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REPORT OF THE RIVER MASTER OF THE DELAWARE RIVER

FOR THE PERIOD DECEMBER 1, 1999-NOVEMBER 30, 2000

Open-File Report 03-414

U.S. Department of the Interior
U.S. Geological Survey

CALENDAR FOR REPORT YEAR 2000

DECEMBER 1999

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Report of the River Master of the Delaware River
For the period December 1,1999 - November 30, 2000

By Bruce E. Krejmas, Gary N. Paulachok, and William J. Carswell, Jr.

Open-File Report 03-414

Reston, Virginia
2003

U.S. DEPARTMENT OF THE INTERIOR
GALE A. NORTON, Secretary

U.S. Geological Survey
Charles G. Groat, Director

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U.S. Geological Survey
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Box 25286
Denver, CO 80225-0286

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CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
	Length	
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Area	
square mile (mi^2)	2.590	square kilometer
	Volume	
million gallons (Mgal)	3,785	cubic meter
million gallons (Mgal)	1.547	cubic foot per second-day
billion gallons (Bgal)	3.785	cubic hectometer
cubic foot per second-day ($ft^3/s{\cdot}d$)	0.002447	cubic hectometer
	Flow rate	
million gallons per day (Mgal/d)	1.547	cubic foot per second
million gallons per day (Mgal/d)	0.04381	cubic meter per second
billion gallons per day (Bgal/d)	43.81	cubic meter per second
cubic foot per second (ft^3/s)	0.02832	cubic meter per second

Vertical datum: Vertical coordinate information is referenced to the North American Vertical Datum of 1988; horizontal coordinate information is referenced to the North American Datum of 1927.

Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) as follows: °C= (°F-32)/1.8

RIVER MASTER LETTER OF TRANSMITTAL AND SPECIAL REPORT

OFFICE OF THE DELAWARE RIVER MASTER
United States Geological Survey
415 National Center
Reston, Virginia 20192

December 18, 2003

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

The Honorable
Ruth Ann Minner
Governor of Delaware

The Honorable
James E. McGreevey
Governor of New Jersey

The Honorable
George E. Pataki
Governor of New York

The Honorable
Edward G. Rendell
Governor of Pennsylvania

The Honorable
Michael R. Bloomberg
Mayor of the City of New York

No. 5, Original.—October Term, 1950
State of New Jersey, Complainant,
v.
State of New York and City of New York, Defendants,
Commonwealth of Pennsylvania and State of Delaware, Intervenors.

Dear Sirs and Madam:

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 47th Annual Report of the River Master of the Delaware River for the 12-month period from December 1, 1999, to November 30, 2000. In this report, this period is referred to as the River Master report year or the report year.

During the 2000 River Master report year, monthly precipitation in the upper Delaware River Basin ranged from 55 percent of the long-term average during December 1999 to 166 percent of the long-term average during June 2000. Total precipitation during the report year was 3.78 inches more than the long-term average. Precipitation during the December to May period, when reservoirs typically refill, was 3.51 inches more than the 59-year average. Precipitation during the report year was above normal from January to July, and below normal in December and from August to November.

On December 1, 1999, when the report year began, combined storage in the New York City reservoirs in the upper Delaware River Basin was 177.092 billion gallons (Bgal) or 65.4 percent of combined storage capacity. Median combined storage on December 1, computed on the basis of 32 years of record, is 163.894 Bgal. Operations on December 1, 1999, were being conducted as prescribed in the Decree. Storage varied little during the winter until late February when storage increased sharply. The reservoirs were full or nearly full for most of April to June and all the reservoirs spilled. Storage declined slowly from July to November, but remained above average. On November 30, 2000, combined storage in the New York City reservoirs was 220.704 Bgal, or 81.5 percent of combined capacity. The operations in the basin continued to be conducted as prescribed in the Decree.

The Delaware River Master Advisory Committee met at Stockton, New Jersey, on May 25, 2000, to discuss hydrologic conditions in the basin and operational procedures for the 2000 reservoir-release season. During the report year, the following individuals served as members of the Advisory Committee:

Delaware	Dr. Robert R. Jordan
New Jersey	Robert C. Shinn, Jr.
New York	N.G. Kaul
New York City	Joel A. Miele, Sr.
Pennsylvania	Irene B. Brooks

The River Master informed the Committee that, on the basis of information provided by New York City, the excess-release quantity beginning June 15 was 8.763 Bgal. Based on modifications to reservoir release programs in Delaware River Basin Commission (DRBC) Docket No. D-77-20 CP (Revision No. 4), the excess-release quantity was to be used for various purposes. On the basis of hydrologic conditions in late-May, the Parties to the Decree unanimously agreed to release that portion of the excess-release quantity that could be released starting June 15.

During the report year, the River Master and staff participated in a number of water-supply related meetings of the Delaware River Basin Commission. Upon invitation of the representatives of the Parties to the Decree, the Deputy Delaware River Master met periodically with those representatives as an adviser to DRBC's Flow Management Technical Advisory Committee. Discussions of particular interest to the River Master focused mainly on proposals for managing reservoir releases and streamflow in the upper Delaware River Basin.

The U.S. Geological Survey (USGS) continued the operation of its field office of the Delaware River Master at Milford, Pennsylvania. Gary N. Paulachok, Deputy Delaware River Master, continued in charge of the office, assisted by Bruce E. Krejmas and Heidi L. Soden.

During the year, the USGS office at Milford continued the weekly distribution of a summary hydrologic report. These weekly reports contain preliminary data on precipitation in the upper Delaware River Basin, releases and spills from 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, and diversions by New Jersey. The reports were distributed to members of the Delaware River Master Advisory Committee and to other parties interested in Delaware River operations. A monthly summary of hydrologic conditions, supplemented by an outlook of river flow for the upcoming month, also was provided to Advisory Committee members.

The following section of this report documents Delaware River operations during the report year. During the year, the City of New York diverted 221.334 Bgal from the Delaware River Basin and released 51.526 Bgal from Pepacton, Cannonsville, and Neversink Reservoirs to the Delaware River. The River Master directed releases from these reservoirs to the Delaware River totaling 7.630 Bgal.

The final section of this report describes water quality at various monitor sites on the Delaware Estuary. It includes basic data on chemical properties and physical characteristics of the water and presents summary statistics on the data.

Throughout the year, diversions to supply water to New York City and releases designed to maintain the flow of the Delaware River at Montague were made as directed by the River Master. Diversions by New York City from its reservoirs in the Delaware River Basin did not exceed the limit stipulated by the Decree. Diversions by New Jersey also were within the Decree limits.

The River Master and staff are grateful for the continued cooperation and support of the Parties to the Decree. Also, the contributions of the PPL Corporation and Southern Company in informing the River Master of plans for power generation and furnishing data on reservoir releases, are greatly appreciated.

A draft of this report was furnished to the River Master Advisory Committee members for review and comment. These comments have been incorporated into this final report.

Sincerely yours,

/Signed/

Stephen F. Blanchard
Delaware River Master

DELAWARE RIVER OPERATIONS

Abstract

A Decree of the United States Supreme Court in 1954 established the position of Delaware River Master. In addition, the Decree authorizes diversions of water from the Delaware River Basin and requires compensating releases from certain reservoirs, owned by New York City, to be made under the supervision and direction of the River Master. The Decree stipulates that the River Master will furnish reports to the Court, not less frequently than annually. This report is the 47th Annual Report of the River Master of the Delaware River. It covers the 2000 River Master report year, that is, the period from December 1, 1999, to November 30, 2000.

During the report year, precipitation in the upper Delaware River Basin was 3.78 in. more than the long-term average. Combined storage in Pepacton, Cannonsville, and Neversink Reservoirs was above the long-term median on December 1, 1999. Reservoir storage increased rapidly in late February and all the reservoirs filled and spilled. Storage declined steadily from early July to November. Delaware River operations were conducted as prescribed by the Decree throughout the report year.

Diversions from the Delaware River Basin by New York City and New Jersey were in compliance with the terms of the Decree. Reservoir releases were made as directed by the River Master at rates designed to meet the flow objective for the Delaware River at Montague, N.J., on 36 days during the report year. Releases were made at experimental conservation rates—or rates designed to relieve thermal stress and protect the fishery in the tailwaters of the reservoirs—on all other days.

During the report year, New York City and New Jersey complied fully with the terms of the Decree, agreements among the Parties to the Decree and the Delaware River Basin Commission, and directives and requests of the River Master.

As part of a long-term program, the quality of water in the Delaware Estuary between Trenton, N.J., and Reedy Island Jetty, Del., was monitored at various locations. Data on water temperature, specific conductance, dissolved oxygen, and pH were collected by electronic instruments at four sites. In addition, discrete water-quality data were collected at 3 sites on a monthly basis and at 18 sites on a bi-monthly basis.

Introduction

An 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 New York City reservoirs to the Delaware River. The Decree stipulated that these diversions and releases were to be made under the supervision and direction of the Delaware River Master. The Decree also stipulated that reports on Delaware River operations be made to the Court not less frequently than annually. This report documents operations from December 1, 1999, to November 30, 2000, or the 2000 River Master report year. The report also presents information on water quality in the Delaware Estuary during the report year.

Some hydrologic data presented in this report are records of streamflow and water quality for U.S. Geological Survey data-collection stations. These records were collected, computed, and furnished by the offices of the U.S. Geological Survey at Troy, New York; Malvern and Lemoyne, 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 locations of major streams and reservoirs, and selected streamflow-gaging stations in the Delaware River Basin are shown in figure 1.

Acknowledgments

The River Master's daily operation records were prepared from hydrologic data collected chiefly on a day-to-day basis. Data for these records were collected and computed by the Office of the Delaware River Master or were furnished by the following agencies and utilities: Data for Pepacton, Cannonsville, and Neversink Reservoirs by the New York City Department of Environmental Protection, Bureau of Water Supply; for Lake Wallenpaupack by the PPL Corporation; and for Rio Reservoir by Southern Company. Precipitation data and quantitative precipitation forecasts were provided by the National Weather Service.

Definition of Terms and Procedures

The following definitions apply to various terms and procedures used in the operations documented in this report. A table for converting inch-pound units to the International System of Units (SI) is given on page v.

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

Conservation releases. - Controlled releases from reservoirs designed to maintain specified flows in stream channels below the reservoirs.

