release forecasts		Uncontrolled runoff		Date	Dis-charge			
	Lake Wallenpaupack cfs	Mongaup Reservoir cfs	Present conditions cfs	Weather adjustment cfs		cfs	cfs	cfs	cfs
1985	1	2	3	4		5	6	7	8
MONTAGUE DESIGN RATE 1,300 CFS SEPTEMBER 1-12, 1,500 CFS SEPTEMBER 13 TO OCTOBER 4, 1,655 CFS OCTOBER 5-31, AND 1,700 CFS NOVEMBER 1-30									
Aug. 29	355	130	586	116	Sept. 1	1,187	113		113
30	355	130	549	110	2	1,144	156		156
31	177	130	956	0	3	1,263	37		37
Sept. 1	236	130	916	0	4	1,282	18		18
2	296	130	857	0	5	1,283	17		17
3	297	238	703	10	6	1,248	52		52
4	416	108	666	47	7	1,237	63		63
5	297	108	485	26	8	916	384		384
6	238	130	697	0	9	1,065	235		235
7	356	130	630	0	10	1,116	184		184
8	0	0	585	547	11	1,132	168		168
9	0	0	654	1,620	12	2,274	0		0
10	0	0	2,461	101	13	2,562	0		0
11	0	0	1,698	0	14	1,698	0		0
12	0	0	1,293	0	15	1,293	207	150	57
13	0	43	1,136	0	16	1,179	321	125	196
14	238	259	891	0	17	1,329	171	114	57
15	356	259	728	0	18	1,343	157	100	57
16	297	324	695	0	19	1,316	184	125	59
17	297	324	700	0	20	1,321	179	120	59
18	356	259	686	0	21	1,301	199	125	74
19	297	259	644	0	22	1,200	300	125	175
20	297	324	607	0	23	1,228	272	125	147
21	356	324	561	0	24	1,241	259	125	134
22	416	324	535	0	25	1,275	225	125	100
23	416	324	576	0	26	1,316	184	125	59
24	475	324	564	0	27	1,363	137	31	106
25	0	281	583	545	28	1,409	91		91
September 29 to November 30 estimated Montague discharge was greater than the design rate									

Col. 1 - Furnished by power company.
Col. 2 - Furnished by power company.
Col. 3 - Computed from index stations.
Col. 4 - Computed increase in runoff based on weather forecasts.
Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4
Col. 6 - Design rate - Col. 5.
Col. 7 - Thermal release payback per DRBC Conservation Order No. 7.
Col. 8 - Col. 6 - Col. 7.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J.
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases			Computed uncon-trolled	Total
									N.Y.C. reservoirs		Power-plants		
Date 1984	Amount								Directed	Other			
	1	2	3	4		5	6		7	8	9	10	11
Nov. 28	723	546	152	25	Nov. 30	0	0	Dec. 1	723	0	0	4,477	5,200
29	0	51	34	25	Dec. 1	0	0	2	0	110	0	4,150	4,260
30	0	56	34	25	2	0	65	3	0	115	65	3,800	3,980
Dec. 1	0	50	34	25	3	0	178	4	0	109	178	3,803	4,090
2	0	50	34	25	4	0	135	5	0	109	135	3,806	4,050
3	0	48	34	25	5	1,255	119	6	0	107	1,374	3,379	4,860
4	0	50	34	25	6	683	140	7	0	109	823	2,828	3,760
5	0	50	34	25	7	0	92	8	0	109	92	2,389	2,590
6	0	56	34	25	8	0	0	9	0	115	0	2,225	2,340
7	0	53	36	25	9	0	38	10	0	114	38	2,228	2,380
8	0	51	36	25	10	0	243	11	0	112	243	2,035	2,390
9	0	51	36	25	11	0	65	12	0	112	65	2,273	2,450
10	0	51	36	25	12	0	0	13	0	112	0	2,538	2,650
11	0	51	36	25	13	0	0	14	0	112	0	2,778	2,890
12	0	51	36	25	14	0	0	15	0	112	0	3,288	3,400
13	0	51	36	25	15	0	0	16	0	112	0	3,268	3,380
14	0	51	36	25	16	0	0	17	0	112	0	3,158	3,270
15	0	51	36	25	17	0	108	18	0	112	108	2,880	3,100
16	0	51	37	25	18	0	54	19	0	113	54	2,723	2,890
17	0	54	37	25	19	0	151	20	0	116	151	2,813	3,080
18	0	50	37	25	20	0	270	21	0	112	270	3,268	3,650
19	0	50	37	25	21	0	103	22	0	112	103	3,705	3,920
20	0	51	37	25	22	0	0	23	0	113	0	6,867	6,980
21	0	51	37	25	23	0	0	24	0	113	0	6,137	6,250
22	0	51	37	25	24	0	0	25	0	113	0	4,877	4,990
23	0	51	37	25	25	0	0	26	0	113	0	4,147	4,260
24	0	57	37	25	26	0	76	27	0	119	76	3,505	3,700
25	0	51	37	25	27	0	254	28	0	113	254	3,213	3,580
26	0	51	37	25	28	281	356	29	0	113	637	3,870	4,620
27	0	51	37	25	29	0	205	30	0	113	205	6,362	6,680
28	0	53	37	25	30	0	216	31	0	115	216	6,209	6,540
Total	723	2,090	1,229	775		2,219	2,868		723	3,371	5,087	112,999	122,180

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to Col. 1.
Col. 8 = Col. 2 + Col. 4 + Col. 4 - Col. 7.
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs: Directed, Date 1984/85	Directed: Amount (1)	Pepacton (2)	Cannonsville (3)	Neversink (4)	Controlled releases from power reservoirs: Date	Lake Wallenpaupack (5)	Mongaup Reservoir (6)	Delaware River at Montague, Segregation of flow: Date	Controlled releases, N.Y.C. reservoirs: Directed (7)	Controlled releases, N.Y.C. reservoirs: Other (8)	Controlled releases: Power-plants (9)	Computed uncon-trolled (10)	Total (11)
Dec. 29	0	51	37	25	Dec. 31	0	205	Jan. 1	0	113	205	5,182	5,500
30	0	51	37	25	Jan. 1	0	22	2	0	113	22	4,885	5,020
31	0	51	37	25	2	0	254	3	0	113	254	4,513	4,880
Jan. 1	0	50	37	25	3	0	313	4	0	112	313	3,905	4,330
2	0	50	37	25	4	0	238	5	0	112	238	3,560	3,910
3	0	51	37	25	5	0	0	6	0	113	0	3,177	3,290
4	0	51	37	25	6	0	97	7	0	113	97	3,050	3,260
5	0	51	37	25	7	166	248	8	0	113	414	2,863	3,390
6	0	51	37	25	8	255	254	9	0	113	509	2,078	2,700
7	0	51	37	25	9	249	286	10	0	113	535	1,352	2,000
8	0	53	37	25	10	236	286	11	0	115	522	1,163	1,800
9	0	50	37	25	11	224	243	12	0	112	467	1,821	2,400
10	190	54	121	25	12	0	0	13	200	0	0	1,800	2,000
11	246	184	37	25	13	2	32	14	246	0	34	2,020	2,300
12	0	53	37	25	14	240	265	15	0	115	505	1,780	2,400
13	0	50	37	25	15	227	216	16	0	112	443	1.645	2.200
14	0	48	37	25	16	236	221	17	0	110	457	1,533	2,100
					17	242	200	18			442	1,458	1,900
15	0	50	37	25	18	237	119	19	0	112	356	1,432	1,900
16	0	50	37	25	19	0	0	20	0	112	0	1,488	1,600
17	200	139	37	25	20	349	54	21	201	0	403	1,146	1,750
18	175	113	37	25	21	1,627	238	22	175	0	1,865	1,160	3,200
19-20	387	266	74	50	22	241	200	23	390	0	441	1,369	2,200
21	185	60	113	25	23	308	140	24	198	0	448	1,354	2,000
22	336	63	266	25	24	259	162	25	354	0	421	1,225	2,000
23	655	50	585	25	25	237	173	26	660	0	410	1,330	2,400
24	512	56	458	25	26	0	0	27	539	0	0	1,461	2,000
25	421	53	343	25	27	0	32	28	421	0	32	1,247	1,700
26	281	51	206	25	28	22	151	29	282	0	173	1,445	1,900
27	181	56	116	25	29	0	281	30	197	0	281	1,222	1,700
28	211	51	133	25	30	0	205	31	209	0	205	1,236	1,650
Total	3,990	2,058	3,155	775		5,357	5,135		4,072	1,916	10,492	64,900	81,380

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to Col. 1.
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9
Col. 11 - 24 hours of calendar day shown.

Note: Computational transmit time from New York reservoirs to Montague was increased 24 hours Jan. 18-23 (Montague dates); Some data adjusted to preserve budget balance.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Mongaup Reservoir	Date	Controlled releases			Computed uncontrolled	Total
									N.Y.C. reservoirs		Powerplants		
Date	Amount								Directed	Other			
1985	1	2	3	4		5	6		7	8	9	10	11
Jan. 29	261	53	193	25	Jan. 31	0	302	Feb. 1	271	0	302	1,027	1,600
30	212	50	156	6	Feb. 1	0	184	2	212	0	184	1,104	1,500
31	355	46	283	25	2	0	0	3	354		0	1,046	1,400
Feb. 1	379	56	308	25	3	99	70	4	389	0	169	942	1,500
2	285	53	207	25	4	244	227	5	285	0	471	1,194	1,950
3	385	53	309	25	5	243	324	6	387	0	567	796	1,750
4	330	50	257	25	6	0	200	7	332	0	200	1,018	1,550
5	480	57	405	25	7	0	151	8	487	0	151	812	1,450
6	506	50	430	25	8	227	140	9	505	0	367	878	1,750
7	760	53	684	25	9	0	0	10	762	0	0	888	1,650
8	730	51	653	25	10	0	59	11	729	0	59	962	1,750
9	790	51	710	25	11	0	200	12	786	0	200	1,114	2,100
10	700	53	622	25	12	0	11	13	700	0	11	1,689	2,400
11	600	53	529	25	13	0	119	14	607	0	119	2,174	2,900
12	500	51	424	23	14	0	0	15	498	0	0	2,402	2,900
13	270	48	218	5	15	0	0	16	271	0	0	2,429	2,700
14	0	8	8	5	16	0	103	17	0	21	103	2,176	2,300
15	0	6	9	5	17	0	0	18	0	20	0	1,880	1,900
16	0	6	9	5	18	0	0	19	0	20	0	1,680	1,700
17	0	6	9	5	19	0	173	20	0	20	173	1,557	1,750
18	0	6	9	5	20	0	22	21	0	20	22	1,608	1,650
19	110	54	37	23	21	0	0	22	114	0	0	1,436	1,550
20	300	50	226	22	22	0	0	23	298	0	0	1,652	1,950
21	0	8	9	5	23	0	0	24	0	22	0	4,378	4,400
22	0	6	9	5	24	0	0	25	0	20	0	9,580	9,600
23	0	6	9	5	25	0	0	26	0	20	0	11,480	11,500
24	0	6	9	5	26	0	65	27	0	20	65	8,655	8,740
25	0	6	9	5	27	0	232	28	0	20	232	6,728	6,980
Total	7,953	996	6,740	454		813	2,582		7,987	203	3,395	73,285	84,870

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to Col. 1.
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases			Computed uncon-trolled	Total
Date	Amount								N.Y.C. reservoirs		Power-plants		
									Directed	Other			
1985	1	2	3	4		5	6		7	8	9	10	11
Feb. 26	0	6	9	5	Feb. 29	0	238	Mar. 1	0	20	238	5,622	5,880
27	0	6	9	5	Mar. 1	252	281	2	0	20	533	4,597	5,150
28	0	6	9	5	2	0	0	3	0	20	0	4,240	4,260
Mar. 1	0	6	9	5	3	0	86	4	0	20	86	3,684	3,790
2	0	6	9	5	4	0	65	5	0	20	65	3,495	3,580
3	0	6	9	5	5	0	0	6	0	20	0	4,340	4,360
4	0	6	9	5	6	464	22	7	0	20	486	3,924	4,430
5	0	6	9	5	7	458	173	8	0	20	631	3,559	4,210
6	0	6	9	5	8	475	0	9	0	20	475	3,985	4,480
7	0	6	9	5	9	0	0	10	0	20	0	3,980	4,000
8	0	6	9	5	10	0	54	11	0	20	54	3,946	4,020
9	0	6	9	5	11	473	383	12	0	20	856	5,934	6,810
10	0	6	9	5	12	705	486	13	0	20	1,191	15,089	16,300
11	0	6	9	5	13	737	475	14	0	20	1,212	11,568	12,800
12	0	6	9	5	14	772	464	15	0	20	1,236	9,044	10,300
13	0	6	9	5	15	720	464	16	0	20	1,184	6,976	8,180
14	0	6	9	5	16	0	481	17	0	20	481	6,009	6,510
15	0	6	9	5	17	0	416	18	0	20	416	5,674	6,110
16	0	6	9	5	18	700	459	19	0	20	1,159	4,431	5,610
17	0	6	9	5	19	0	324	20	0	20	324	4,236	4,580
18	0	6	9	5	20	715	448	21	0	20	1,163	3,837	5,020
19	0	6	9	5	21	587	475	22	0	20	1,062	3,548	4,630
20	0	6	9	5	22	674	443	23	0	20	1,117	3,193	4,330
21	0	6	9	5	23	0	448	24	0	20	448	3,232	3,700
22	0	6	9	5	24	0	497	25	0	20	497	3,133	3,650
23	0	6	9	5	25	732	308	26	0	20	1,040	2,680	3,740
24	0	6	9	5	26	0	281	27	0	20	281	2,589	2,890
25	0	6	11	5	27	0	389	28	0	22	389	2,359	2,770
26	0	6	11	5	28	0	308	29	0	22	308	2,420	2,750
27	0	6	9	5	29	5	200	30	0	20	205	2,585	2,810
28	0	6	8	5	30	0	0	31	0	19	0	2,651	2,670
Total	0	186	282	155		8,469	8,668		0	623	17,137	146,560	164,320