Daily excess-release credits. - Daily credits and deficits during the seasonal release period (June 15 to the following March 15) are computed as the arithmetic difference between the daily mean discharge of the Delaware River at Montague, N.J., and 1,750 ft^3/s. The daily credit cannot exceed the 24-hour period releases from Pepacton, Cannonsville, and Neversink Reservoirs

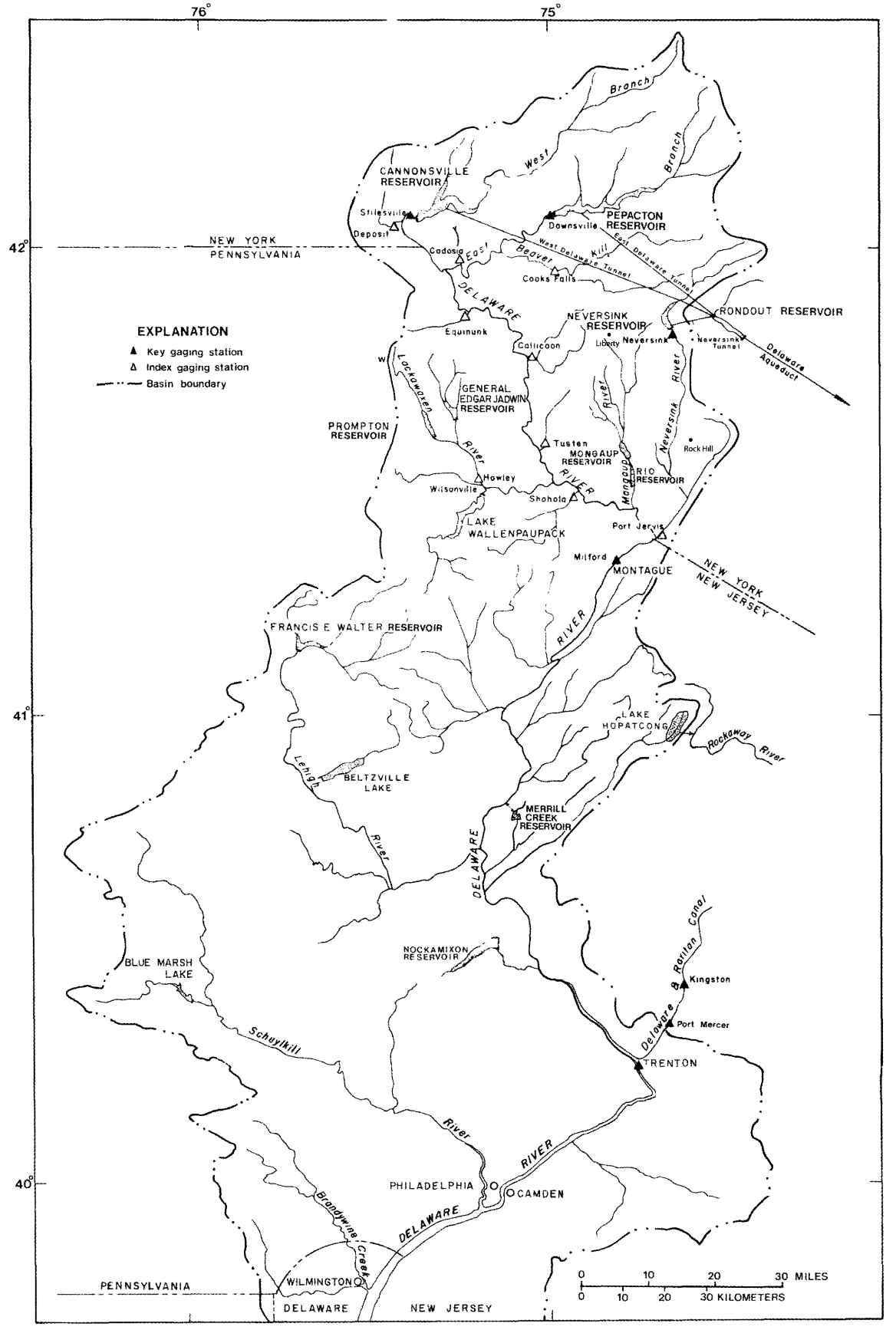

Figure 1. Delaware River Basin above Wilmington, Delaware.

routed to Montague and made in accordance with direction, except as follows: during the seasonal period, credits also are applied for part or all of other releases from these reservoirs that contribute to the daily mean discharge at Montague between 1,750 ft^3/s and the applicable excess-release rate.

Directed releases. - Controlled releases from New York City reservoirs in the upper Delaware River Basin, designed by the Delaware River Master to meet the Montague flow objective.

Diversions. - The transfer of water by New York City from Pepacton, Cannonsville, and Neversink Reservoirs in the upper Delaware River Basin through the East Delaware, West Delaware, and Neversink Tunnels, respectively, to the City's water-supply system. Also, the transfer of water by New Jersey from the Delaware River through the Delaware and Raritan Canal.

Excess quantity. - As defined in the Decree, the excess quantity of water is equal to 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 Mgal/d stipulated by 1954 Decree) from all its sources of supply obtainable without pumping, except that the excess quantity shall not exceed 70 billion gallons. Each year, the seasonal period for release of the excess quantity begins on June 15. The flow objective for the period becomes effective at Montague on that date and remains in effect until the following March 15, or until the cumulative total of excess-release credits equals the seasonal quantity, whichever occurs first.

Index gaging station. A particular site on a tributary of the upper Delaware River where systematic observations of gage height and discharge are obtained. These stations are used mainly during the directed-release season to estimate inflows of surface water to the river.

Key gaging stations. A particular site on the East Branch Delaware River, West Branch Delaware River, Neversink River, Delaware and Raritan Canal, and mainstem Delaware River where continuous, systematic observations of gage height and discharge are obtained. These stations are used on a year-round basis in River Master operations.

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

Rate of flow. - Mean discharge for a specified 24-hour period, in cubic feet per second or million gallons per day.

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

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

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.

Time of day. - Time of day is expressed in 24-hour Eastern Standard Time, which during the report year included a 23-hour day on April 2 and a 25-hour day on October 29.

Uncontrolled runoff at Montague. - Runoff from the drainage area above Montague excluding the drainage area above the Pepacton, Cannonsville, Neversink, Wallenpaupack, and Rio Dams, but including spillway overflow at these dams.

Precipitation

Precipitation in the Delaware River Basin above Montague totaled 46.99 in. for the 2000 report year and was 3.78 in. more than the long-term (59-year) average. Monthly precipitation ranged from 55 percent of the long-term average in December 1999 to 166 percent of average in June 2000. Data on monthly precipitation during the report year and long-term average precipitation are presented in table 1[1]. These data were computed from records collected by the National Weather Service; the New York City Department of Environmental Protection, Bureau of Water Supply; and the River Master, at 10 geographically distributed stations.

The seasonal period from December to May typically is when surface-water and groundwater reservoirs fill. During this period in 1999-2000, average precipitation at the 10 stations was 23.79 in., which is 117 percent of the 59-year average. During June to November, average precipitation at the 10 stations was 23.20 in., which is 101 percent of the long-term average. The maximum monthly precipitation was 8.79 in. in June 2000, measured at Liberty, New York; the minimum monthly precipitation was 1.36 in. in October 2000, measured at Rock Hill, New York (locations shown on figure 1).

Operations

December to May

Operations on December 1, 1999, were being conducted as prescribed by the Decree. The Montague flow objective was 1,750 ft^3/s, and the allowable diversions to New York City and New Jersey were 800 Mgal/d and 100 Mgal/d, respectively. Conservation releases from New York City reservoirs were made at the experimental release rates shown in table 2.

From December 1999 to May 2000, the first half of the report year, total precipitation was 3.51 in. above average. Monthly precipitation ranged from 55 percent of the long-term average in December 1999 to 153 percent in May 2000 (table 1). Runoff in the upper basin was in the normal range during December, January, and April; and above normal during February, March, and May.

On December 1, 1999, when the 2000 report year began, Pepacton Reservoir contained 100.636 Bgal of water in storage above the point of maximum depletion, or 71.8 percent of the 140.190 Bgal storage capacity. Cannonsville Reservoir contained 60.488 Bgal, or 63.2 percent of the 95.706 Bgal storage capacity. Neversink Reservoir contained 15.968 Bgal, or 45.7 percent of the 34.941 Bgal storage capacity. Combined storage in these reservoirs on December 1 was 177.092 Bgal, or 65.4 percent of combined capacity. Daily storage in Pepacton, Cannonsville, and Neversink Reservoirs is shown in tables 3, 4, and 5, respectively, and combined storage is illustrated in figure 2.

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1. All numbered tables in the section "Delaware River Operations" are grouped at the end of this section, beginning on page 28.

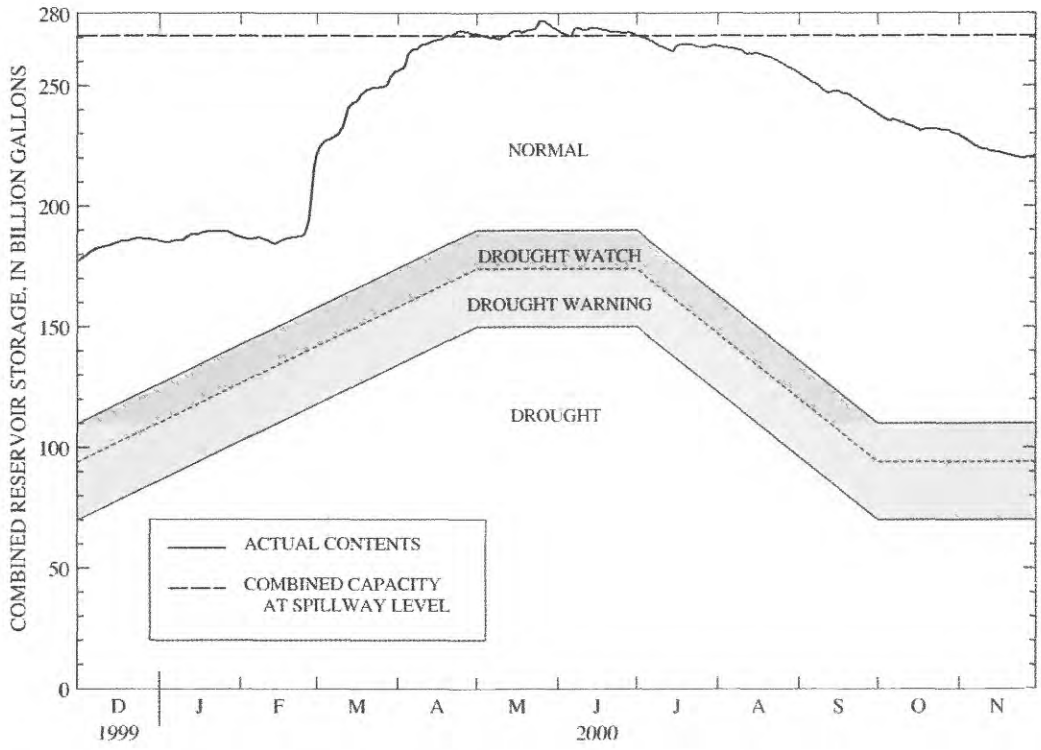

Figure 2. Operation curves and actual contents for New York City reservoirs in the Delaware River Basin, December 1, 1999, to November 30, 2000.

From December to May, inflow to the City's reservoirs typically exceeds outflow and, consequently, the amount of water in storage increases. The average inflow to Pepacton, Cannonsville, and Neversink Reservoirs for these 6 months during the 59-year period from December 1940 to May 1999 was 302.4 Bgal. During the corresponding 6 months of the current report year, inflow to the three reservoirs totaled 359.3 Bgal. Evaporation loss is not included in the computations.

Combined storage was fairly constant from December to late February. Precipitation at the end of February, in combination with above-normal temperatures causing snow melt, resulted in large volumes of runoff and a rapid increase in storage during late February. Combined storage continued to increase, although more gradually, from March to mid-April. The combined storage of the reservoirs was about 101 percent of full capacity at the end of May.