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 8 = Col. 2 + Col. 3 + Col. 4.
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases N.Y.C. reservoirs Directed	Controlled releases N.Y.C. reservoirs Other	Power-plants	Computed uncon-trolled	Total
Date 1985	Amount 1	2	3	4		5	6		7	8	9	10	11
Mar. 29	0	6	8	5	Mar. 31	0	59	Apr. 1	0	19	59	3,262	3,340
30	0	6	8	5	Apr. 1	0	292	2	0	19	292	4,569	4,880
31	0	6	8	5	2	0	340	3	0	19	340	4,581	4,940
Apr. 1	0	6	8	5	3	0	362	4	0	19	362	4,129	4,510
2	0	6	8	5	4	0	351	5	0	19	351	3,890	4,260
3	0	6	8	5	5	0	248	6	0	19	248	3,823	4,090
4	0	6	8	5	6	0	0	7	0	19	0	3,771	3,790
5	0	6	8	5	7	0	65	8	0	19	65	4,156	4,240
6	0	6	8	15	8	237	292	9	0	29	529	4,432	4,990
7	0	19	8	15	9	329	259	10	0	42	588	3,950	4,580
8	0	19	8	15	10	0	200	11	0	42	200	3,738	3,980
9	0	19	8	15	11	0	248	12	0	42	248	3,480	3,770
10	0	20	8	15	12	0	184	13	0	43	184	3,223	3,450
11	0	19	8	15	13	0	0	14	0	42	0	3,038	3,080
12	0	19	8	15	14	7	70	15	0	42	77	2,941	3,060
13	0	19	8	15	15	8	140	16	0	42	148	2,910	3,100
14	0	19	14	15	16	0	108	17	0	48	108	2,794	2,950
15	0	19	25	15	17	0	232	18	0	59	232	2,559	2,850
16	0	19	25	15	18	0	194	19	0	59	194	2,377	2,630
17	0	19	25	15	19	0	130	20	0	59	130	2,510	2,690
18	0	17	25	15	20	0	0	21	0	57	0	2,773	2,830
19	0	19	25	15	21	0	32	22	0	59	32	2,599	2,690
20	0	19	25	15	22	0	162	23	0	59	162	2,369	2,590
21	0	19	25	15	23	0	162	24	0	59	162	2,269	2,490
22	0	19	25	15	24	99	162	25	0	59	261	2,250	2,570
23	0	19	25	15	25	0	173	26	0	59	173	2,318	2,550
24	0	19	25	15	26	0	130	27	0	59	130	2,281	2,470
25	0	19	25	15	27	0	0	28	0	59	0	2,151	2,210
26	0	19	25	15	28	0	22	29	0	59	22	1,969	2,050
27	0	17	25	17	29	0	151	30	0	59	151	1,810	2,020
Total	0	450	467	372		680	4,768		0	1,289	5,448	92,913	99,650

Col. 2 - 24 hours beginning 1200 of date shown, except 23 hours Apr. 27.
Col. 3 - 24 hours ending 2400 one day later, except 23 hours Apr. 27.
Col. 4 - 24 hours beginning 1500 one day later, except 23 hours Apr. 26.
Col. 5 - 24 hours beginning 0800 of date shown, except 23 hours Apr. 27.
Col. 6 - 24 hours beginning 1200 of date shown, except 23 hours Apr. 27.

Col. 8 = Col. 2 + Col. 3 + Col. 4.
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown, except 23 hours Apr. 28.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases N.Y.C. reservoirs Directed	Controlled releases N.Y.C. reservoirs Other	Controlled releases Power-plants	Computed uncon-trolled	Total
Date 1985	Amount 1	2	3	4		5	6		7	8	9	10	11
Apr. 28	0	19	25	17	Apr. 30	0	167	May 1	0	61	167	1,722	1,950
29	0	19	25	17	May 1	0	162	2	0	61	162	1,727	1,950
30	0	19	25	15	2	0	200	3	0	59	200	3,871	4,130
May 1	0	19	25	15	3	0	227	4	0	59	227	5,794	6,080
2	0	19	25	15	4	0	178	5	0	59	178	4,273	4,510
3	0	19	25	15	5	0	70	6	0	59	70	3,521	3,650
4	0	19	25	15	6	0	157	7	0	59	157	3,304	3,520
5	0	19	25	15	7	0	200	8	0	59	200	3,121	3,380
6	0	19	25	15	8	0	157	9	0	59	157	2,804	3,020
7	0	19	25	15	9	0	130	10	0	59	130	2,521	2,710
8	0	19	25	15	10	0	0	11	0	59	0	2,261	2,320
9	0	19	25	15	11	0	0	12	0	59	0	2,061	2,120
10	0	19	25	15	12	0	49	13	0	59	49	1,872	1,980
11	0	19	25	15	13	0	146	14	0	59	146	1,775	1,980
12	0	19	25	15	14	0	0	15	0	59	0	1,701	1,760
13	0	19	25	15	15	0	0	16	0	59	0	1,541	1,600
14	0	19	25	15	16	0	0	17	0	59	0	1,481	1,540
15	90	19	54	15	17	0	0	18	88	0	0	1,952	2,040
16	133	68	32	36	18	0	0	19	136	0	0	3,264	3,400
17	94	50	29	15	19	0	0	20	94	0	0	3,406	3,500
18	0	19	25	15	20	0	0	21	0	59	0	2,811	2,870
19	0	19	25	15	21	0	0	22	0	59	0	2,371	2,430
20	0	19	25	15	22	0	0	23	0	59	0	2,041	2,100
21	0	19	25	15	23	0	0	24	0	59	0	1,851	1,910
22	0	19	25	15	24	0	0	25	0	59	0	1,671	1,730
23	0	19	25	15	25	0	0	26	0	59	0	1,541	1,600
24	61	19	26	15	26	0	0	27	60	0	0	1,450	1,510
25	136	53	42	45	27	0	0	28	140	0	0	1,720	1,860
26	104	56	31	17	28	0	0	29	104	0	0	4,206	4,310
27	0	19	26	15	29	0	400	30	0	60	400	3,780	4,240
28	0	19	25	15	30	0	389	31	0	59	389	2,822	3,270
Total	618	740	840	522		0	2,632		622	1,480	2,632	80,236	84,970

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to Col. 1.
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 - Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases			Computed uncon-trolled	Total
									N.Y.C. reservoirs		Power-plants		
Date 1985	Amount 1	2	3	4		5	6		Directed 7	Other 8	9	10	11
May 29	0	19	25	15	May 31	0	200	June 1	0	59	200	2,821	3,080
30	0	19	25	15	June 1	204	0	2	0	59	204	3,477	3,740
31	0	19	25	15	2	330	92	3	0	59	422	3,239	3,720
June 1	0	19	25	15	3	650	243	4	0	59	893	2,498	3,450
2	0	19	25	15	4	485	200	5	0	59	685	2,396	3,140
3	0	19	25	15	5	968	248	6	0	59	1,216	2,225	3,500
4	0	19	25	15	6	928	232	7	0	59	1,160	2,071	3,290
5	0	19	25	15	7	940	184	8	0	59	1,124	1,897	3,080
6	0	19	25	15	8	0	0	9	0	59	0	1,921	1,980
7	0	19	25	15	9	0	59	10	0	59	59	1,712	1,830
8	0	19	25	15	10	471	286	11	0	59	757	1,424	2,240
9	0	19	25	15	11	453	232	12	0	59	685	1,436	2,180
10	0	19	25	15	12	474	254	13	0	59	728	1,273	2,060
11	46	19	25	15	13	2	227	14	46	13	229	1,222	1,510
12	59	19	25	15	14	224	194	15	59	0	418	1,193	1,670
13	59	19	25	15	15	417	0	16	59	0	417	1,414	1,890
14	58	19	25	15	16	497	0	17	59	0	497	1,514	2,070
15	0	19	25	15	17	469	0	18	0	59	469	1,412	1,940
16	0	19	25	15	18	472	0	19	0	59	472	1,339	1,870
17	15	19	25	15	19	122	0	20	15	44	122	1,299	1,480
18	35	19	25	15	20	181	0	21	35	24	181	1,220	1,460
19	59	19	25	15	21	262	0	22	59	0	262	1,099	1,420
20	508	70	393	53	22	0	0	23	516	0	0	594	1,110
21	617	70	506	54	23	0	16	24	630	0	16	814	1,460
22	260	70	145	51	24	482	146	25	266	0	628	1,036	1,930
23	290	70	179	50	25	523	16	26	299	0	539	1,132	1,970
24	162	70	50	48	26	576	151	27	168	0	727	1,005	1,900
25	174	70	59	43	27	488	124	28	172	0	612	776	1,560
26	162	70	46	46	28	381	65	29	162	0	446	902	1,510
27	790	70	705	15	29	0	0	30	790	0	0	1,120	1,910
Total	3,294	978	2,633	690		10,999	3,169		3,335	966	14,168	47,481	65,950

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to Col. 1.
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 - Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases: N.Y.C. reservoirs Directed	Controlled releases: N.Y.C. reservoirs Other	Controlled releases: Power-plants	Computed uncon-trolled	Total
Date 1985	Amount 1	2	3	4		5	6		7	8	9	10	11
June 28	608	70	503	40	June 30	0	76	July 1	613	0	76	991	1,680
29	29	19	25	15	July 1	0	162	2	29	30	162	1,179	1,400
30	59	19	25	15	2	170	146	3	59	0	316	1,025	1,400
July 1	59	19	25	15	3	284	189	4	59	0	473	868	1,400
2	658	73	557	48	4	0	200	5	678	0	200	232	1,110
3	336	70	221	50	5	290	54	6	341	0	344	975	1,660
4	857	71	719	73	6	0	0	7	863	0	0	647	1,510
5	877	104	735	45	7	2	0	8	884	0	2	964	1,850
6	447	70	345	45	8	308	0	9	448	12	308	1,162	1,930
7	464	70	348	46	9	0	86	10	464	0	86	870	1,420
8	484	70	371	48	10	281	49	11	489	0	330	801	1,620
9	235	19	169	48	11	548	0	12	236	0	548	956	1,740
10	244	19	180	45	12	662	0	13	244	0	662	1,174	2,080
11	904	67	792	48	13	0	0	14	902	5	0	1,603	2,510
12	626	68	698	62	14	0	65	15	626	202	65	1,367	2,260
13	0	19	347	62	15	0	281	16	0	428	281	2,201	2,910
14	223	19	348	43	16	0	340	17	223	187	340	2,570	3,320
15	0	19	218	15	17	0	167	18	0	252	167	2,011	2,430
16	0	19	156	23	18	62	248	19	0	198	310	1,492	2,000
17	0	19	156	45	19	0	54	20	0	220	54	1,286	1,560
18	234	70	122	45	20	0	0	21	237	0	0	1,043	1,280
19	481	70	371	45	21	0	0	22	486	0	0	2,054	2,540
20	207	70	193	42	22	467	0	23	207	98	467	3,048	3,820
21	254	70	169	15	23	552	0	24	254	0	552	2,254	3,060
22	0	60	136	15	24	693	130	25	0	211	823	1,506	2,540
23	0	51	42	15	25	1,782	329	26	0	108	2,111	1,491	3,710
24	0	19	42	25	26	709	216	27	0	86	925	1,869	2,880
25	0	53	145	22	27	0	0	28	0	220	0	1,710	1,930
26	0	51	144	23	28	0	0	29	0	218	0	1,482	1,700
27	0	51	145	22	29	48	0	30	0	218	48	1,174	1,440
28	0	51	142	17	30	514	108	31	0	210	622	948	1,780
Total	8,286	1,539	8,589	1,117		7,372	2,900		8,342	2,903	10,272	42,953	64,470

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 - in response to Col. 1.
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 - Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases: N.Y.C. reservoirs: Directed	Controlled releases: N.Y.C. reservoirs: Other	Controlled releases: Power-plants	Computed uncon-trolled	Total
Date 1985	Amount 1	2	3	4		5	6		7	8	9	10	11
July 29	0	46	142	15	July 31	447	0	Aug. 1	0	203	447	1,510	2,160
30	0	42	144	15	Aug. 1	469	0	2	0	201	469	2,190	2,860
31	0	22	42	15	2	481	0	3	0	79	481	2,090	2,650
Aug. 1	0	19	42	17	3	0	0	4	0	78	0	1,512	1,590
2	60	19	42	17	4	0	16	5	62	16	16	1,196	1,290
3	0	19	42	22	5	463	373	6	0	83	836	991	1,910
4	0	43	144	17	6	469	373	7	0	204	842	934	1,980
5	0	39	144	28	7	469	286	8	0	211	755	1,094	2,060
6	0	46	144	23	8	347	367	9	0	213	714	1,023	1,950
7	104	42	144	23	9	385	248	10	104	105	633	1,068	1,910
8	243	40	183	28	10	0	356	11	243	8	356	833	1,440
9	196	50	142	25	11	0	324	12	196	21	324	849	1,390
10	76	60	144	25	12	360	216	13	76	153	576	795	1,600
11	81	51	145	22	13	391	254	14	81	137	645	717	1,580
12	160	43	118	22	14	374	275	15	160	23	649	768	1,600
13	60	19	25	17	15	452	292	16	61	0	744	1,005	1,810
14	75	19	42	19	16	471	211	17	80	0	682	858	1,620
15	103	40	42	20	17	349	76	18	102	0	425	723	1,250
16	60	19	25	15	18	333	184	19	59	0	517	654	1,230
17	0	19	25	15	19	396	248	20	0	59	644	677	1,380
18	110	50	42	22	20	492	189	21	114	0	681	615	1,410
19	104	39	42	22	21	581	189	22	103	0	770	467	1,340
20	111	45	42	23	22	592	130	23	110	0	722	338	1,170
21	81	19	40	22	23	656	119	24	81	0	775	674	1,530
22	580	51	498	32	24	354	76	25	581	0	430	159	1,170
23	349	51	271	36	25	355	151	26	358	0	506	646	1,510
24	57	19	25	15	26	570	119	27	59	0	689	1,092	1,840
25	57	19	25	15	27	408	119	28	59	0	527	874	1,460
26	57	19	25	15	28	411	103	29	59	0	514	767	1,340
27	68	19	34	15	29	419	130	30	68	0	549	663	1,280
28	98	31	42	28	30	473	119	31	101	0	592	807	1,500
Total	2,890	1,059	3,007	645		11,967	5,543		2,917	1,794	17,510	28,589	50,810

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 - in response to Col. 1.
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 - Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases: N.Y.C. reservoirs Directed	Controlled releases: N.Y.C. reservoirs Other	Controlled releases: Power-plants	Computed uncon-trolled	Total
Date 1985	Amount 1	2	3	4		5	6		7	8	9	10	11
Aug. 29	113	19	79	15	Aug. 31	366	130	Sept. 1	113	0	496	1,121	1,730
30	156	19	125	15	Sept. 1	325	130	2	159	0	455	946	1,560
31	37	19	25	15	2	198	130	3	37	22	328	943	1,330
Sept. 1	18	19	25	15	3	236	119	4	18	41	355	766	1,180
2	17	19	25	15	4	290	238	5	17	42	528	593	1,180
3	52	19	25	15	5	295	194	6	52	7	489	702	1,250
4	63	19	29	15	6	426	92	7	63	0	518	739	1,320
5	384	70	271	46	7	294	113	8	387	0	407	436	1,230
6	235	50	155	31	8	231	146	9	236	0	377	747	1,360
7	184	50	107	29	9	352	189	10	186	0	541	3,453	4,180
8	168	50	101	17	10	0	0	11	168	0	0	3,482	3,650
9	0	19	25	15	11	0	0	12	0	59	0	2,321	2,380
10	0	19	25	15	12	0	0	13	0	59	0	1,641	1,700
11	0	19	25	15	13	0	0	14	0	59	0	1,291	1,350
12	57	19	25	15	14	0	0	15	59	0	0	1,061	1,120
13	196	71	84	46	15	0	22	16	201	0	22	797	1,020
14	57	19	25	15	16	279	243	17	59	0	522	909	1,490
15	57	19	25	15	17	357	281	18	59	0	638	863	1,560
16	59	19	25	15	18	305	351	19	59	0	656	705	1,420
17	59	19	25	15	19	284	265	20	59	0	549	742	1,350
18	74	19	42	15	20	353	243	21	76	0	596	668	1,340
19	175	19	139	15	21	296	216	22	173	0	512	475	1,160
20	147	19	113	15	22	313	265	23	147	0	578	495	1,220
21	134	19	102	15	23	374	227	24	136	0	601	583	1,320
22	100	19	67	15	24	417	200	25	101	0	617	532	1,250
23	59	19	25	15	25	396	254	26	59	0	650	551	1,260
24	106	19	73	15	26	1,399	324	27	107	0	1,723	10,570	12,400
25	91	19	57	15	27	1,020	437	28	91	0	1,457	48,252	49,800
26	0	19	25	15	28	1,599	486	29	0	59	2,085	18,156	20,300
27	0	19	25	15	29	1,684	502	30	0	59	2,186	9,755	12,000
Total	2,798	766	1,919	544		12,089	5,797		2,822	407	17,886	114,295	135,410

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 1200 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 - in response to Col. 1.
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 - Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases: N.Y.C. reservoirs Directed	Controlled releases: N.Y.C. reservoirs Other	Controlled releases: Power-plants	Computed uncon-trolled	Total
Date 1985	Amount 1	2	3	4		5	6		7	8	9	10	11
Sept.28	0	19	25	15	Sept.30	1,605	459	Oct. 1	0	59	2,064	6,777	8,900
29	0	19	25	15	Oct. 1	1,618	437	2	0	59	2,055	5,326	7,440
30	0	19	25	15	2	1,513	464	3	0	59	1,977	4,594	6,630
Oct. 1	0	19	25	15	3	1,454	448	4	0	59	1,902	4,149	6,110
2	0	19	25	15	4	1,468	524	5	0	59	1,992	4,489	6,540
3	0	19	25	15	5	1,458	481	6	0	59	1,939	10,902	12,900
4	0	19	25	15	6	1,332	454	7	0	59	1,786	7,075	8,920
5	0	19	25	15	7	0	394	8	0	59	394	5,487	5,940
6	0	19	25	15	8	26	270	9	0	59	296	4,325	4,680
7	0	19	25	15	9	0	308	10	0	59	308	3,563	3,930
8	0	19	25	15	10	0	324	11	0	59	324	3,137	3,520
9	0	19	25	15	11	0	227	12	0	59	227	2,834	3,120
10	0	19	25	15	12	0	259	13	0	59	259	2,532	2,850
11	0	19	25	15	13	0	86	14	0	59	86	2,725	2,870
12	0	19	25	15	14	0	362	15	0	59	362	2,739	3,160
13	0	19	25	15	15	0	319	16	0	59	319	2,852	3,230
14	0	19	25	17	16	0	243	17	0	61	243	2,796	3,100
15	0	19	25	15	17	0	248	18	0	59	248	2,503	2,810
16	0	19	25	15	18	0	297	19	0	59	297	2,234	2,590
17	0	19	25	15	19	0	146	20	0	59	146	2,205	2,410
18	0	19	25	15	20	0	92	21	0	59	92	2,459	2,610
19	0	19	25	15	21	2	308	22	0	59	310	2,341	2,710
20	0	19	25	15	22	224	270	23	0	59	494	2,207	2,760
21	0	19	25	15	23	218	324	24	0	59	542	2,069	2,670
22	0	19	25	15	24	230	275	25	0	59	505	2,556	3,120
23	0	19	25	15	25	225	167	26	0	59	392	3,129	3,580
24	0	19	25	15	26	0	0	27	0	59	0	3,001	3,060
25	0	19	26	17	27	0	81	28	0	62	81	2,587	2,730
26	0	20	25	15	28	232	329	29	0	60	561	2,309	2,930
27	0	19	25	15	29	235	275	30	0	59	510	2,181	2,750
28	0	19	25	15	30	239	167	31	0	59	406	2,055	2,520
Total	0	590	776	469		12,079	9,038		0	1,835	21,117	110,138	133,090

Col. 2 - 24 hours beginning 1200 of date shown, except 25 hours Oct. 26.
Col. 3 - 24 hours ending 2400 one day later, except 25 hours Oct. 26.
Col. 4 - 24 hours beginning 1500 one day later, except 25 hours Oct. 25.
Col. 5 - 24 hours beginning 0800 of date shown, except 25 hours Oct. 26.
Col. 6 - 24 hours beginning 1200 of date shown, excepr 25 hours Oct. 26.

Col. 8 = Col. 2 + Col. 3 + Col. 4.
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown, except 25 hours Oct. 27.

Table 15. - Controlled releases from reservoirs in the upper Delaware River basin and segregation of flow of Delaware River at Montague, N.J. - continued
(River Master daily operation record)
Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Controlled releases from power reservoirs			Delaware River at Montague Segregation of flow					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallen-paupack	Mongaup Reservoir	Date	Controlled releases			Computed uncon-trolled	Total
									N.Y.C. reservoirs		Power-plants		
Date 1985	Amount 1	2	3	4		5	6		Directed 7	Other 8	9	10	11
Oct. 29	0	19	25	15	Oct. 31	251	81	Nov. 1	0	59	332	1,959	2,350
30	0	19	25	15	Nov. 1	231	205	2	0	59	446	1,845	2,340
31	0	19	25	15	2	0	0	3	0	59	0	1,821	1,880
Nov. 1	0	19	25	15	3	5	70	4	0	59	75	1,746	1,880
2	0	19	25	15	4	479	475	5	0	59	954	1,837	2,850
3	0	19	25	15	5	456	459	6	0	59	915	2,456	3,430
4	0	19	25	15	6	469	265	7	0	59	734	3,387	4,180
5	0	19	25	15	7	0	270	8	0	59	270	3,031	3,360
6	0	19	25	15	8	0	167	9	0	59	167	2,684	2,910
7	0	19	25	15	9	0	0	10	0	59	0	2,371	2,430
8	0	19	25	15	10	0	97	11	0	59	97	2,314	2,470
9	0	19	25	15	11	468	302	12	0	59	770	2,901	3,730
10	0	19	25	15	12	474	454	13	0	59	928	4,513	5,500
11	0	19	25	15	13	0	146	14	0	59	146	6,105	6,310
12	0	19	25	15	14	0	200	15	0	59	200	8,711	8,970
13	0	19	25	15	15	457	211	16	0	59	668	9,373	10,100
14	0	19	25	15	16	135	135	17	0	59	270	17,571	17,900
15	0	19	25	15	17	0	486	18	0	59	486	21,555	22,100
16	0	19	25	15	18	932	464	19	0	59	1,396	16,345	17,800
17	0	19	25	15	19	953	443	20	0	59	1,396	11,345	12,800
18	0	19	25	15	20	950	470	21	0	59	1,420	9,221	10,700
19	0	19	25	15	21	944	443	22	0	59	1,387	7,874	9,320
20	0	19	25	15	22	939	448	23	0	59	1,387	7,674	9,120
21	0	19	25	15	23	708	443	24	0	59	1,151	7,270	8,480
22	0	19	25	15	24	780	394	25	0	59	1,174	6,267	7,500
23	0	19	25	15	25	946	513	26	0	59	1,459	5,672	7,190
24	0	19	25	15	26	946	497	27	0	59	1,443	8,348	9,850
25	0	19	25	15	27	942	459	28	0	59	1,401	12,940	14,400
26	0	19	25	15	28	1,630	518	29	0	59	2,148	15,593	17,800
27	0	19	25	15	29	1,621	518	30	0	59	2,139	12,502	14,700
Total	0	570	750	450		15,716	9,633		0	1,770	25,349	217,231	244,350

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.

Col. 8 = Col. 2 + Col. 3 + Col. 4.
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 8 - Col. 9.
Col. 11 - 24 hours of calendar day shown.

Table 16. - Thermal releases, thermal release payback and savings banks established by DRBC Conservation orders No. 5 (revised), No. 6 (revised), and No. 7. Col. 2-5 in cfs; Col. 6-19 in cfs-days

Mont. date	Design rate	Pay-back	Adj. rate	Dir. Rel.	Thermal releases					Savings		N.J. Div. Bank		Thermal Emergency Bank			Basin Bank	
					Pep.	Can.	Nev.	Daily	Cumul.	Daily	Cumul.	Daily	Cumul.	Savings	Payback	Cumul.	Daily	Cumul.
1986	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
July 1	1,550			608														
2	1,550			29														
3	1,550			59														
4	1,550			59														
5	1,550			658														
6	1,550			336														
7	1,550			857														
8	1,550			877														
9	1,550			447		12		12	12									
10	1,550			464				0	12									
11	1,550			484				0	12									
12	1,550			235				0	12									
13	1,550			244				0	12									
14	1,550			904			5	5	17									
15	1,550			626		157	45	202	219									
16	1,550			0		324	44	368	587									
17	1,550			223		161	26	187	774									
18	1,550			0		195		195	969									
19	1,550			0		133	8	141	1,110									
20	1,550			0		133	30	163	1,273									
21	1,550			234				0	1,273									
22	1,550			481				0	1,273									
23	1,550			207		98		98	1,371									
24	1,550			254				0	1,371									
25	1,550			0	31	113		144	1,515									
26	1,550			0	31	19		50	1,565									
27	1,550			0	0	19	10	29	1,594									
28	1,350			0	31	122	7	160	1,754	0	0	0	0	0	0	0	0	0
29	1,350			0	31	121	8	160	1,914	0	0	0	0	0	0	0	0	0
30	1,350			0	31	122	7	160	2,074	104	104	26	26	26	0	26	52	52
31	1,350			0	31	119	2	152	2,226	0	104	0	26	0	0	0	0	52

Col. 1 - Montague date.
Col. 2 - Design rate, based on Interstate Water Management Recommendations, July 1-27 and based on DRBC Resolution No. 85-21 (Revised), Conservation Order No. 6 (Revised)-July 28 to September 29.
Col. 3 - Thermal release payback, based on DRBC Resolution No. 85-30 Conservation Order No. 7. Payback effective September 3 until thermal bank (Col. 17) = 3,500 cfs-days.
Col. 4 - Col. 2 minus Col. 3.
Col. 5 - Directed release designed to achieve rate in Col. 2 or Col. 4.
Col. 6 - Amount of release from Pepacton reservoir charged to thermal release bank.
Col. 7 - Amount of release from Cannonsville reservoir charged to thermal release bank.
Col. 8 - Amount of release from Neversink reservoir charged to thermal release bank.
Col. 9 - Col. 6 + Col. 7 + Col. 8.
Col. 10 - Summation of Col. 9, limited to 2,000 cfs-days July 5-24 and 3,500 cfs-days thereafter, based on Conservation Order No. 7.
Col. 11 - Savings achieved by Conservation Order No. 6 revised.
Col. 12 - Summation of Col. 11.
Col. 13 - 25 percent of Col. 11.
Col. 14 - Summation of Col. 13.
Col. 15 - 25 percent of Col. 11.
Col. 16 - Col. 3.
Col. 17 - Summation of Col. 15 + Col. 16.
Col. 18 - 50 percent of Col. 11.
Col. 19 - Summation of Col. 18.