Combined storage in the three New York City reservoirs was 175.936 Bgal on November 30, 1999 and 273.697 Bgal on May 31, 2000, a net increase of 97.761 Bgal or 36.1 percent of capacity. The maximum combined storage during the period from December to May was 276.974 Bgal on May 26. Typically, maximum storage in the individual reservoirs occurs on different days. Maximum storage in Pepacton Reservoir during the December to May period was 141.746 Bgal on May 26 and 27, 2000; maximum storage in Cannonsville Reservoir was 100.373 Bgal on April 5; and maximum storage in Neversink Reservoir was 35.016 Bgal on May 26. Pepacton Reservoir spilled from April 15 to July 1, Cannonsville Reservoir spilled from February 29 to July 4, and

Neversink Reservoir spilled May 24-28. A total of 121.862 Bgal spilled from these reservoirs during the December to May period.

During the December to May period, diversions to Rondout Reservoir by New York City totaled 111.825 Bgal (611 Mgal/d). The forecasted discharge at Montague, exclusive of water released from the City reservoirs, was greater than the flow objective on all days in the period, and no releases were directed. The observed daily mean discharge at Montague exceeded the applicable flow objective on all days.

Applicable design rates for the gaging station Delaware River at Montague, N.J., are presented in table 6.

June to November

Monthly precipitation from June to November was above average in June and July and below average from August to November. Total precipitation during the period was 23.20 in. or 0.27 in. more than the 59-year average (table 1).

Releases were directed to meet the Montague flow objective on 36 days between June 1 and November 30, 2000, when the forecasted discharge at Montague, exclusive of water released from the New York City reservoirs, was less than the flow objective. Releases at experimental conservation rates or at rates designed to protect the fishery were made at other times during the period. River Master records show that from June 25 to October 30, a total of 8,269 $(ft^3/s)\cdot d$ or 5.345 Bgal was released for fisheries protection in the upper Delaware River Basin.

From June 1 to June 14, the Montague flow objective was 1,750 ft^3/s. The forecasted flow, exclusive of releases from Pepacton, Cannonsville, and Neversink Reservoirs, did not fall below the flow objective and no releases were directed.

The New York City Department of Environmental Protection, Bureau of Water Supply, Quality, and Protection furnished the River Master with the following data for the 2000 calendar year, as stipulated in the Decree:

1. The estimated continuous safe yield from all the City's sources, obtainable without pumping, is 1,665 Mgal/d, or a total during calendar year 2000 of 1.665 Bgal/d x 366 days = 609.390 Bgal.

2. The estimated consumption that the City must provide for, from all its sources of supply during calendar year 2000, is 591.582 + 7.250 = 598.832 Bgal.

On the basis of the Decree and the above data, the aggregate quantity of excess-release water was 83 percent of (609.390 - 598.832), or 8.763 Bgal.

Data on water consumption by the City of New York for each calendar year since 1950, from all sources of supply, are presented in table 7.

Modifications to reservoir release programs in DRBC Docket No. D-77-20 CP (Revision No. 4) were made on April 28, 1999. As part of these modifications, 50 percent of the annual excess-release quantity was placed in a fishery-protection bank to augment releases during drought warning. The remainder of the excess-release quantity could be used to provide an increase in the Montague flow objective or could be banked in accordance with the procedures outlined in the Lower Basin Drought Management Plan.

On June 15, 2000, the beginning of the seasonal excess-release period, the Montague flow objective was increased to 1,810 ft^3/s. Unusual circumstances during summer 2000 resulted in flows at conservation rates in the tailwaters of Cannonsville Reservoir. The conservation release from Cannonsville Reservoir into the West Branch Delaware River was reduced as scheduled from 160 ft^3/s to 45 ft^3/s on September 16. Low-flow conditions in the tailwaters were expected to persist throughout September and early October, however, as 12 Bgal of water was to be drained from Lake Wallenpaupack so that maintenance work could be performed.

As recommended at the August 16, 2000, special meeting of the Delaware River Master Advisory Committee, the New York State Department of Environmental Conservation and the New York City Department of Environmental Protection negotiated an agreement to provide for additional releases from Cannonsville Reservoir to maintain a minimum daily flow of 200 ft^3/s at the USGS streamflow-gaging station on West Branch Delaware River at Hale Eddy, N.Y. These additional releases were charged against the bank established specifically for Special Thermal Stress Releases. This program was in effect until October 31, 2000.

A copy of a DRBC resolution temporarily modifying Docket No. D-77-20 CP (Revision No. 3) to provide additional releases from Cannonsville Reservoir is included as Appendix A of this report. A total of 4,069 ($ft^3/s \cdot d$) was released for this program; Table 8 presents a summary of the additional releases.

Between June 15 and November 30, 2000, the forecasted flow at Montague, exclusive of releases from the New York City reservoirs, was less than the flow objective on 36 days and releases were directed. On 11 days during the June 15 to November 30 period, the observed flow was less than the flow objective. On all 11 days, observed flows were within 10 percent of the flow objective. Applicable design rates for the gaging station Delaware River at Montague, N.J., are presented in table 6.

The total discharge measured at Montague, the portion derived from uncontrolled runoff from the drainage area below the reservoirs, the portion contributed by power reservoirs, and the portion contributed by Pepacton, Cannonsville, and Neversink Reservoirs from July to November are shown graphically on figure 3. In analyzing the water budget for Montague, uncontrolled runoff was computed as the residual of observed flow minus releases and spill from all reservoirs, and, therefore, was subject to errors in observations, transit times, and routing of the various components of flow. The conservation release of 100 ft^3/s from Rio Reservoir is included in the uncontrolled-runoff component. The net effect of these uncertainties is incorporated in the derived hydrograph of uncontrolled runoff. Diversions to Rondout Reservoir from June 1 to November 30, 2000, totaled 109.509 Bgal.

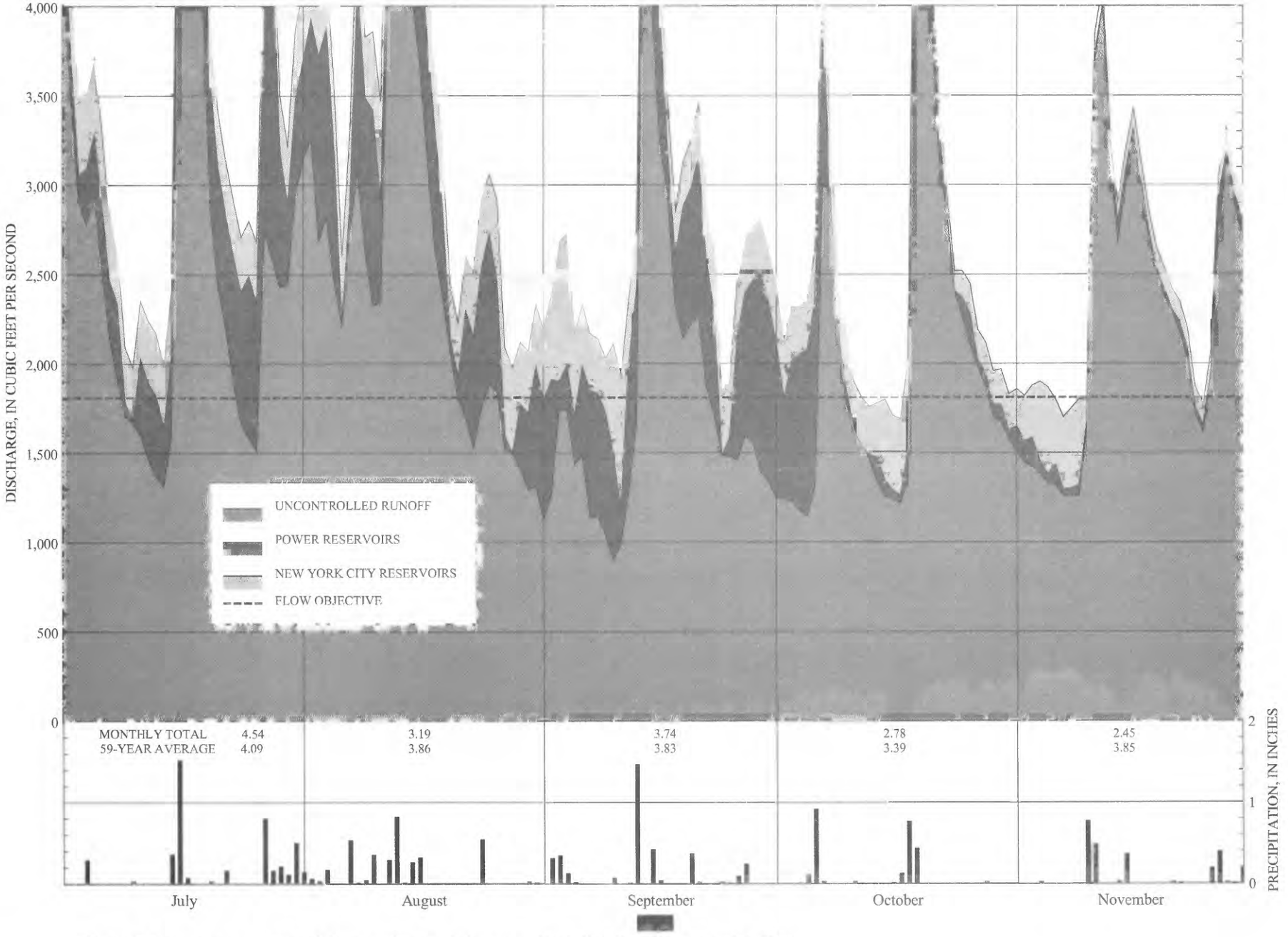

Figure 3. Components of flow, Delaware River at Montague, N.J., July 1 to November 30, 2000

Summary of Operations

From December 1, 1999, to November 30, 2000, diversions from three New York City reservoirs in the Delaware River Basin to Rondout Reservoir totaled 221.334 Bgal, and all releases from the three reservoirs to the Delaware River totaled 51.526 Bgal. Actual directed releases to the Delaware River from these reservoirs totaled 7.630 Bgal.

During the year, maximum storage was 141.783 Bgal in Pepacton Reservoir on June 8; 100.373 Bgal in Cannonsville Reservoir on April 5; and 35.429 Bgal in Neversink Reservoir on July 16. Maximum combined storage in the three resolvers was 276.974 Bgal on May 26, 2000, and the combined spill was 154.152 Bgal.

During the year, minimum storage was 92.813 Bgal (66.2 percent of capacity) in Pepacton Reservoir on February 25, 2000; 60.488 Bgal (63.2 percent of capacity) in Cannonsville Reservoir on December 1, 1999; and 15.123 Bgal (43.3 percent of capacity) in Neversink Reservoir on January 31, 2000. Minimum combined storage in the three reservoirs was 177.092 Bgal on December 1, 1999.

On November 30, 2000, the end of the report year, combined storage in the three reservoirs was 220.704 Bgal or 81.5 percent of combined capacity. During the year, the net change in combined storage was 44.768 Bgal, or an increase in contents of 16.5 percent.