Table 16. - Thermal releases, thermal release payback and savings banks established by DRBC Conservation orders No. 5 (revised), No. 6 (revised), and No. 7.

Col. 2-5 in cfs; Col. 6-19 in cfs-days

Mont.	Design	Pay-	Adj.	Dir.	Thermal releases					Savings		N.J. Div. Bank		Thermal Emergency Bank			Basin Bank	
date	rate	back	rate	Rel.	Pep.	Can.	Nev.	Daily	Cumul.	Daily	Cumul.	Daily	Cumul.	Savings	Payback	Cumul.	Daily	Cumul.
1986	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Aug. 1	1,350			0	27	119	0	146	2,372	0	104	0	26	0		26	0	52
2	1,350			0	23	121	0	144	2,516	0	104	0	26	0		26	0	52
3	1,350			0	0	19	0	19	2,535	0	104	0	26	0		26	0	52
4	1,350			0	0	19	0	19	2,554	0	104	0	26	0		26	0	52
5	1,350			60	0	16	0	16	2,570	200	304	50	76	50		76	100	152
6	1,350			0	0	19	7	26	2,596	0	304	0	76	0		76	0	152
7	1,350			0	24	121	2	147	2,743	0	304	0	76	0		76	0	152
8	1,350			0	20	121	13	154	2,897	0	304	0	76	0		76	0	152
9	1,350			0	27	121	8	156	3,053	0	304	0	76	0		76	0	152
10	1,350			104	0	105	0	105	3,158	200	504	50	126	50		126	100	252
11	1,350			243	0	0	8	8	3,166	200	704	50	176	50		176	100	352
12	1,350			196	0	21	0	21	3,187	200	904	50	226	50		226	100	452
13	1,350			76	41	102	10	153	3,340	200	1,104	50	276	50		276	100	552
14	1,350			81	32	98	7	137	3,477	200	1,304	50	326	50		326	100	652
15	1,350			154	0	23	0	23	3,500	200	1,504	50	376	50		376	100	752
16	1,350			60						200	1,704	50	426	50		426	100	852
17	1,350			75						200	1,904	50	476	50		476	100	952
18	1,350			103						200	2,104	50	526	50		526	100	1,052
19	1,350			60						200	2,304	50	576	50		576	100	1,152
20	1,350			0						140	2,444	35	611	35		611	70	1,222
21	1,350			110						200	2,644	50	681	50		661	100	1,322
22	1,350			104						200	2,844	50	711	50		711	100	1,422
23	1,350			111						200	3,044	50	761	50		761	100	1,522
24	1,350			81						200	3,244	50	811	50		811	100	1,622
25	1,350			580						200	3,444	50	861	50		861	100	1,722
26	1,350			349						200	3,644	50	911	50		911	100	1,822
27	1,350			57						200	3,844	50	961	50		961	100	1,922
28	1,350			56						200	4,044	50	1,011	50		1,011	100	2,022
29	1,350			57						200	4,244	50	1,061	50		1,061	100	2,122
30	1,350			68						200	4,444	50	1,111	50		1,111	100	2,222
31	1,350			98						200	4,644	50	1,161	50		1,161	100	2,322

Col. 1 - Montague date.
Col. 2 - Design rate, based on Interstate Water Management Recommendations, July 1-27 and based on DRBC Resolution No. 85-21 (Revised), Conservation Order No. 6 (Revised)-July 28 to September 29.
Col. 3 - Thermal release payback, based on DRBC Resolution No. 85-30 Conservation Order No. 7. Payback effective September 3 until thermal bank (Col. 17) = 3,500 cfs-days.
Col. 4 - Col. 2 minus Col. 3.
Col. 5 - Directed release designed to achieve rate in Col. 2 or Col. 4.
Col. 6 - Amount of release from Pepacton reservoir charged to thermal release bank.
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Col. 8 - Amount of release from Neversink reservoir charged to thermal release bank.
Col. 9 - Col. 6 + Col. 7 + Col. 8.
Col. 10 - Summation of Col. 9, limited to 2,000 cfs-days July 5-24 and 3,500 cfs-days thereafter, based on Conservation Order No. 7.
Col. 11 - Savings achieved by Conservation Order No. 6 revised.
Col. 12 - Summation of Col. 11.
Col. 13 - 25 percent of Col. 11.
Col. 14 - Summation of Col. 13.
Col. 15 - 25 percent of Col. 11.
Col. 16 - Col. 3.
Col. 17 - Summation of Col. 15 + Col. 16.
Col. 18 - 50 percent of Col. 11.
Col. 19 - Summation of Col. 18.

Table 17. - Consumption of Water by New York City - 1940 to 1985.
Data furnished by New York City, Department of
Environmental Protection, Bureau of Water Supply

Year	Consumption in City proper (mgd)	Consumption in City proper (gpcd) 1/	Furnished to outside communities (mgd)	Total (mgd)	Annual (bg)
1940	922.7	124	21.6	944.3	345.614
41	964.2	130	24.8	989.0	360.985
42	906.7	124	21.5	928.2	338.793
43	942.7	133	21.5	964.2	351.933
44	1,004.9	144	26.5	1,031.4	377.492
1945	1,056.2	146	22.0	1,078.2	393.543
46	1,117.1	146	24.1	1,141.2	416.538
47	1,159.0	149	30.4	1,189.4	434.131
48	1,172.3	150	31.5	1,203.8	440.591
49	1,166.9	149	36.2	1,203.1	439.132
1950	953.3	121	29.1	982.4	358.576
51	1,041.9	131	28.1	1,070.0	390.550
52	1,087.0	136	32.7	1,119.7	409.810
53	1,093.9	135	44.6	1,138.5	415.552
54	1,063.4	131	46.3	1,109.7	405.040
1955	1,109.9	136	45.3	1,155.2	421.648
56	1,111.3	136.2	48.9	1,160.2	424.633
57	1,169.0	143	57.2	1,226.2	447.563
58	1,152.9	140.8	49.6	1,202.5	438.912
59	1,204.3	146.8	60.3	1,264.6	461.579
1960	1,199.4	153.9	58.9	1,258.3	460.529
61	1,221.0	156.0	64.0	1,285.0	469.022
62	1,207.6	153.5	68.8	1,276.4	465.896
63	1,218.0	154.1	76.7	1,294.7	472.582
64	1,189.2	149.8	79.4	1,268.6	464.295
1965	1,052.1	131.9	71.2	1,123.3	409.995
66	1,044.9	130.4	73.2	1,118.1	408.128
67	1,135.3	141.0	71.0	1,206.3	440.302
68	1,242.0	153.6	78.2	1,320.2	483.175
69	1,328.7	163.5	80.1	1,408.8	514.229
1970	1,400.3	177.9	90.4	1,490.7	544.116
71	1,423.6	180.0	87.9	1,511.5	551.695
72	1,412.4	178.3	83.0	1,495.4	547.340
73	1,448.9	182.7	95.4	1,544.3	563.681
74	1,441.8	181.5	96.3	1,538.1	561.409
1975	1,415.0	177.9	92.1	1,507.1	550.093
76	1,435.0	180.1	95.8	1,530.8	560.264
77	1,483.0	185.9	104.7	1,587.7	579.510
78	1,479.4	185.1	103.0	1.582.4	577.566
79	1,513.0	189.0	104.6	1,617.6	590.426
1980	1,506.3	187.9	110.0	1,616.3	591.582
81	1,309.5	185.2*	100.0	1,409.5	514.475
82	1,383.0	195.6*	104.8	1,487.8	543.060
83	1,424.2	201.4*	112.6	1,536.8	561.010
84	1,465.2	207.2*	113.9	1,579.1	577.963
1985	1,325.4	187.4*	106.5	1,431.9	522.656

1/ Gallons per Capita per day.
*Provisional

Table 16. - Thermal releases, thermal release payback and savings banks established by DRBC Conservation orders No. 5 (revised), No. 6 (revised), and No. 7.
Col. 2-5 in cfs; Col. 6-19 in cfs-days

Mont. date	Design rate	Pay-back	Adj. rate	Dir. Rel.	Thermal releases					Savings		N.J. Div. Bank		Thermal Emergency Bank			Basin Bank	
					Pep.	Can.	Nev.	Daily	Cumul.	Daily	Cumul.	Daily	Cumul.	Savings	Payback	Cumul.	Daily	Cumul.
1986	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Sept. 1	1,300		1,300	113						250	4,894	62.5	1,223.5	62.5		1,223.5	125	2,447
2	1,300		1,300	156						250	5,144	62.5	1,286	62.5		1,286	125	2,572
3	1,300	0	1,300	37						230	5,374	57.5	1,343.5	57.5	0	1,343.5	115	2,687
4	1,300	0	1,300	18						211	5,585	52.75	1,396.25	52.75	0	1,396.25	105.5	2,792.5
5	1,300	0	1,300	17						210	5,795	52.5	1,448.75	52.5	0	1,448.75	105	2,897.5
6	1,300	0	1,300	52						245	6,040	61.25	1,510	61.25	0	1,510	122.5	3,020
7	1,300	0	1,300	63						250	6,290	62.5	1,572	62.5	0	1,572	125	3,145
8	1,300	0	1,300	384						250	6,540	62.5	1,635	62.5	0	1,635	125	3,270
9	1,300	0	1,300	235						250	6,790	62.5	1,698	62.5	0	1,698	125	3,395
10	1,300	0	1,300	184						250	7,040	62.5	1,760	62.5	0	1,760	125	3,520
11	1,300	0	1,300	168						250	7,290	62.5	1,822	62.5	0	1,822	125	3,645
12	1,300	0	1,300	0						0	7,290	0	1,822	0	0	1,822	0	3,645
13	1,500	0	1,300	0						0	7,290	0	1,822	0	0	1,822	0	3,645
14	1,500	0	1,300	0						0	7,290	0	1,822	0	0	1,822	0	3,645
15	1,500	150	1,350	57						50	7,340	12.5	1,835	12.5	150	1,985	25	3,670
16	1,500	125	1,375	196						50	7,390	12.5	1,848	12.5	125	2,123	25	3,695
17	1,500	114	1,386	57						50	7,440	12.5	1,860	12.5	114	2,249	25	3,720
18	1,500	100	1,400	57						50	7,490	12.5	1,872	12.5	100	2,361	25	3,745
19	1,500	125	1,375	59						50	7,540	12.5	1,885	12.5	125	2,499	25	3,770
20	1,500	120	1,380	59						50	7,590	12.5	1,898	12.5	120	2,632	25	3,795
21	1,500	125	1,375	74						50	7,640	12.5	1,910	12.5	125	2,769	25	3,820
22	1,500	125	1,375	175						50	7,690	12.5	1,922	12.5	125	2,906	25	3,845
23	1,500	125	1,375	147						50	7,740	12.5	1,935	12.5	125	3,044	25	3,870
24	1,500	125	1,375	134						50	7,790	12.5	1,948	12.5	125	3,181	25	3,895
25	1,500	125	1,375	100						50	7,840	12.5	1,960	12.5	125	3,319	25	3,920
26	1,500	125	1,375	59						50	7,890	12.5	1,973	12.5	125	3,456	25	3,945
27	1,500	31	1,469	106						50	7,940	12.5	1,985	12.5	31	3,500	25	3,970
28	1,500	0	1,500	91						50	7,990							
29	1,500		1,500	0						0	7,990							

Col. 1 - Montague date.
Col. 2 - Design rate, based on Interstate Water Management Recommendations, July 1-27 and based on DRBC Resolution No. 85-21 (Revised), Conservation Order No. 6 (Revised)-July 28 to September 29.
Col. 3 - Thermal release payback, based on DRBC Resolution No. 85-30 Conservation Order No. 7. Payback effective September 3 until thermal bank (Col. 17) = 3,500 cfs-days.
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Col. 6 - Amount of release from Pepacton reservoir charged to thermal release bank.
Col. 7 - Amount of release from Cannonsville reservoir charged to thermal release bank.
Col. 8 - Amount of release from Neversink reservoir charged to thermal release bank.
Col. 9 - Col. 6 + Col. 7 + Col. 8.
Col. 10 - Summation of Col. 9, limited to 2,000 cfs-days July 5-24 and 3,500 cfs-days thereafter, based on Conservation Order No. 7.
Col. 11 - Savings achieved by Conservation Order No. 6 revised.
Col. 12 - Summation of Col. 11.
Col. 13 - 25 percent of Col. 11.
Col. 14 - Summation of Col. 13.
Col. 15 - 25 percent of Col. 11.
Col. 16 - Col. 3.
Col. 17 - Summation of Col. 15 + Col. 16.
Col. 18 - 50 percent of Col. 11.
Col. 19 - Summation of Col. 18.

FIGURE 3 — UNCONTROLLED COMPONENT, DELAWARE RIVER AT MONTAGUE, N. J. 1985

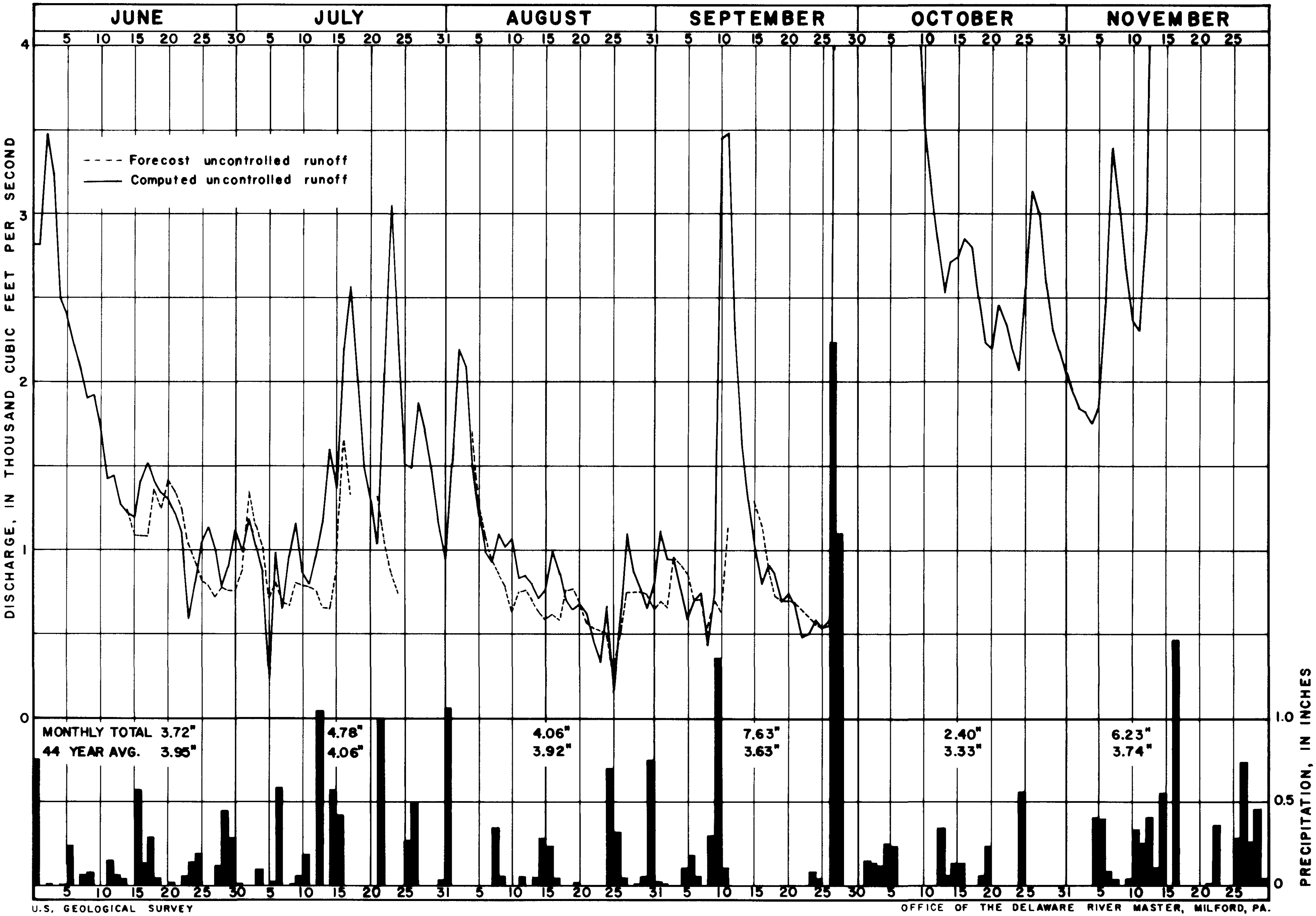
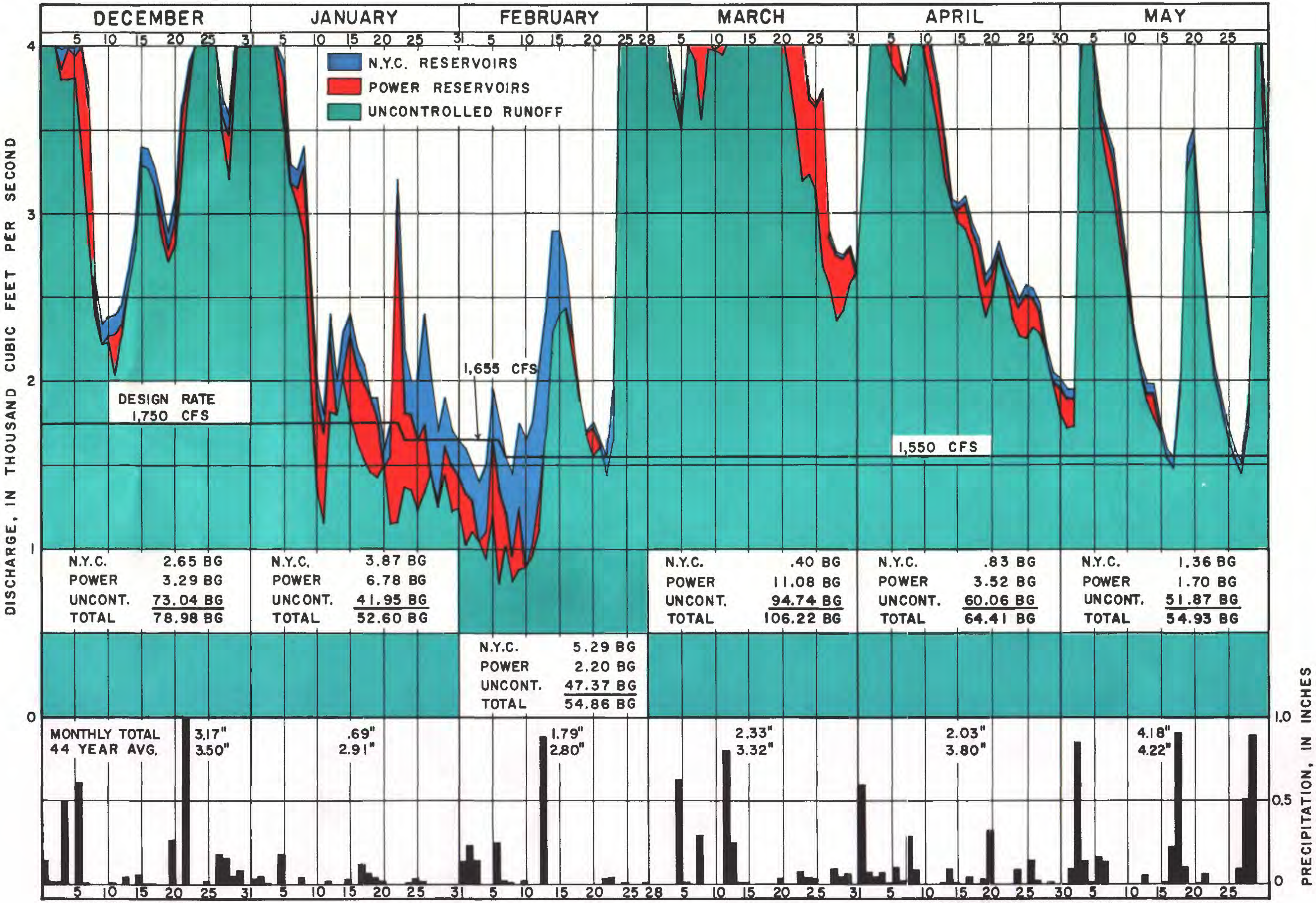


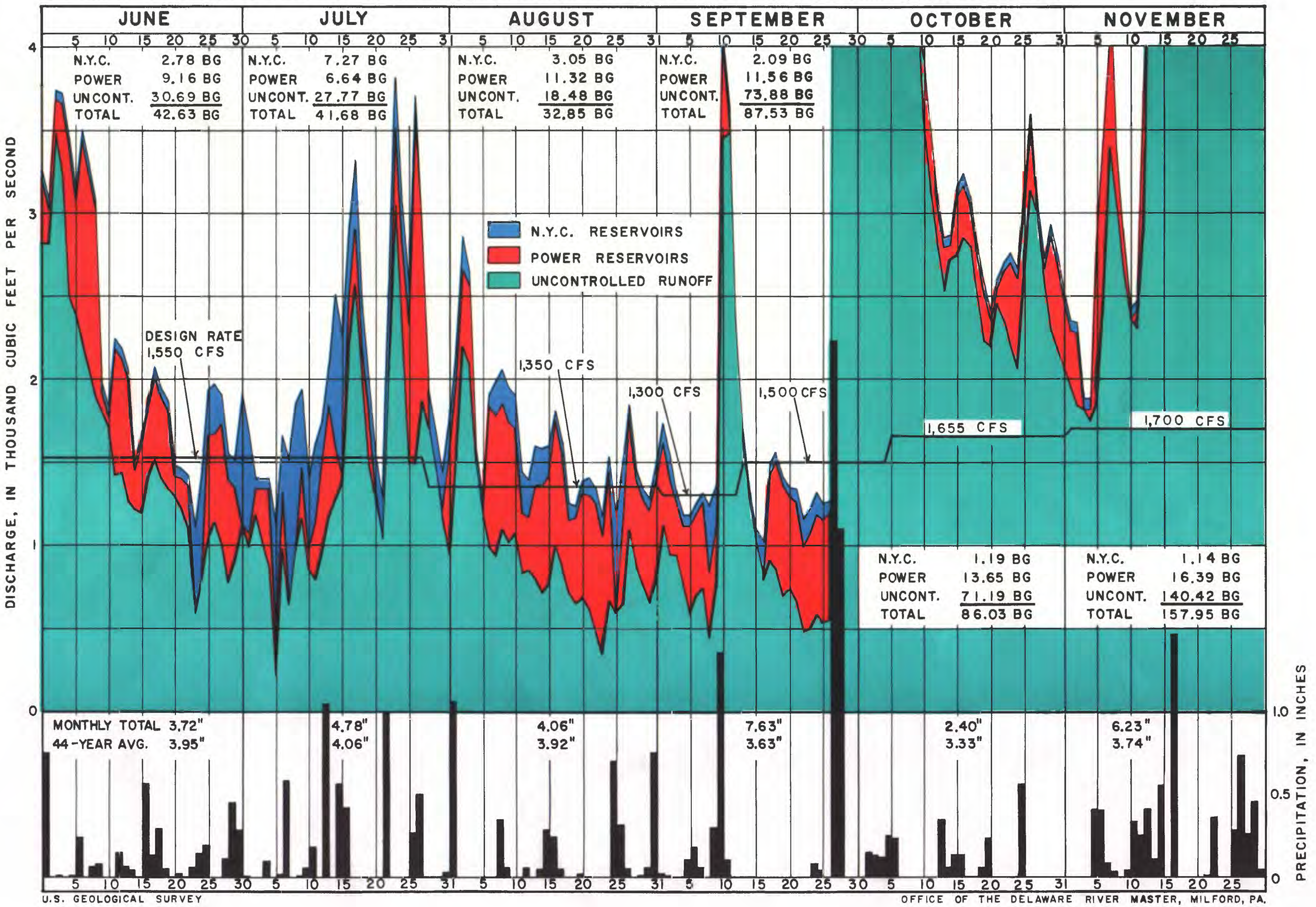
PLATE 1.—COMPONENTS OF FLOW, DELAWARE RIVER AT MONTAGUE, N.J. 1985



U.S. GEOLOGICAL SURVEY

OFFICE OF THE DELAWARE RIVER MASTER, MILFORD, PA.

PLATE I.–COMPONENTS OF FLOW, DELAWARE RIVER AT MONTAGUE, N.J. (CONTINUED) 1985



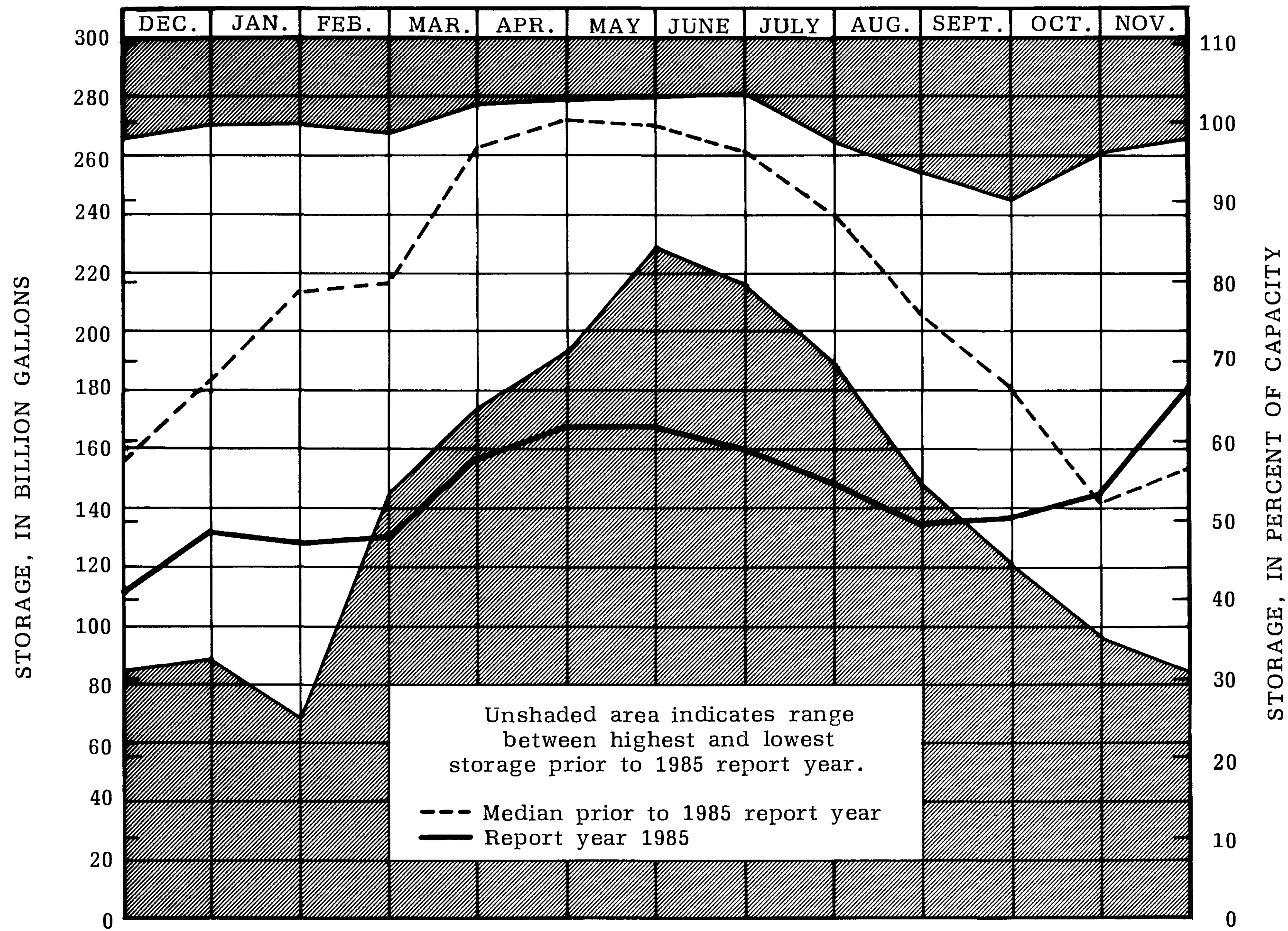


Figure 4. - Combined storage in Pepacton, Cannonsville, and Neversink Reservoirs on first day of month, June 1967 to December 1985