The distribution of combined storage for the three reservoirs on the first day of the month, for the reference period June 1967 to November 1999, and for the report year, is shown in figure 4. Storage was above the median in every month of the report year except January and February. Storage was above the 75th percentile from June to November. Storage in September was the highest of record for the first day of September.

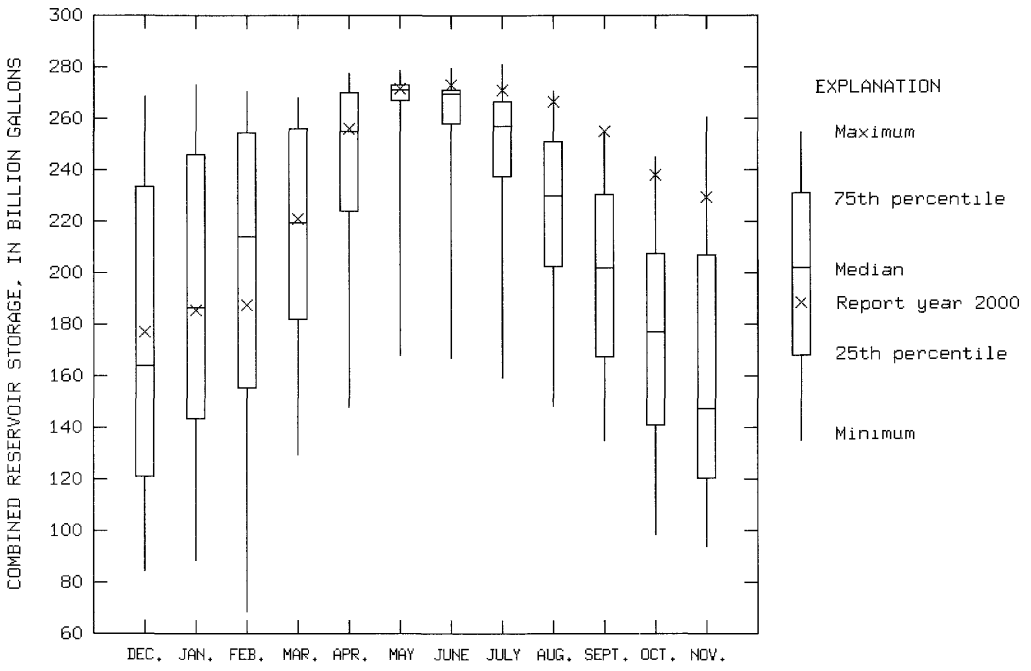

Figure 4. Combined storage in Pepacton, Cannonsville, and Neversink Reservoirs on the first day of the month, December 1999 to November 2000 (this report year), and summary statistics for the antecedent period of record, June 1967 to November 1999.

Supplemental Releases From Wallenpaupack Powerplant

An agreement between the PPL Corporation and New York City provides for supplemental releases from the Wallenpaupack hydroelectric powerplant if the Delaware River Basin Commission requests compensation for water consumed at the corporation'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 ft^3/s for more than 3 consecutive days. No supplemental releases were requested during the report year.

Streamflow

Components of Flow, Delaware River at Montague, N.J.

The data and computations of the various components of flow form the basic operational records used by the River Master to carry out specific responsibilities related to the Montague formula. The operational record has two parts: forecasted flow at Montague, exclusive of controlled releases from New York City's reservoirs (table 9), and segregation of components of daily mean flow at Montague (table 10).

The following components may be present in the flow of the Delaware River at Montague:

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

The releases from New York City's reservoirs necessary to maintain the Montague objective were computed from the forecasted flow at Montague, exclusive of controlled releases from the reservoirs.

Time of Travel

Following are average times for the effective travel of water from the various sources of controlled supply to Montague. These times were used for flow routing during the 2000 report year:

Source	Hours
Pepacton Reservoir	60
Cannonsville Reservoir	48
Neversink Reservoir	33
Lake Wallenpaupack	16
Rio Reservoir	8

Travel times were computed from reservoir and powerplant operations data and historical gaging-station records. They generally are suitable for use in the operations of the River Master. Occasionally, however, notable exceptions are observed. For example, when a large release from Cannonsville Reservoir follows a small release, a substantial portion of the water fills the channel en route, and the remainder may arrive at Montague as much as 18 hours later. During winter, the formation of ice cover, together with low streamflow, gradually increases the resistance to flow, resulting in increased travel times. Because ice-affected travel times increase gradually over several days, and releases were not being directed to meet the Montague objective during periods of ice cover, no adjustments were made to compensate for increased travel times during these periods.

Segregation of Flow At Montague

The River Master daily operations record of reservoir releases and segregation of the various components contributing to the flow of the Delaware River at Montague are presented in table 10. The data are arranged to conform to the downstream movement of water from the various sources to Montague. Summation of data along individual lines in the table is equivalent to routing the various flow contributions to Montague, using the average travel times given previously. Uncontrolled runoff was computed as a residual by subtracting the flow contributions of all other sources from the observed discharge at Montague.

Computation of Directed Releases

During the report year, the River Master used the following information for daily operations: (1) discharges computed from recorded or reported stream gage heights, for various 24-hour periods, without current information on any changes in stage-discharge relations; (2) daily discharge from New York City's three reservoirs, measured with venturi meters; (3) rainfall reports for the previous 24 hours; (4) actual powerplant releases 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 various sources. Although variable uncertainty is inherent in estimates of future conditions, these data by necessity must be used in the daily designs and direction of releases.

The travel time of water from Pepacton Reservoir to Montague (60 hours) is greater than the travel time of water from any other reservoir. Releases from Cannonsville and Neversink Reservoirs were timed to arrive at Montague concurrently with releases from Pepacton Reservoir. To allow for differences in travel times, daily directed releases were scheduled to begin from Pepacton Reservoir at 1200 hours, from Cannonsville Reservoir at 2400 hours, and from Neversink Reservoir at 1500 hours the following day.

Releases from the City's reservoirs required to maintain the specified flow at Montague were computed from estimates of releases from Lake Wallenpaupack and Rio Reservoir and forecasts of uncontrolled runoff at Montague. To account for the travel times from these sources to Montague, the computation requires that estimates of the following components of flow be made

2 or more days in advance: (1) release of water from Lake Wallenpaupack; (2) release of water from Rio Reservoir; and (3) uncontrolled runoff at Montague. The River Master daily operations record for computing daily directed release requirements during periods of low flow is given in table 9.

The electric utilities furnished advance estimates of power generation and releases. Because the hydroelectric plants were used chiefly for meeting peak-power demands, the estimates were subject to various modifying factors including the vagaries of weather on electricity demand. In addition, because the power companies are members of regional power pools, demand for power outside of the local service area unexpectedly may affect generation schedules. As a result, at times, the actual use of water for power generation differed considerably from the advance estimates that were used in the design of reservoir releases.

For computational purposes during periods of low flow, estimates of uncontrolled runoff at Montague were treated as two components: (1) current runoff and (2) forecasted increase in runoff from precipitation. Estimates for these components are given in table 9.

During ice-free conditions, current runoff was computed using a routing and recession procedure based on discharges at 0800 hours at the following USGS gaging stations:

Station Name	Drainage Area (mi^2)
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

During the winter period, the advance estimate of uncontrolled runoff (current conditions) was made on the basis of flows at a reduced network of gaging stations and the recession curve for computed uncontrolled flow at Montague.

The forecasted runoff from precipitation is shown in table 9 under the heading "Weather Adjustment." Throughout the low-flow periods, the National Weather Service office in Binghamton, N.Y., furnished quantitative forecasts of average precipitation and air temperatures, for the drainage area above Montague, for each day of the 3-day design period. During winter, runoff was estimated on the basis of the current status of snow and ice, along with forecasted precipitation and temperature. During other periods, forecasted precipitation was used to estimate runoff.

The forecasted flow at Montague, exclusive of releases from New York City's reservoirs (table 9), is computed as the sum of forecasted releases from power reservoirs, estimated uncontrolled runoff including conservation releases from Rio Reservoir, and weather adjustments. If the computed flow was less than the flow objective at Montague, then the deficiency was made up by directed releases from the City's reservoirs.

When forecasts of precipitation or powerplant releases were revised appreciably, the releases required from the reservoirs were recomputed. Commonly, this procedure resulted in a reduced release requirement for New York City reservoirs for that day and, consequently, water was conserved. Only the final figures for releases from New York City reservoirs are given in table 9.

Analysis of Forecasts

Forecasts of streamflow at Montague, developed on the basis of anticipated contributions from the components described previously (excluding releases from New York City's reservoirs), differed on most days from observed flow. Occasionally, variations in the components were partially compensating and observed flows were in good agreement with forecasted flows.

The forecasted flow of the Delaware River at Montague, exclusive of releases from New York City reservoirs, was less than the flow objective on several days from August 27 to November 10, 2000. The following tabulation compares estimates of three contributions to flow at Montague with actual operations during this period.

Releases and Runoff	Forecasted flow [$(ft^3/s)\cdot d$]	Actual flow [$(ft^3/s)\cdot d$]
Power releases		
Lake Wallenpaupack	5,189	5,584
Rio Reservoir	2,693	3,614
Runoff from uncontrolled area	49,305	52,168

From August 27 to November 10, actual releases from Lake Wallenpaupack averaged 8 percent more than forecasted amounts, and actual releases from Rio Reservoir averaged 34 percent more than forecasted amounts. Observed runoff from the uncontrolled area was about 6 percent greater than forecasted runoff.

On any given day, the forecasted flow and the actual flow can differ considerably. The range of actual daily flows from August 27 to November 10 is as follows: daily releases at Lake Wallenpaupack differed by 96 ft^3/s less to 368 ft^3/s more than forecasted releases, and daily releases at Rio Reservoir differed by 177 ft^3/s less to 248 ft^3/s more than forecasted releases. On the basis of observed flows at Montague, total directed releases from New York City's reservoirs during the report year were 24 percent more than required for exact forecasting.