Section III

WATER QUALITY OF THE DELAWARE RIVER ESTUARY

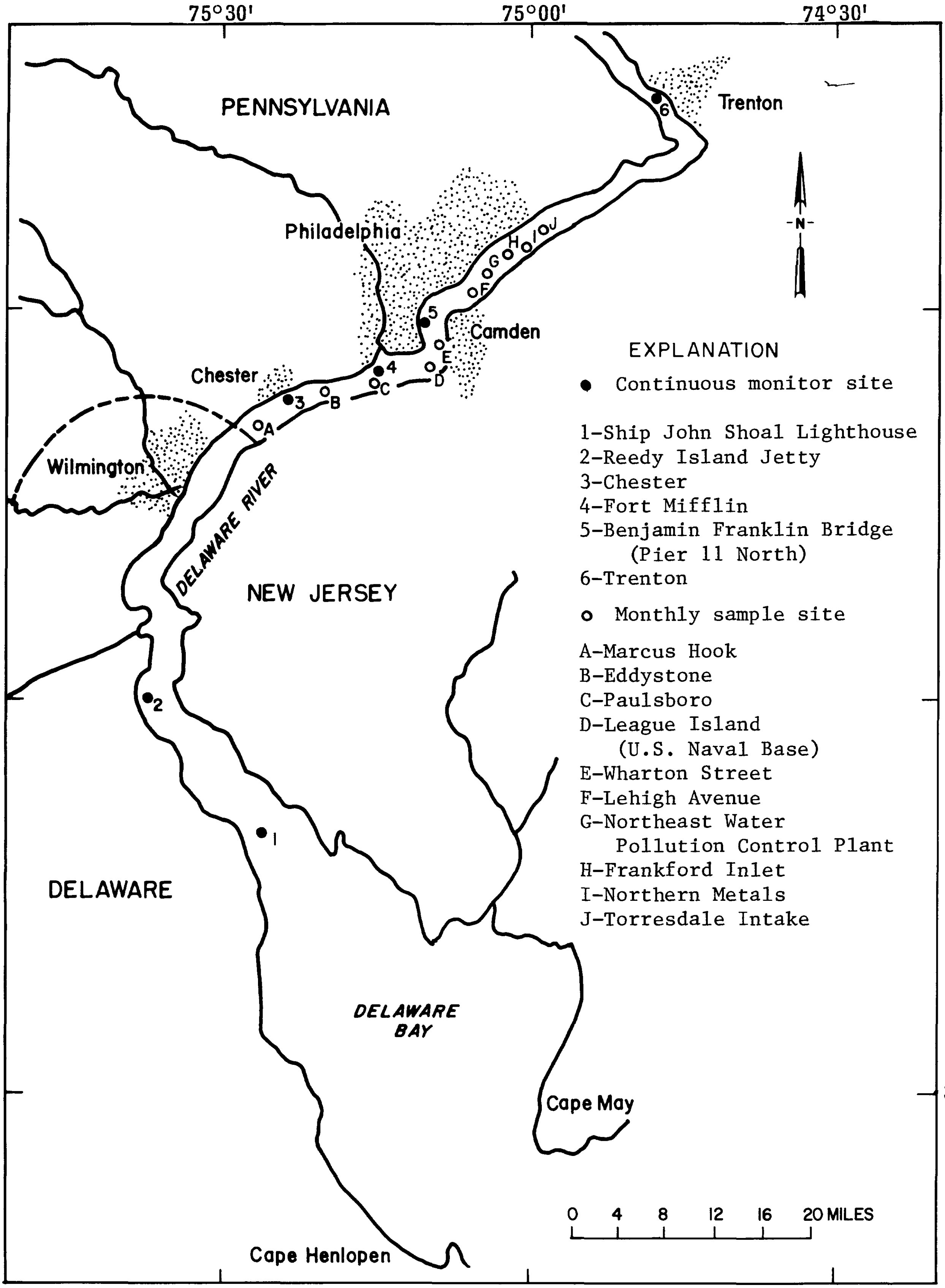


Figure 5.--Delaware River Estuary

Section III

WATER QUALITY OF THE DELAWARE RIVER ESTUARY

By L. DeWayne Cecil

INTRODUCTION

This section describes the water-quality monitoring program carried out by the U.S. Geological Survey in the Delaware Estuary during the 1985 report year. Also presented here are some of the data that were obtained by this program and a brief discussion of the significance of the data.

WATER-QUALITY MONITORING PROGRAM

Water quality of the Delaware River and Estuary was monitored between Trenton, N.J., and Ship John Shoal Lighthouse, N.J. Data were acquired continuously by electronic instruments at six monitor sites, one at Trenton, just upstream of the head of tidewater and at five sites in the estuary (fig. 5). The monitors at Chester, Pa., Fort Mifflin, Pa. and Benjamin Franklin Bridge were not operated from early December 1984 through the end of March 1985. In addition to the period just mentioned the monitor at Fort Mifflin, Pa. was not in operation from September 11 through the end of November 1985. At Ship John Shoal Lighthouse and Fort Mifflin the water was monitored for two parameters: temperature and specific conductance. At the remaining sites, the water was monitored for four parameters: temperature, specific conductance dissolved oxygen, and pH.

Additional data were obtained monthly at ten sites between Torresdale, Pa. and Marcus Hook, Pa. At each of these sites, samples of water were collected at three points of the cross-section. These samples were analyzed for temperature, chloride, alkalinity, biochemical oxygen demand, specific conductance, dissolved oxygen, and pH.

Data obtained from the continuous monitoring sites were processed by computer and stored for future reference by the U.S. Geological Survey. They were also distributed regularly to cooperators and published annually by the U.S. Geological Survey in "Water Resources Data for Pennslyvania, Volume 1, Delaware River Basin". Data from the monthly sites were processed and stored by the City of Philadelphia Water Department.

The above-described programs were carried out in cooperation with the City of Philadelphia Water Department, Delaware River Basin Commission, Delaware River Master, and other agencies of federal, state, and county governments.

ESTAURINE WATER-QUALITY DATA DURING 1985

The following is a summary and discussion of the data that were collected during the 1985 report year. Additional information can be found in the tables at the end of this section.

Streamflow

Streamflow is a major factor in influencing the water quality of the estuary. Increased streamflow usually results in better water quality by limiting salt-water intrusion and diluting the concentration of dissolved minerals, thereby contributing to lower specific conductance and chloride level. Increased flow also aids in maintaining lower water temperature during warm weather and supporting higher dissolved-oxygen levels.

Based on streamflow records for the Delaware River at Trenton, mean monthly streamflow was lowest for the year during August (3,696 cfs) and highest for the year during November (17,730 cfs) (see table 9). The mean monthly streamflow was above the respective median for the period of record July, September, October, and November and below the median for the rest of the year.

Temperature

The significance of water temperature in regard to water quality in the estuary lies in its profound influence on various physical, chemical, and biological properties of the water. In general, increases in water temperature have deleterious effects on water quality by lowering the saturation level of dissolved oxygen and increasing biological activities.

The primary factors involved in controlling water temperature in the estuary are climatic; however, various uses of the water by man can also have significant effects.

Based on records from Benjamin Franklin Bridge (Pier 11 North) Philadelphia, Pa., mean monthly temperatures for the period March to November 1985 were below normal in June and July and equaled or exceeded the norm for the remainder of the reporting period. The norm is based on historical temperature records from 1962 to 1984 (see fig. 6)

Specific Conductance and Chloride

Specific conductance is the ability of a solution to conduct electricity. Basically, it can be used to measure the amount of ionized material in solution and relates approximately to dissolved-solids content.

Specific conductance values in bodies of water usually reflect the geochemistry of the drainage basin; however, pollution and the intrusion of oceanic salts can also have considerable effects. Increasing streamflows reduce the concentration of dissolved solids, thus lowering specific conductance and chloride levels. Conversely, decreasing flows have the opposite effects.

In the Delaware Estuary, the intrusion of oceanic salts is important to those who must use the estuary as a water supply. For this reason, chloride concentration is of great interest. Water with chloride concentrations in excess of 250 mg/L (milligrams per liter) is usually considered undesirable for domestic use and water with concentrations in excess of 50 mg/L is unsatisfactory for some industrial uses.

As sea water has a chloride concentration of approximately 19,000 mg/L the location of a body of water in relation to the sea can influence chloride levels in that body of water. For this reason, chloride concentrations in the Delaware Estuary generally increase with distance downstream toward the Delaware Bay and Atlantic Ocean.

Chloride concentration was not measured directly at Fort Mifflin, Pa., and Reedy Island Jetty, Del., but a correlation between specific conductance and chloride concentration has been developed based on analyses of water samples taken in the estuary. Chloride concentrations at those sites presented in tables 18 and 20 were derived from that relationship. The relationship is less reliable when chloride concentrations are lower than 30 mg/l because other ionized materials may be present in amounts large enough to affect the conductance-chloride relationship. Therefore, chloride concentrations derived from specific conductance are not given when the relationship indicates chloride concentrations of less than 30 mg/l. Chloride concentrations at Chester, Pa., were furnished by Scott Paper Company.

At Fort Mifflin, the maximum daily chloride concentration equaled or exceeded 50 mg/L 16 percent of the time (see table 18). The maximum was 157 mg/L on September 4. At Chester, the chloride concentrations equaled 50 mg/L on all but 2 days in December; a few days in January, March, and April, all of Fedruary and June 15 to November 17 with the exception of September 30 and exceeded 250 mg/l December 1, February 6,7,11 and 12, August 20,23, and 24, and September 1 to 27 with a maximum concentration of 1300 mg/l on September 26 (see table 19). The maximum daily chloride concentration in the estuary at Chester was greater than 50 mg/L 54 percent of the time and greater than 250 mg/L 10 percent of the time (see table 19). Chloride concentrations in excess of 250 mg/L were recorded on all days at Reedy Island Jetty (see table 20) with concentrations in the range of 2,000 to 9,000 mg/L being common. The maximum at this site was 9,440 mg/L on September 25.

Dissolved Oxygen

Dissolved oxygen is necessary in water for the respiration of aquatic organisms. It also plays a significant role in chemical reactions in aquatic environments. The major sources of dissolved oxygen in water are diffusion from the air and photosynthesis in aquatic plants. Dissolved-oxygen levels are limited by temperature, salinity, and the partial pressure of atmospheric oxygen.

Dissolved-oxygen levels in the estuary tend to be highest near Trenton and to decrease with distance downstream to a point near or somewhat downstream from the Benjamin Franklin Bridge where minimum values are usually reached.

During the past year, mean dissolved-oxygen concentration at the Benjamin Franklin Bridge was below 5 mg/L from May 28 to September 28 (see table 21). The minimum daily mean was 1.3 on August 22. At Chester, the mean dissolved-oxygen concentration was below 5 mg/L from May 24 to September 28 with the exception of July 25 when the mean was 5.4 mg/L (see table 22). The lowest daily mean was 1.3 mg/L on June 5 and 6. The minimum hourly value was 0.9 mg/L also on June 5 and 6. At Reedy Island Jetty, the minimum hourly value was 5.2 mg/L on July 23 and August 8 and 22.

Figure 7 shows the frequency of hourly dissolved-oxygen concentration at Benjamin Franklin Bridge (Pier 11 North) and Chester during the critical summer period, July through September. During this period, the dissolved-oxygen concentration was below 4 mg/L 92 percent of the time at the Benjamin Franklin Bridge. Dissolved-oxygen concentrations were similar at the Benjamin Franklin Bridge in the 1984 and 1985 report years. Dissolved-oxygen concentration was below 4 mg/L 55 percent of the time at Chester in 1985 as compared with 92 percent of the time in 1984. These dissolved-oxygen data suggest an improved condition in 1985 as compared to 1984.