Comparison of hydrographs of forecasted daily runoff and observed daily runoff from the uncontrolled area (fig. 5) indicates that the forecasts generally were adequate for use in designing

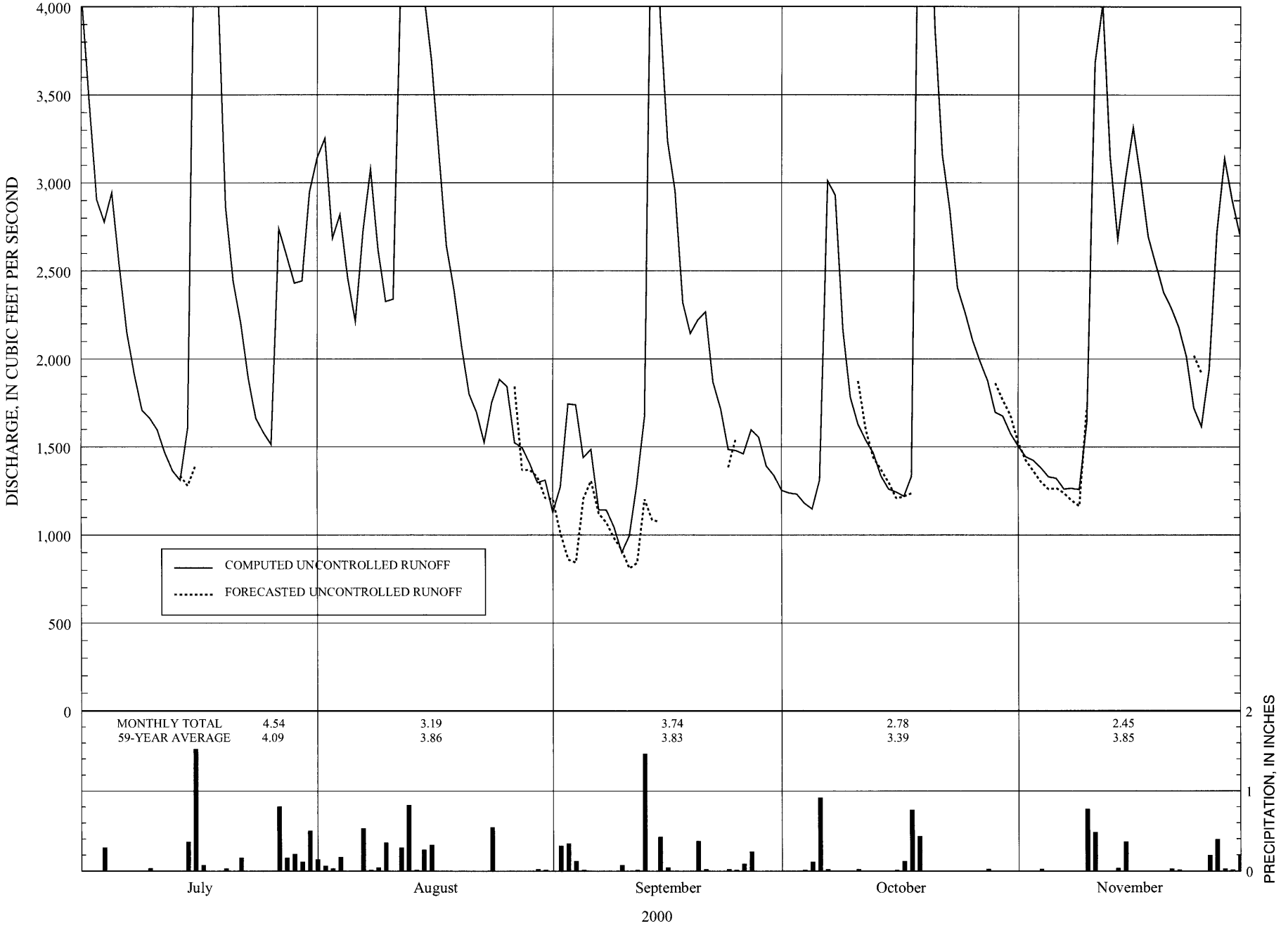

Figure 5. Uncontrolled runoff component, Delaware River at Montague, N.J., July 1 to November 30, 2000.

releases from New York City's reservoirs. Numerical adjustments to the designs were made when needed to compensate for errors in the forecasts, but because of travel times, the effects of the adjustments on flows at Montague are not evident until several days after the design date.

Analysis of the precipitation forecasts shows that the total precipitation amount forecasted for the 3-day design periods is fairly accurate, but often the timing of storms may be either earlier or later than forecasted. The accuracy of the runoff forecasts is affected greatly by the timing of precipitation events. In addition, if the actual storm track differs from the forecasted track, the amount and timing of runoff can be appreciably different than predicted.

Diversions to New York City Water Supply

The 1954 Amended Decree authorizes New York City to divert water from the Delaware River Basin at a rate not to exceed 800 Mgal/d. The Decree also specifies that the rate of diversions shall be computed as the aggregate total diversion beginning on June 1 of each year divided by the number of days elapsed since the preceding May 31.

Diversions during the report year from Pepacton, Cannonsville, and Neversink Reservoirs to the New York City water-supply system (Rondout Reservoir) are given in table 11. Included is a running account of the average rates of combined diversions from the three reservoirs, computed as prescribed by the Decree or the "Interstate Water Management Recommendations of the Parties to the Decree (DRBC Resolution 83-13)." The following tabulation shows allowable maximum diversion rates and average actual diversions for various periods during the report year.

Effective dates	Allowable diversion (Mgal/d)	Average actual diversion (Mgal/d)
June 1, 1999, to May 31, 2000	800	631
June 1 to November 30, 2000	800	598

During the year, a total of 221.334 Bgal of water was diverted to the New York City water-supply system. The allowable diversion was 320.174 Bgal.

Storage in New York City Reservoirs

The following tabulation summarizes the "point of maximum depletion" and other pertinent levels and contents of Pepacton, Cannonsville, and Neversink Reservoirs. This information was provided by the New York City Board of Water Supply.

Level	Pepacton Reservoir		Cannonsville Reservoir		Neversink Reservoir	
	Elevation (ft)	Contents (Bgal)	Elevation (ft)	Contents (Bgal)	Elevation (ft)	Contents (Bgal)
Full pool or spillway crest	1,280.00	*140.190	1,150.00	*95.706	1,440.00	*34.941
Point of maximum depletion	1,152.00	*3.511	1,040.00	*1.020	1,319.00	*0.525
Sill of diversion tunnel	1,143.00	*4.200	1,035.00	*1.564	1,314.00	
Sill of river outlet tunnel	1,126.50		1,020.50		1,314.00	
Dead storage		1.800		0.328		1.680

*Contents shown are quantities stored between listed elevations.

Storage in Pepacton, Cannonsville, and Neversink Reservoirs, above the "point of maximum depletion" or minimum full-operating level, is given in tables 3, 4, and 5, respectively.

On December 1, 1999, combined storage in the three reservoirs was 177.092 Bgal, or 65.4 percent of combined capacity. As discussed previously, storage increased from below normal to normal during the winter period. Pepacton Reservoir spilled a total of 32.649 Bgal from April 15 to July 1, 2000. Cannonsville Reservoir spilled a total of 116.208 Bgal from February 29 to July 4, 2000. Neversink Reservoir spilled a total of 5.295 Bgal from May 24-28, June 6-10 and July 15-21, 2000. Combined storage reached a maximum for the year on May 26, 2000, when all three reservoirs were spilling. The seasonal decline in storage began in July, later than normal. Combined storage declined to 220.704 Bgal, or 81.5 percent of combined capacity on November 30, 2000.

Comparison of River Master Operations Data With Other Streamflow Records

River Master operations essentially are day-to-day operations, which by necessity use preliminary data on streamflow. In this section, records used in River Master operations are compared to final data published for USGS gaging stations. The data on releases were reported in million gallons per day and converted to cubic feet per second for use in the comparisons.

Releases from New York City Reservoirs

River Master operations data on controlled releases from Pepacton, Cannonsville, and Neversink Reservoirs to the Delaware River were furnished by New York City. These data were obtained from calibrated instruments connected to venturi meters installed in the outlet conduits of the reservoirs.

The USGS gaging station on East Branch Delaware River at Downsville, N.Y., is 0.5 mile downstream from Pepacton Reservoir Dam (fig. 1). Discharge measured at this station includes releases from Pepacton Reservoir and a small amount of seepage and any runoff that enters the channel between the dam and the gaging station. The drainage area is 371 mi^2 at the dam and 372 mi^2 at the gaging station.

The following tabulation compares releases from Pepacton Reservoir (table 10), reported by New York City, to the final records for the USGS gaging station on East Branch Delaware River at Downsville, N.Y. (table 12), for the flow objectives shown.

Flow objective (ft^3/s)	45	70	95
NYC-measured flow (ft^3/s)	44.9	69.6	94.7
USGS-measured flow (ft^3/s)	44.0	69.4	92.2
Percent difference*	+2.0	+0.3	+2.7

*Computed as $\frac{\text{(NYC-measured flow minus USGS-measured flow)}}{\text{(USGS-measured flow)}} \times 100$

The differences at all flow rates are less than 3 percent. The River Master's office made three discharge measurements during the year. These measurements yielded differences similar to those in the tabulation at the 45-ft^3/s and 95-ft^3/s flow rates. The calibration of instruments connected to the venturi meters was adjusted periodically by New York City to improve the accuracy of the readings.

The USGS gaging station on West Branch Delaware River at Stilesville, N.Y., is 1.4 miles downstream from Cannonsville Dam (fig. 1). Discharge measured at this station includes releases from Cannonsville Reservoir and runoff from 2 mi^2 of drainage area between the dam and the gaging station. The drainage area is 454 mi^2 at the dam and 456 mi^2 at the gaging station.

The following tabulation compares releases from Cannonsville Reservoir (table 10), reported by New York City, to the final records for the USGS gaging station on West Branch Delaware River at Stilesville, N.Y. (table 13), for the flow objectives shown.

Flow objective (ft^3/s)	45	160	161-450
NYC-measured flow (ft^3/s)	44.4	159	243
USGS-measured flow (ft^3/s)	53.6	158	241
Percent difference*	-17.2	+0.6	+0.8

*Computed as $\frac{\text{(NYC-measured flow minus USGS-measured flow)}}{\text{(USGS-measured flow)}} \times 100$

The records at this gaging station are considered fair at flows greater than 100 ft^3/s and poor at flows less than 100 ft^3/s. The recorded flows include runoff from precipitation on the area between the dam and the gaging station and seepage near the base of the dam. On January 21, 1998, the seepage was measured at 3.9 ft^3/s, which was greater than rates estimated in previous years. The differences in flow between reservoir-release records and USGS gaging-station records continue to be monitored by the River Master's office, in cooperation with New York City and the USGS District office in Troy, N.Y. To further investigate the differences, two discharge measurements were made during the report year, just below the Cannonsville release outlet. By measuring flow at this location, most of the runoff contribution from the intervening area between the outlet and the gaging station is eliminated, but seepage near the base of the dam is included. The first measurement differed from New York City release records by -4.1 percent (unadjusted) and +4.7 percent when adjusted for the seepage of 3.9 ft^3/s for the 45 ft^3/s flow objective. The second measurement differed from New York City release records by -1.8 percent (unadjusted) and +0.6 percent (adjusted) for the 160 ft^3/s flow objective.

The USGS gaging station on Neversink River at Neversink, N.Y., is 1,650 feet downstream from Neversink Dam (fig. 1). Discharge measured at this station includes releases from Neversink Reservoir and, during storms, a small amount of runoff that originates between the dam and the gaging station. The drainage area is 92.5 mi^2 at the dam and is 92.6 mi^2 at the gaging station.

The following tabulation compares releases from Neversink Reservoir (table 10), reported by New York City, to the final records for the USGS gaging station on Neversink River at Neversink, N.Y. (table 14), for the flow objectives shown.

Flow objective (ft^3/s)	25	53
NYC-measured flow (ft^3/s)	24.7	52.0
USGS-measured flow (ft^3/s)	23.9	52.4
Percent difference*	+3.3	-0.8

*Computed as $\frac{\text{(NYC-measured flow minus USGS-measured flow)}}{\text{(USGS-measured flow)}} \times 100$

The flow objectives are the experimental conservation release rates. The River Master's office made two discharge measurements during the year to further investigate the differences between reservoir-release records and USGS gaging-station records. These measurements yielded differences similar to those in the tabulation at flows of 25 ft^3/s.

Releases from Lake Wallenpaupack

Records of daily discharge through the Wallenpaupack powerplant were furnished by the PPL Corporation and published by the USGS as Wallenpaupack Creek at Wilsonville, Pa. (table 15). These discharges represent the flow through the turbines of the powerplant and were computed on a midnight-to-midnight basis. For River Master operations, flows were computed on a 24-hour basis beginning at 0800 hours to compensate for the travel time to Montague (table 10).

From December 1999 to November 2000, the River Master's record agrees with the published USGS record, except for some small variations that result mainly from differences in time frame and rounding of computations. Overall, the records agree to within 0.04 percent for the year.

Delaware River at Montague, N.J.

The River Master's operations record for the Delaware River at Montague, N.J., (table 10) showed 0.01 percent less discharge for the year than the published U.S. Geological Survey record for the gaging station at that site (table 16). Daily values for the two records were in good agreement.

Diversion Tunnels

Records of diversions through the East Delaware, West Delaware, and Neversink Tunnels (fig. 1) were furnished by the City of New York. These records were obtained from the City's calibrated instruments connected to venturi meters installed in the tunnel conduits. The measured flows were transmitted electronically, on a 15-second interval, to the New York City Department of Environmental Protection computer at the Rondout Effluent Chamber. On 5-minute intervals, release and diversion quantities for the preceding 5-minute period are computed on the basis of the instantaneous rate-of-flow data from each instrument. These 5-minute quantities are summed to compute daily total flows, which were reported to the River Master's office on a daily basis. On a weekly basis, the diversion values were checked against the flow meter totalizer readings and were corrected when necessary. Periodic current-meter measurements were made by the River Master's office to verify the reported diversions. The measurements were made in the outlet channels below the tunnels.

The East Delaware Tunnel is used to divert water from Pepacton Reservoir to Rondout Reservoir. Conditions in the outlet channel of the East Delaware Tunnel were unfavorable for flow measurements during the report year because of high water levels in Rondout Reservoir. Comparison of diversion data provided by New York City with gage height record for the outlet channel of the East Delaware Tunnel did not indicate any large discrepancies in diversions reported by the City.

The generating plant at the downstream end of the East Delaware Tunnel operated most days of the report year. When the powerplant was not in operation, some water leaked through the wicket gates and was not recorded on the totalizer. A current-meter measurement made in 1989

shows that the rate of leakage (if assumed unchanged with time) is about 8.0 Mgal/d. Because the powerplant was not in operation for the equivalent of 71 days during the 2000 report year, the unmeasured leakage totaled about 0.6 Bgal. The record of diversions through the East Delaware Tunnel is considered substantially correct.

The West Delaware Tunnel is used to divert water from Cannonsville Reservoir to Rondout Reservoir. One current-meter measurement of flow in the West Delaware Tunnel outlet channel was made during the year. This measurement shows that, on average, the venturi instruments gave larger results, specifically, +4.1 percent for the totalizer and +4.1 percent for the rate-of-flow indicator when compared to the current-meter measurement. Inspections of the channel below the outlet, when valves were closed, revealed only negligible leakage.

A hydroelectric powerplant uses water diverted through the West Delaware Tunnel, but the plant operates only when diversions are less than 300 Mgal/d. When the powerplant is not operating, the valves on the pipelines to the plant are closed, and there is no leakage through the system. The results of the measurements and inspections made during the report year and previous years indicate that the reported record of diversions through the West Delaware Tunnel is substantially correct.

The Neversink Tunnel is used to divert water from Neversink Reservoir to Rondout Reservoir. No current-meter measurements of flow from Neversink Tunnel were made during the report year.

A hydroelectric plant uses water diverted through the Neversink Tunnel. When the powerplant is not operating and the main valve on the diversion tunnel is open, leakage develops that is not recorded on the venturi instruments. One measurement made in 1999 showed a leakage rate of 16.2 ft^3/s (10.5 Mgal/d). When the powerplant was operating, the leakage was included in the recorded flow. No leakage occurs when the main valve on the tunnel is closed.

During the 2000 report year, the powerplant operated part of the day on most days and was not operated the equivalent of 229 days. Using the leakage rate noted above and records of powerplant operation, about 2.4 Bgal of water was diverted but not recorded.

Diversions by New Jersey

The Amended Decree authorizes New Jersey to divert water from the Delaware River or its tributaries in New Jersey, to areas outside the Delaware River Basin, without compensating releases. These diversions may not exceed 100 Mgal/d as a monthly average, and the diversion on any day may not exceed 120 Mgal/d. The USGS gaging station on Delaware and Raritan Canal at Port Mercer, New Jersey (fig. 1) is used as the official control point for measuring the diversions by New Jersey (table 17).

The following tabulation lists the allowable diversion by New Jersey, the period it was in effect, and the maximum monthly diversion during the report year:

Effective dates	Allowable monthly average diversion (Mgal/d)	Maximum monthly average diversion (Mgal/d)	Month of maximum average diversion
Dec. 1, 1999, to Nov. 30, 2000	100	92.5	July 2000

The maximum daily diversion was 98 Mgal on April 15 and September 10, 2000. The streamflow record shows that diversions by New Jersey were within the allowable limits prescribed by the Decree.

Conformance of Operations as Provided Under Amended Decree of The U.S. Supreme Court Dated June 7, 1954

From December 1, 1999, to November 30, 2000, operations of the Delaware River Master were conducted as stipulated by the Decree.

Diversions from the Delaware River Basin to the New York City water-supply system were less than those authorized by the Decree. Under compensating releases of the Montague Formula, New York City released water from its reservoirs at rates designed by the River Master to maintain the applicable flow objectives at Montague. During the report year, New York City complied fully with the directives of the River Master.

Diversions from the Delaware River Basin by New Jersey were within limits prescribed by the Decree. New Jersey complied fully with the requests of the River Master.

Table 1. Precipitation in the Delaware River Basin above Montague, N.J.
[All values, except percentages, in inches]

Month	December 1940 to November 1999 Monthly Average	December 1999 to November 2000			
		Amount	Percent of average	Excess (+) or deficit (-)	
				Month	Cumulative
December	3.37	1.84	55	-1.53	-1.53
January	3.02	3.44	114	+.42	-1.11
February	2.64	3.26	123	+.62	-.49
March	3.32	4.08	123	+.76	+.27
April	3.76	4.81	128	+1.05	+1.32
May	4.17	6.36	153	+2.19	+3.51
June	3.91	6.50	166	+2.59	+6.10
July	4.09	4.54	111	+.45	+6.55
August	3.86	3.19	83	-.67	+5.88
September	3.83	3.74	98	-.09	+5.79
October	3.39	2.78	82	-.61	+5.18
November	3.85	2.45	64	-1.40	+3.78
12 months	43.21	46.99	109	+3.78	

Table 2. Conservation release rates for New York City reservoirs in the Delaware River Basin
[All values in cubic feet per second]

Reservoir	Effective dates	Conservation release rates		
		Basic	Augmented	Experimental
Pepacton	December 1 to March 31	6	50	45
	April 1-7	6	70	45
	April 8-30	19	70	45
	May 1-31	19	70	70
	June 1 to August 31	19	70	95
	September 1-30	19	70	70
	October 1-31	19	70	45
	November 1-30	6	50	45
Cannonsville	December 1 to March 31	8	33	45
	April 1-15	8	45	45
	April 16 to May 31	23	45	45
	June 1-14	23	45	160
	June 15 to August 15	23	325	160
	August 16 to September 15	23	45	160
	September 16 to October 31	23	45	45
	November 1-30	23	33	45
Neversink	December 1 to March 31	5	25	25
	April 1-7	5	45	25
	April 8-30	15	45	25
	May 1 to September 30	15	45	53
	October 1-31	15	45	25
	November 1-30	5	25	25

Table 3. Storage in Pepacton Reservoir, N.Y., for year ending November 30, 2000

[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. Storage at spillway level is 140,190 million gallons]
(River Master daily operations record; gage reading at 0800 hours)

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	100,636	99,970	95,267	105,542	129,253	140,708	140,801	140,043	138,498	136,290	126,568	118,411
2	101,024	99,800	94,995	106,804	130,103	140,579	140,375	139,987	138,351	136,036	126,272	117,804
3	101,055	99,551	94,665	107,863	130,369	140,523	140,412	139,546	138,040	135,674	125,783	117,619
4	101,242	99,583	94,456	108,653	131,291	140,338	140,135	139,455	138,094	135,294	125,505	117,383
5	101,351	99,366	94,411	109,105	133,060	140,394	140,190	139,216	138,003	134,750	125,019	116,964
6	101,445	99,444	94,546	109,380	134,390	140,375	140,079	138,885	137,912	134,210	124,863	116,646
7	101,507	99,382	94,605	110,128	135,312	140,375	141,506	138,700	138,205	134,030	124,828	116,076
8	101,648	99,259	94,710	110,859	135,729	140,412	141,783	138,259	138,076	133,545	124,585	115,959
9	101,445	98,983	94,516	111,252	136,672	140,079	141,617	137,730	137,748	133,114	124,239	115,525
10	101,320	98,998	94,156	112,037	137,419	140,043	141,338	137,346	137,875	132,541	123,790	115,243
11	101,226	99,106	94,141	113,024	137,948	140,505	141,320	137,528	137,657	132,326	123,566	114,961
12	101,195	98,983	93,722	115,011	138,572	140,560	141,412	137,310	137,583	131,898	123,170	114,694
13	101,133	99,106	93,437	117,266	138,995	140,579	141,486	137,054	137,784	132,004	122,946	114,213
14	101,133	98,829	93,125	118,293	139,638	141,098	141,486	136,818	137,784	131,862	122,722	114,113
15	101,101	98,614	93,318	119,580	140,061	141,135	141,375	136,581	138,223	131,773	122,258	113,881
16	100,993	98,429	93,348	120,225	140,449	141,153	141,227	137,310	138,296	131,791	121,985	113,683
17	101,009	98,537	93,273	121,180	140,468	141,098	141,246	137,857	138,186	131,452	121,540	113,486
18	101,148	98,429	93,393	122,138	140,746	140,801	141,264	138,149	138,186	131,149	121,591	113,189
19	100,993	98,198	93,258	122,842	141,005	141,079	141,209	138,205	138,094	131,238	121,591	112,843
20	100,823	98,168	93,303	123,687	140,894	141,005	141,116	138,351	138,351	130,723	121,402	112,745
21	101,055	97,953	93,140	123,911	141,005	140,968	140,838	138,296	138,480	130,475	121,231	112,398
22	101,211	97,648	93,170	124,499	141,079	140,931	140,876	138,461	138,351	130,156	120,924	112,135
23	101,024	97,465	93,021	124,707	141,246	140,950	140,913	138,461	138,351	129,837	120,838	111,971
24	101,039	97,267	92,932	124,950	141,320	140,987	140,801	138,406	138,113	129,536	120,599	111,644
25	100,915	97,069	92,813	125,105	141,338	141,709	140,523	138,425	137,912	128,849	120,225	111,284
26	100,683	96,871	93,946	125,314	141,172	141,746	140,505	138,535	137,839	128,585	119,987	110,778
27	100,668	96,673	95,222	125,436	141,135	141,746	140,412	138,572	137,565	128,322	119,885	110,974
28	100,513	96,234	99,583	125,748	140,968	141,394	140,727	138,590	137,236	127,811	119,801	110,680
29	100,326	95,963	103,500	126,971	140,838	141,394	140,301	138,848	137,072	127,565	119,070	110,387
30	100,420	95,765		127,846	140,727	141,061	140,264	138,700	136,872	126,971	118,799	110,192
31	100,125	95,493		128,972		140,931		138,756	136,581		118,664	
Change	-186	-4,632	+8,007	+25,472	+11,755	+204	+667	-1,508	-2,175	-9,610	-8,307	-8,472
Equiv. Mgal/d	-6.0	-149.4	+276.1	+821.7	+391.8	+6.6	-22.2	-48.6	-70.2	-320.3	-268.0	-282.4
Equiv. ft^3/s	-9.3	-231	+427	+1,271	+606	+10.2	-34.4	-75.3	-109	-496	-415	-437