Hydrogen-Ion Concentration (pH)

Hydrogen-ion concentration (pH) is fundamentally a measure of acidity or alkalinity. Values of pH below 7 indicate acidity, whereas values above 7 indicate alkalinity. In natural waters, pH generally ranges from 6.0 to 8.5. The main factors controlling the pH of a body of water are usually the geochemistry of the drainage basin and external influences such as pollution. Photosynthetic activity can also have a considerable influence on pH values. Increased photosynthetic activity (algal bloom) produces higher pH values. All pH values at Benjamin Franklin Bridge, Chester, and Reedy Island Jetty were in a range of 5.5 to 8.5. Daily minimum pH at Benjamin Franklin Bridge ranged between 5.5 and 5.9 from August 21 to September 11. This suggests a local contamination event since monitors upstream as well as downstream did not show this trend. The pH in the estuary tends to be lowest near Trenton, N.J., and to increase downstream.

Table 18.- Chloride concentrations, Delaware River at Fort Mifflin, Pa.
Daily maximum and minimum chloride concentrations in milligrams per liter
December 1, 1984 to November 30, 1985

Day	December		January		February		March		April		May		June		July		August		September		October		November	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1							-	-	43	*	37	*	31	*	35	*	59	41	111	47				
2							-	-	42	*	42	*	31	*	33	*	48	33	120	53				
3							-	-	35	*	50	*	30	*	35	*	43	30	114	74				
4							-	-	35	*	45	*	31	*	31	*	37	*	157	77				
5							-	-	38	*	30	*	45	*	35	*	37	*	117	48				
6							-	-	40	*	*	*	37	*	33	*	33	*	91	57				
7							-	-	40	*	*	*	37	*	33	*	31	*	86	45				
8							42	*	43	*	*	*	35	*	37	*	45	*	91	52				
9							52	*	42	*	*	*	33	*	37	30	42	30	106	48				
10							38	*	40	*	37	*	31	*	40	30	42	*	103	59				
11							33	*	40	*	*	*	33	*	37	30	43	*	-	-				
12							45	*	38	*	*	*	31	*	35	30	40	*	-	-				
13							52	*	35	*	*	*	42	*	35	30	42	*	-	-				
14							45	*	37	*	*	*	42	*	37	*	48	*	-	-				
15							37	*	37	*	*	*	37	*	35	30	50	37	-	-				
16							45	*	35	*	*	*	35	*	37	30	45	*	-	-				
17							37	*	42	*	*	*	38	*	38	30	47	*	-	-				
18							40	*	35	*	*	*	42	*	33	*	52	*	-	-				
19							48	*	43	*	*	*	38	*	33	*	53	37	-	-				
20							40	*	40	*	*	*	40	*	35	*	59	42	-	-				
21							45	*	37	*	30	*	37	*	35	*	60	40	-	-				
22							33	*	33	*	37	*	37	*	37	30	74	40	-	-				
23							38	*	37	*	38	*	35	*	35	30	77	47	-	-				
24							33	*	40	*	37	*	33	*	37	31	80	42	-	-				
25							42	*	38	*	33	*	35	*	37	30	83	45	-	-				
26							37	*	33	*	*	*	33	*	40	30	134	59	-	-				
27							30	*	31	*	*	*	31	*	42	30	117	60	-	-				
28							28	*	33	*	*	*	35	*	43	31	111	52	-	-				
29							30	*	31	*	30	*	33	*	40	30	97	52	-	-				
30							37	*	42	*	*	*	35	*	38	31	86	33	-	-				
31							42	*	-	-	35	*	-	-	42	30	103	48	-	-				

* Less than 30 mg/l

Table 19.- Chloride concentrations, Delaware River at Chester, Pa.[1]
Daily maximum and minimum chloride concentrations in milligrams per liter
December 1, 1984 to November 30, 1985

Day	December		January		February		March		April		May		June		July		August		September		October		November	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1	266	120	50	34	68	45	50	43	33	31	-	-	44	38	160	57	136	60	250	120	35	*	120	67
2	208	123	50	33	70	52	50	43	32	30	-	-	45	37	162	65	120	72	274	180	32	*	120	75
3	190	100	50	30	70	65	55	43	35	31	-	-	46	39	130	65	140	65	280	145	32	*	120	79
4	140	80	45	35	87	55	45	38	41	31	-	-	47	39	142	62	120	74	375	150	30	*	140	80
5	125	85	45	33	105	55	45	40	45	40	-	-	60	38	165	68	100	68	370	155	*	*	120	77
6	138	70	48	33	290	65	60	37	40	33	50	36	60	41	175	60	100	60	280	150	*	*	80	58
7	78	53	40	32	260	70	50	38	40	32	45	35	48	40	170	63	105	65	385	165	35	*	60	54
8	74	50	42	31	92	60	43	34	37	30	40	35	52	38	140	72	90	55	355	170	35	*	55	49
9	66	52	42	30	70	60	55	38	40	33	57	36	48	38	145	70	85	55	390	190	*	*	52	46
10	75	52	46	30	200	65	47	37	35	32	40	35	47	39	160	78	85	55	350	170	*	*	55	46
11	68	45	38	32	360	95	50	37	36	31	45	36	50	42	170	78	90	55	490	165	30	*	50	46
12	70	44	38	33	444	107	49	35	65	32	40	35	50	41	150	75	100	61	420	160	*	*	80	55
13	75	45	45	31	220	64	39	34	39	32	40	32	48	35	170	76	110	76	410	150	30	*	70	55
14	62	43	40	30	97	62	38	33	40	35	42	33	48	38	140	80	110	50	460	180	*	*	80	56
15	57	50	40	32	70	51	45	33	40	34	37	32	64	38	165	74	110	55	500	165	*	*	60	51
16	65	50	38	31	70	55	40	32	40	35	40	32	66	38	160	73	130	45	500	195	30	*	80	55
17	66	47	39	31	63	55	40	30	50	34	38	33	60	44	190	75	127	64	560	260	30	*	60	43
18	65	40	40	33	65	53	45	30	38	35	45	33	55	44	165	76	190	65	660	260	30	*	46	38
19	66	46	50	35	70	49	40	30	39	35	37	33	54	44	170	86	235	90	680	280	32	30	38	33
20	62	47	45	36	63	51	53	32	38	35	43	30	55	40	177	77	260	85	680	290	32	*	35	31
21	60	44	52	33	62	52	40	32	38	35	40	32	52	38	138	72	240	77	740	290	55	30	35	32
22	77	45	45	36	62	50	38	30	44	35	39	33	58	40	185	77	240	82	860	330	35	30	35	*
23	60	48	45	37	58	49	35	32	68	35	39	34	58	38	190	77	290	95	990	260	50	30	31	*
24	-	-	50	40	55	50	40	32	42	35	40	34	59	43	195	92	270	115	900	400	50	30	30	*
25	-	-	50	39	56	50	42	*	40	36	45	35	59	42	200	90	206	122	1030	400	45	30	35	*
26	60	38	50	40	96	48	46	30	40	36	45	36	75	40	205	80	150	125	1300	450	43	32	30	*
27	52	40	45	42	95	48	35	30	38	36	40	32	156	48	135	76	159	140	580	120	50	32	30	*
28	50	35	60	40	85	48	40	30	-	-	40	36	130	50	165	70	218	117	90	35	40	35	30	*
29	45	36	66	43	-	-	40	*	-	-	45	38	138	54	155	75	210	120	50	38	45	34	35	*
30	43	37	55	44	-	-	40	30	-	-	44	35	121	55	120	75	180	116	40	32	72	35	35	*
31	52	35	58	41	-	-	40	31	-	-	45	32	-	-	155	75	206	158	-	-	65	45	-	-

[1]/Collection and analysis by Scott Paper Company
* Less than 30 mg/l

Table 20.- Chloride concentrations, Delaware River at Reedy Island Jetty, Del.
Daily maximum and minimum chloride concentrations in milligrams per liter
December 1, 1984 to November 30, 1985

Day	December		January		February		March		April		May		June		July		August		September		October		November	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1	6987	4116	5954	2238	-	-	3875	2228	6300	3124	6250	2578	5550	2354	6750	3291	6375	2606	6970	3950	4087	1286	6500	3437
2	6851	3636	5936	2182	-	-	5400	2214	5981	2956	6817	2732	5600	2256	6936	3364	6275	2844	7499	4000	2763	1286	6375	3800
3	7532	3875	5750	2588	-	-	5900	1668	6600	2592	6902	2662	4750	2648	6851	3510	6750	3437	6300	3925	-	-	6834	4058
4	6953	3687	6600	2658	-	-	6350	2214	5310	2228	7433	2606	5918	2648	6800	3437	5972	3291	6834	4000	-	-	6600	4480
5	6375	2980	6250	2966	-	-	5750	2550	5370	2228	6775	2452	5945	2816	5550	3510	5963	3152	6834	3950	-	-	6987	3700
6	7532	3510	6600	2685	-	-	-	-	5186	1850	5550	2270	5750	2732	5370	3218	4650	2718	-	-	-	-	5954	3687
7	5340	2938	5990	2634	-	-	-	-	4600	1766	-	-	5450	2662	4480	3026	5280	2886	-	-	-	-	6400	3291
8	-	6325	2504	-	-	-	-	-	-	-	-	-	5250	2816	5093	3180	4600	2298	-	-	-	-	6400	3585
9	6250	2294	-	-	-	-	-	-	2844	1454	-	-	5155	2648	5909	3012	-	-	7700	4650	5400	2032	6300	3291
10	6800	2700	-	-	-	-	-	-	3950	1598	-	-	4200	2662	6250	3437	-	-	8308	4145	5825	1822	5450	3124
11	6450	2896	-	-	-	-	4000	2116	-	-	-	-	5500	2536	6350	3138	-	-	9160	4400	6000	1892	5918	2942
12	6450	2868	-	-	-	-	5310	2088	-	-	-	-	5900	2858	6500	2998	5936	2424	8308	4700	6325	2452	6750	3082
13	6000	2868	-	-	-	-	3687	1370	-	-	3950	1822	5750	2704	5600	2718	6885	2382	8533	5124	6350	2466	6800	3040
14	6250	2728	-	-	-	-	4375	1314	-	-	3850	1626	5927	2494	5450	2452	6375	2662	8500	5155	6300	2620	5972	3040
15	6350	2952	-	-	-	-	4600	1272	-	-	5186	2144	6885	2326	6936	2914	6868	2536	8533	5124	6500	2816	5918	3126
16	5963	2840	-	-	-	-	3670	974	-	-	4375	2046	6775	2564	6350	2732	6800	2816	8264	5370	5972	2690	6275	3291
17	5918	2994	-	-	-	-	4300	997	-	-	4800	2214	6325	2648	6750	2872	6775	2970	9160	5340	5750	2620	5450	2466
18	5900	2124	-	-	6275	2816	4400	1118	-	-	5062	2018	5400	2774	6885	2830	6250	3291	8866	5400	5400	2606	4087	2186
19	6000	3022	-	-	6375	2816	5990	1570	-	-	5000	1076	6600	2620	7433	3653	6300	3636	9000	5450	4440	2578	3194	1612
20	6375	3008	-	-	6400	2690	5825	2088	-	-	4087	1850	6300	2690	7532	3585	6902	3619	8533	5500	-	-	2816	1244
21	5954	2994	-	-	5600	2620	4400	1682	-	-	5155	1752	5310	2424	6750	3585	6600	3653	8475	5550	5500	2816	2452	963
22	6500	3134	-	-	5750	2662	4145	1878	3900	2004	4650	1556	5963	2648	5963	3364	6936	3670	8566	5450	5217	2620	-	-
23	5340	2840	-	-	4700	2228	4300	1976	5093	1906	4700	1776	4116	2522	5750	3194	6919	3687	9200	5936	5062	2676	-	-
24	5750	2588	-	-	5093	2396	5124	2102	5217	2312	5124	1794	4000	2326	5954	3152	7266	3925	9400	5936	5280	2662	-	-
25	4200	1888	-	-	5186	2200	3975	2214	4800	2018	5093	1962	5340	2228	5990	3437	6600	3900	9440	5900	4480	2634	-	-
26	3925	1720	-	-	4750	2102	4400	1990	4700	2088	5186	2172	5918	2452	5600	3124	6500	3619	9200	5972	-	-	3437	861
27	-	-	-	-	5927	2410	5031	1906	5370	2284	5280	2284	7433	2732	5340	2396	6325	3585	9280	5250	-	-	3925	1030
28	5031	1958	-	-	-	-	5280	2228	5370	2242	5124	2144	6902	3110	6000	2550	6300	3291	6325	659	-	-	3900	963
29	4174	1734	-	-	-	-	5340	2242	5310	2368	5990	2606	6868	3152	6600	2914	6500	3510	4650	1654	5500	2704	3437	557
30	4058	1888	-	-	-	-	5900	2214	5936	2480	5936	2648	6750	3138	6400	2984	6919	3636	4560	1258	5936	2732	2914	569
31	5900	2084	-	-	-	-	5750	2592	-	-	5918	2704	-	-	6919	2942	6851	3653	-	-	6250	3166	-	-

* Less than 30 mg/L

Table 21.- Dissolved oxygen, Delaware River at Benjamin Franklin Bridge at Philadelphia, Pa.
Daily mean dissolved oxygen in milligrams per liter
December 1, 1984 to November 30, 1985