Change for year +9,881 Mgal | Equivalent for year +27.0 Mgal/d | Equivalent for year +41.8 ft^3/s

Table 4. Storage in Cannonsville Reservoir, N.Y., for year ending November 30, 2000

[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. Storage at spillway level is 95,706 million gallons]
(River Master daily operations record; gage reading at 0800 hours)

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	60,488	69,781	76,827	96,881	98,426	97,701	97,589	96,189	93,333	88,042	80,405	83,056
2	61,142	69,689	76,633	98,249	98,152	97,540	97,267	95,963	93,348	87,681	80,184	83,056
3	61,651	69,768	76,661	98,523	98,056	97,347	96,929	95,754	93,348	87,334	79,935	82,984
4	62,237	69,596	76,509	98,651	98,700	97,218	96,704	95,722	93,348	86,987	79,769	82,883
5	62,925	69,742	76,523	98,539	100,373	96,881	96,334	95,738	93,288	86,626	79,714	82,854
6	63,447	70,046	76,661	98,426	100,309	96,687	96,285	95,523	93,227	86,308	80,004	82,738
7	63,956	70,218	76,868	98,184	99,890	96,446	96,575	95,341	93,151	86,193	80,267	82,593
8	64,504	70,351	77,061	98,104	99,359	96,462	97,154	95,143	93,120	85,904	80,350	82,565
9	64,963	70,457	76,730	97,943	99,311	96,157	97,218	94,930	93,120	85,297	80,378	82,550
10	65,408	70,470	76,537	98,394	99,424	96,221	97,041	94,626	93,014	84,877	80,447	82,767
11	65,968	71,212	76,440	98,716	99,182	96,671	96,977	94,398	92,603	84,516	80,516	83,085
12	66,286	71,953	76,150	99,553	98,828	96,897	97,251	93,942	92,086	84,169	80,447	83,287
13	66,681	72,562	75,804	100,260	98,796	97,299	97,734	93,790	92,162	84,198	80,460	83,461
14	67,012	73,013	75,555	99,713	98,555	97,862	97,975	93,516	92,177	84,154	80,488	83,620
15	67,662	73,331	75,763	99,199	98,523	98,249	98,023	93,303	92,223	84,299	80,391	83,880
16	68,073	73,676	76,329	98,716	98,378	98,265	98,104	93,516	92,116	84,198	80,295	84,097
17	68,550	74,008	76,578	98,619	98,313	98,184	97,911	93,713	92,025	84,010	80,101	84,313
18	68,735	74,229	77,006	98,957	98,329	97,750	97,750	93,774	91,903	83,807	80,295	84,473
19	68,907	74,658	77,282	98,828	98,909	97,798	97,895	93,866	91,614	83,721	80,751	84,704
20	69,093	74,920	77,462	98,667	98,941	98,023	97,685	93,957	91,416	83,620	81,105	84,863
21	69,106	75,307	77,683	98,474	98,796	97,975	97,347	93,881	91,157	83,273	81,438	85,138
22	69,463	75,694	77,807	98,329	98,877	97,943	97,315	93,820	90,777	83,128	81,755	85,268
23	69,649	75,929	78,056	98,072	98,925	98,168	97,476	93,561	90,458	82,868	81,958	85,412
24	69,755	76,205	78,249	97,734	99,166	99,295	97,315	93,379	90,290	82,579	82,160	85,557
25	69,768	76,523	78,830	97,540	99,070	100,083	96,993	93,288	89,956	82,160	82,333	85,701
26	69,715	76,840	79,977	97,396	98,764	100,212	96,929	93,257	89,621	81,669	82,521	85,904
27	69,728	77,131	81,929	97,315	98,426	99,826	96,864	93,212	89,317	81,423	82,651	86,250
28	70,139	77,117	87,435	97,476	98,410	99,327	96,784	93,303	89,165	81,192	82,868	86,438
29	69,861	77,034	93,942	98,571	98,104	98,925	96,800	93,318	88,906	80,932	82,969	86,655
30	69,821	76,896		98,764	97,943	98,410	96,559	93,364	88,693	80,682	82,998	86,915
31	69,808	76,896		98,700		98,007		93,272	88,389		83,099	
Change	+10,102	+7,088	+17,046	+4,758	-757	+64	-1,448	-3,287	-4,883	-7,707	+2,417	+3,816
Equiv. Mgal/d	+325.9	+228.6	+587.8	+153.5	-25.2	+2.1	-48.3	-106.0	-157.5	-256.9	+78.0	+127.2
Equiv. ft^3/s	+504	+354	+909	+237	-39.0	+3.2	-74.7	-164	-244	-397	+121	+197

Change for year +27,209 Mgal | Equivalent for year +74.3 Mgal/d | Equivalent for year +115 ft^3/s

Table 5. Storage in Neversink Reservoir, N.Y., for year ending November 30, 2000

[Storage in millions of gallons above elevation 1,319.00 ft. Add 525 million gallons for total contents above sill of outlet tunnel, elevation 1,314.00 ft. Storage at spillway level is 34,941 million gallons]
(River Master daily operations record; gage reading at 0800 hours)

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	15,968	15,958	15,210	18,729	28,561	32,995	34,665	34,660	34,764	30,845	31,248	28,105
2	15,998	15,932	15,257	19,032	28,685	32,995	34,528	34,650	34,744	30,634	31,169	27,839
3	16,037	15,896	15,286	19,296	28,844	33,038	34,528	34,606	34,626	30,680	31,132	27,520
4	16,037	15,985	15,342	19,503	29,079	33,144	34,438	34,655	34,538	30,762	31,058	27,300
5	16,149	16,146	15,374	19,683	29,566	33,062	34,389	34,700	34,448	30,831	30,905	27,018
6	16,274	16,208	15,422	19,847	29,832	33,067	34,374	34,582	34,316	30,854	30,873	26,727
7	16,312	16,261	15,463	20,005	29,946	33,086	35,404	34,616	34,228	30,914	30,804	26,427
8	16,348	16,338	15,473	20,179	29,937	33,081	35,269	34,458	34,106	30,919	30,744	26,190
9	16,322	16,404	15,496	20,436	30,046	33,173	35,175	34,487	34,023	30,873	30,616	25,946
10	16,241	16,491	15,532	20,980	30,082	33,081	35,011	34,497	33,876	30,873	30,478	25,729
11	16,106	16,564	15,574	21,424	30,091	33,225	34,808	34,389	33,736	30,850	30,447	25,612
12	16,070	16,568	15,609	22,380	30,068	33,254	34,739	34,374	33,577	30,841	30,310	25,424
13	15,857	16,574	15,632	23,322	30,095	33,307	34,715	34,325	33,470	31,155	30,191	25,193
14	15,827	16,524	15,697	23,797	30,191	33,374	34,650	34,296	33,341	31,508	30,128	24,932
15	15,762	16,460	15,854	24,149	30,227	33,384	34,616	34,399	33,336	31,710	29,941	24,809
16	15,729	16,454	15,942	24,441	30,296	33,475	34,528	35,429	33,149	31,747	29,819	24,625
17	15,755	16,527	16,033	24,863	30,346	33,596	34,404	35,389	33,024	31,775	29,747	24,405
18	15,684	16,557	16,059	25,341	30,515	33,572	34,214	35,224	32,857	31,789	29,620	24,197
19	15,690	16,544	16,152	25,646	30,670	33,611	34,077	35,165	32,600	31,878	29,656	23,914
20	15,690	16,430	16,205	25,908	30,795	33,944	34,101	35,060	32,425	31,958	29,575	23,733
21	15,765	16,491	16,261	26,114	30,859	34,179	34,047	34,946	32,250	31,789	29,509	23,481
22	15,890	16,278	16,315	26,346	31,364	34,379	34,248	34,887	32,075	31,625	29,459	23,298
23	15,899	16,165	16,355	26,482	31,920	34,433	34,272	34,759	32,099	31,615	29,347	23,052
24	16,004	15,988	16,411	26,596	32,307	34,473	34,370	34,528	31,775	31,583	29,275	23,000
25	16,017	15,912	16,497	26,769	32,543	35,011	34,473	34,438	31,686	31,546	29,146	23,044
26	15,965	15,814	16,782	26,949	32,691	35,016	34,626	34,384	31,504	31,513	29,057	23,100
27	15,968	15,690	17,016	27,081	32,781	34,996	34,793	34,267	31,271	31,466	28,937	23,238
28	15,988	15,593	17,597	27,283	32,762	34,956	34,853	34,286	31,122	31,461	28,773	23,338
29	15,942	15,418	18,367	27,835	32,671	34,868	34,769	34,399	31,039	31,391	28,614	23,405
30	15,958	15,280		28,105	32,829	34,739	34,725	34,567	31,058	31,332	28,399	23,597
31	15,952	15,123		28,351		34,759		34,684	30,966		28,220	
Change	+33	-829	+3,244	+9,984	+4,478	+1,930	-34	-41	-3,718	+366	-3,112	-4,623
Equiv. Mgal/d	+1.1	-26.7	+111.9	+322.1	+149.3	+62.3	-1.1	-1.3	-119.9	+12.2	-100.4	-154.1
Equiv. ft^3/s	+1.6	-41.4	+173	+498	+231	+96.3	-1.8	-2.1	-186	+18.9	-155	-238
Change for year +7,678 Mgal					Equivalent for year +21.0 Mgal/d						Equivalent for year +32.5 ft^3/s	

Table 6. Design rates for Delaware River at Montague, N.J., gaging station, December 1, 1999 to November 30, 2000

[Rates in cubic feet per second]

Effective dates	Montague Design Rate
December 1, 1999 to June 14, 2000	1,750
June 15 to November 30, 2000	1,810

Table 7. Consumption of water by New York City, 1950 to 2000
Data furnished by New York City, Department of Environmental Protection, Bureau of Water Supply
[Mgal/d, million gallons per day; Bgal, billion gallons]