Day	December	January	February	March	April	May	June	July	August	September	October	November
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
1	4.6			9.4	8.6	-	4.0	2.6	1.9	1.7	5.9	4.2
2	5.0			9.2	8.7	-	3.9	2.4	2.0	1.8	6.0	4.3
3	-			9.2	8.7	5.9	3.8	2.2	2.2	1.9	5.9	4.6
4	-			9.1	8.8	5.7	3.7	2.2	2.6	1.9	5.9	5.3
5	-			9.2	9.6	6.3	3.4	2.4	3.0	2.2	5.9	5.3
6	-			9.7	9.6	6.4	3.3	2.4	3.2	2.5	5.9	5.4
7	-			9.7	9.7	6.1	3.3	2.6	3.3	2.7	5.9	5.4
8	-			10.1	9.7	9.5	2.7	2.6	3.0	2.7	5.9	5.5
9	-			10.2	9.6	9.8	2.6	1.9	2.5	2.6	5.7	5.5
10	-			12.7	9.6	9.9	3.4	1.5	2.2	2.0	5.5	5.5
11	-			11.1	9.6	9.4	3.1	1.4	1.8	1.9	5.5	5.4
12	-			10.2	9.1	8.6	-	2.3	1.7	1.9	5.2	5.1
13	-			10.5	9.4	7.2	-	2.6	1.8	2.7	5.1	4.7
14	-			10.6	9.8	7.7	-	3.0	1.7	3.0	5.0	4.6
15	-			10.7	9.7	7.9	-	3.3	1.5	3.2	4.7	4.8
16	-			10.7	9.4	8.0	-	2.9	1.7	3.3	4.5	4.9
17	-			10.5	9.6	7.3	-	2.7	1.9	3.1	4.4	5.5
18	-			10.5	9.5	7.0	2.3	2.8	1.9	2.8	4.2	6.5
19	-			10.2	9.6	7.0	2.2	3.1	2.3	2.5	4.2	6.8
20	-			10.0	8.7	7.1	2.3	2.8	1.9	2.5	4.2	7.1
21	-			10.0	8.3	7.2	3.9	-	1.5	2.7	4.1	7.4
22	-			9.9	8.1	-	3.8	-	1.3	2.7	4.0	7.6
23	-			9.6	7.7	-	4.3	-	1.4	2.7	4.1	7.0
24	-			9.5	7.1	-	4.7	-	1.7	2.4	3.9	7.3
25	-			9.5	6.6	-	4.7	-	1.9	2.5	3.9	7.0
26	-			9.6	6.0	-	4.5	3.9	1.8	2.4	3.8	6.7
27	-			9.5	5.8	-	3.8	3.2	1.9	3.5	3.7	6.5
28	-			9.4	5.6	4.1	3.0	3.1	1.9	5.3	3.9	6.6
29	-			9.3	5.8	4.1	2.9	3.0	2.1	5.7	4.0	6.9
30	-			9.1	-	4.3	2.7	2.6	2.4	5.8	3.7	7.1
31	-			9.0	-	4.1	-	2.3	1.9	-	3.6	-

Table 22.- Dissolved oxygen, Delaware River at Chester, Pa.
Daily mean dissolved oxygen in milligrams per liter
December 1, 1984 to November 30, 1985

Day	December	January	February	March	April	May	June	July	August	September	October	November
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
1				9.8	9.7	6.1	3.0	3.8	3.5	4.5	4.0	6.9
2				9.7	9.6	6.4	2.5	3.8	3.4	4.4	4.0	7.2
3				9.6	9.6	7.0	1.9	3.7	3.5	4.1	4.4	7.7
4				9.6	9.7	6.2	1.5	3.6	3.7	4.1	4.4	8.2
5				9.9	9.5	5.8	1.3	3.3	3.9	3.9	4.4	8.4
6				9.9	9.4	5.4	1.3	3.6	4.0	4.0	4.5	7.5
7				9.9	9.4	5.0	1.6	3.6	4.1	3.9	4.5	6.8
8				9.9	9.4	5.2	1.7	3.8	4.1	4.0	4.3	6.3
9				9.6	9.2	5.3	1.7	3.8	3.5	3.6	4.2	6.4
10				9.4	9.4	5.6	1.6	3.6	3.2	3.4	4.1	6.7
11				9.2	9.6	5.7	1.7	3.4	3.1	3.3	4.1	6.4
12				9.5	9.6	6.0	2.1	3.4	3.1	3.5	4.2	6.5
13				9.9	9.7	6.3	2.5	3.2	3.4	3.7	4.2	6.2
14				9.9	9.6	6.3	3.6	3.6	3.4	4.3	3.9	5.8
15				10.0	9.2	6.5	4.1	3.8	3.4	4.6	3.5	5.7
16				9.9	8.5	6.4	4.0	3.7	3.4	4.7	3.4	6.2
17				9.8	8.1	-	3.6	3.5	3.3	4.8	3.4	6.4
18				10.0	7.6	-	3.4	3.6	3.5	4.8	3.3	5.9
19				10.1	7.1	-	3.3	4.0	3.7	4.6	3.5	6.7
20				10.1	6.8	-	3.1	4.0	3.5	4.3	3.5	7.4
21				10.1	6.3	-	3.2	3.8	3.3	4.4	4.1	8.1
22				10.1	5.9	-	3.5	4.0	3.3	4.2	4.9	8.5
23				10.2	5.7	-	4.0	4.1	3.4	4.4	5.2	8.8
24				10.1	5.9	3.9	3.9	4.3	3.6	4.7	5.3	8.9
25				10.0	5.7	3.5	3.9	4.6	-	4.7	5.1	9.0
26				10.0	5.4	3.2	4.0	5.4	-	4.8	4.8	9.0
27				10.0	5.5	3.2	4.3	4.8	-	5.4	4.9	8.9
28				9.9	5.7	2.9	4.4	4.5	-	4.2	5.0	9.0
29				9.7	5.9	2.9	4.1	4.1	-	3.9	5.1	9.4
30				9.6	6.0	3.0	3.8	4.0	-	4.1	5.2	9.8
31				9.5	-	2.9	-	3.6	-	-	5.6	-

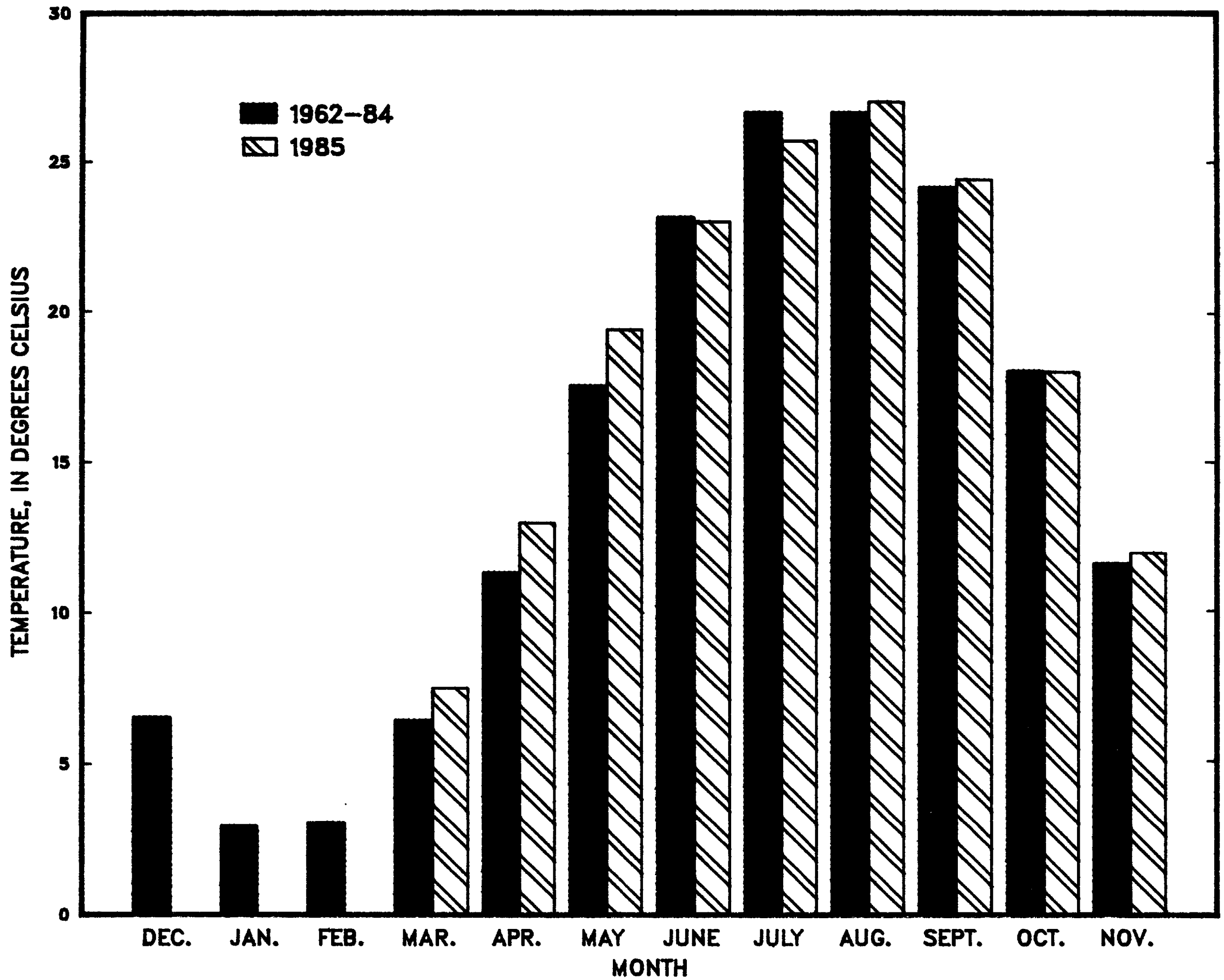


Figure 6. - Mean monthly temperatures of Delaware River at Benjamin Franklin Bridge, Philadelphia, Pennsylvania.

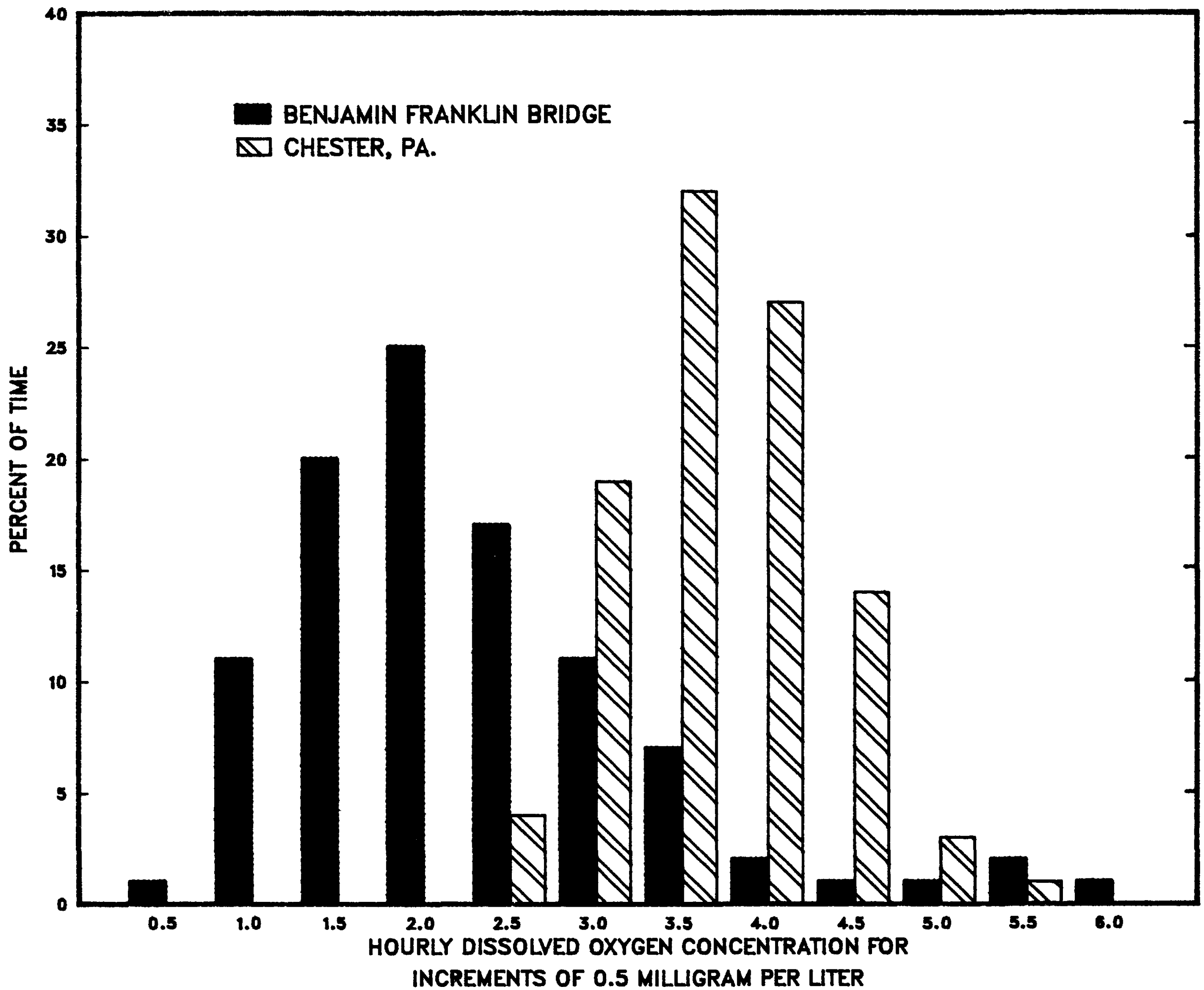


Figure 7. - Frequency of dissolved oxygen concentrations at two stations in the Delaware River July, August and September 1985.