Year	Average daily consumption			Annual Consumption (Bgal)
	City Proper (Mgal/d)	Outside Communities (Mgal/d)	Total (Mgal/d)	
1950	953.3	29.1	982.4	358.576
51	1,041.9	28.1	1,070.0	390.550
52	1,087.0	32.7	1,119.7	409.810
53	1,093.9	44.6	1,138.5	415.552
54	1,063.4	46.3	1,109.7	405.040
1955	1,109.9	45.3	1,155.2	421.648
56	1,111.3	48.9	1,160.2	424.633
57	1,169.0	57.2	1,226.2	447.563
58	1,152.9	49.6	1,202.5	438.912
59	1,204.3	60.3	1,264.6	461.579
1960	1,199.4	58.9	1,258.3	460.529
61	1,221.0	64.0	1,285.0	469.022
62	1,207.6	68.8	1,276.4	465.896
63	1,218.0	76.7	1,294.7	472.582
64	1,189.2	79.4	1,268.6	464.295
1965	1,052.1	71.2	1,123.3	409.995
66	1,044.9	73.2	1,118.1	408.128
67	1,135.3	71.0	1,206.3	440.302
68	1,242.0	78.2	1,320.2	483.175
69	1,328.7	80.1	1,408.8	514.229
1970	1,400.3	90.4	1,490.7	544.116
71	1,423.6	87.9	1,511.5	551.695
72	1,412.4	83.0	1,495.4	547.340
73	1,448.9	95.4	1,544.3	563.681
74	1,441.8	96.3	1,538.1	561.409
1975	1,415.0	92.1	1,507.1	550.093
76	1,435.0	95.8	1,530.8	560.264
77	1,483.0	104.7	1,587.7	579.510
78	1,479.4	103.0	1,582.4	577.566
79	1,513.0	104.6	1,617.6	590.426
1980	1,506.3	110.1	1,616.3	591.582
81	1,309.5	100.0	1,409.5	514.475
82	1,383.0	104.8	1,487.8	543.060
83	1,424.2	112.6	1,536.8	561.010
84	1,465.2	113.9	1,579.1	577.963
1985	1,325.4	106.5	1,431.9	522.656
86	1,351.1	115.2	1,466.3	535.200
87	1,447.1	119.8	1,566.9	571.885
88	1,484.3	125.6	1,609.9	589.090
89	1,402.0	113.4	1,515.4	553.158
1990	1,424.4	122.4	1,546.8	564.577
91	1,469.9	123.6	1,593.5	581.628
92	1,368.7	113.9	1,482.6	542.632
93	1,368.9	118.8	1,487.7	543.011
94	1,357.8	119.2	1,477.0	539.105
1995	1,326.1	123.1	1,449.2	528.958
96	1,283.5	120.2	1,403.7	512.351
97	1,201.3	123.5	1,324.8	483.552
98	1,220.0	124.7	1,344.7	490.816
99	1,237.2	128.6	1,365.8	498.517
2000	1,240.4	124.9	1,365.3	499.700

Table 8. Summary of Cannonsville Reservoir releases during administration of agreement among Parties to the Decree and the Delaware River Basin Commission to temporarily modify Docket No. D-77-20 CP (Revision No. 3), effective August 28 to October 31, 2000

[All values in cubic feet per second]

Date	Directed Release	Conservation Release	Special Additional Release	Total Releases	Hale Eddy Daily Mean Discharge
Sept. 16	0	84	52	136	230
17	0	45	80	125	181
18	0	45	99	144	172
19	0	45	124	169	194
20	0	45	134	179	198
21	0	45	141	186	202
22	243	0	0	243	229
23	0	45	141	186	229
24	0	45	144	189	196
25	0	45	145	190	198
26	0	45	138	183	199
27	0	45	139	184	184
28	0	45	150	195	198
29	0	45	153	198	197
30	0	45	155	200	199
Oct. 1	0	45	153	198	197
2	0	45	153	198	196
3	0	45	155	200	197
4	0	45	155	200	207
5	0	45	155	200	230
6	0	45	155	200	574
7	0	45	155	200	372
8	0	45	155	200	310
9	0	45	155	200	283
10	45	0	155	200	275
11	150	0	50	200	282
12	235	0	0	235	289
13	381	0	0	381	391
14	348	0	0	348	398
15	354	0	0	354	387
16	442	0	0	442	436
17	0	45	117	162	278
18	0	45	51	96	688
19	0	45	0	45	499
20	0	45	0	45	338
21	0	45	0	45	274
22	0	45	0	45	232
23	0	45	34	79	205
24	0	45	56	101	218
25	0	45	56	101	216
26	0	45	56	101	201
27	0	45	74	119	194
28	0	45	85	130	213
29	0	45	90	135	200
30	83	0	59	142	197
31	184	0	0	184	225

Table 9. New York City reservoir release design data
(River Master daily operation record)

[ft^3/s, cubic feet per second; $(ft^3/s)\cdot d$, cubic feet per second days]

Advance estimate of discharge of Delaware River at Montague, N.J. exclusive of New York City reservoir releases										Computation of balancing adjustment					
Date of advance estimate	Powerplant release forecasts		Uncontrolled runoff		Montague date	Discharge (ft^3/s)	Indicated deficiency	Balancing adjustment (ft^3/s)	Directed release (ft^3/s)	Adusted directed release		Actual deficiency		Cumulative difference ($(ft^3/s)\cdot d$)	Balancing adjustment (ft^3/s)
	Lake Wallenpaupack (ft^3/s)	Rio Reservoir (ft^3/s)	Current condition (ft^3/s)	Weather adjustment (ft^3/s)						Daily (ft^3/s)	Cumulative ($(ft^3/s)\cdot d$)	Daily (ft^3/s)	Cumulative ($(ft^3/s)\cdot d$)		
2000	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
MONTAGUE DESIGN RATE = 1,750 (ft^3/s) -- DECEMBER 1, 1999 to JUNE 14, 2000															
The estimated discharge at Montague was greater than the Montague design rate from Dec. 1, 1999 to June 14, 2000															
MONTAGUE DESIGN RATE = 1,810 (ft^3/s) -- JUNE 15, 2000 to NOVEMBER 30, 2000															
The estimated discharge at Montague was greater than the Montague design rate from June 15 to July 8, 2000															
July 6	0	0	1,900	0	July 9	1,900	0	0	0	0	0	25	25	-25	+2
7	0	0	1,793	24	10	1,817	0	0	0	0	0	133	158	-158	+16
8	416	0	1,504	24	11	1,944	0	0	0	0	0	0	158	-158	+16
9	416	0	1,421	266	12	2,103	0	0	0	0	0	0	158	-158	+16
10	416	0	1,397	0	13	1,813	0	+2	0	0	0	0	158	-158	+16
11	416	0	1,335	2	14	1,753	57	+16	73	73	73	170	328	-255	+26
12	416	0	1,255	24	15	1,695	115	+16	131	131	204	0	328	-124	+12
13	0	0	1,088	304	16	1,392	418	+16	434	433	637	0	328	309	-31
The estimated discharge at Montague was greater than the Montague design rate from July 17 to Aug. 26, 2000															
Aug. 24	0	0	1,842	0	Aug. 27	1,842	0	-31	0	0	637	213	541	96	-10
25	0	0	1,368	0	28	1,368	442	-31	411	411	1,048	314	855	193	-19
26	353	0	1,357	13	29	1,723	87	-31	56	56	1,104	36	891	213	-21
27	353	0	1,329	1	30	1,683	127	-31	96	96	1,200	89	980	220	-22
28	353	89	1,208	0	31	1,650	160	-10	150	150	1,350	0	980	370	-37

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 quantitative precipitation forecasts.
Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4.
Col. 6 = Design rate - Col. 5, when positive; otherwise Col. 6 = 0.
Col. 7 = Col. 14 (4 days earlier).
Col. 8 = Design rate - Col. 5 + Col. 7, when positive; otherwise Col. 8 = 0.
Col. 9 = Col. 7 from Table 10.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 10), when positive; otherwise Col. 11 = 0.
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by minus 10, limited to ±60.

Table 9. New York City reservoir release design data—Continued
(River Master daily operation record)

[ft^3/s, cubic feet per second; (ft^3/s)-d, cubic feet per second days]

Advance estimate of discharge of Delaware River at Montague, N.J. exclusive of New York City reservoir releases										Computation of balancing adjustment					
Date of advance estimate	Powerplant release forecasts		Uncontrolled runoff		Montague date	Discharge (ft^3/s)	Indicated deficiency	Balancing adjustment (ft^3/s)	Directed release (ft^3/s)	Adusted directed release		Actual deficiency		Cumulative difference (ft^3/s)· d	Balancing adjustment (ft^3/s)
	Lake Wallenpaupack (ft^3/s)	Rio Reservoir (ft^3/s)	Current condition (ft^3/s)	Weather adjustment (ft^3/s)						Daily (ft^3/s)	Cumulative (ft^3/s)· d	Daily (ft^3/s)	Cumulative (ft^3/s)· d		
2000	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
Aug. 29	353	89	1,194	10	Sept. 1	1,646	164	-19	145	145	1,495	17	997	498	-50
30	353	71	961	46	2	1,431	379	-21	358	358	1,853	0	997	856	-60
31	0	142	828	32	3	1,002	808	-22	786	787	2,640	0	997	1,643	-60
Sept. 1	0	177	788	55	4	1,020	790	-37	753	752	3,392	0	997	2,395	-60
2	96	177	1,084	123	5	1,480	330	-50	280	280	3,672	102	1,099	2,573	-60
3	514	177	1,228	79	6	1,998	0	-60	0	0	3,672	0	1,099	2,573	-60
4	663	177	1,093	28	7	1,961	0	-60	0	0	3,672	0	1,099	2,573	-60
5	668	0	1,069	0	8	1,737	73	-60	13	13	3,685	0	1,099	2,586	-60
6	551	0	981	0	9	1,532	278	-60	218	218	3,903	86	1,185	2,718	-60
7	225	0	915	0	10	1,140	670	-60	610	617	4,520	317	1,502	3,018	-60
8	96	106	804	6	11	1,012	798	-60	738	740	5,260	620	2,122	3,138	-60
9	611	0	775	66	12	1,452	358	-60	298	298	5,558	0	2,122	3,436	-60
10	611	0	875	328	13	1,814	0	-60	0	0	5,558	0	2,122	3,436	-60
11	611	0	806	278	14	1,695	115	-60	55	55	5,613	0	2,122	3,491	-60
12	568	0	772	304	15	1,644	166	-60	106	106	5,719	0	2,122	3,597	-60
The estimated discharge at Montague was greater than the Montague design rate from Sept. 16 to Sept. 23, 2000															
Sept. 21	0	0	1,374	11	Sept. 24	1,385	425	-60	365	364	6,083	324	2,446	3,637	-60
22	97	106	1,264	285	25	1,752	58	-60	0	0	6,083	227	2,673	3,410	-60
The estimated discharge at Montague was greater than the Montague design rate from Sept. 26 to Oct. 1, 2000															
Sept. 29	775	112	980	0	Oct. 2	1,867	0	-60	0	0	6,083	8	2,681	3,402	-60

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 quantitative precipitation forecasts.
Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4.
Col. 6 = Design rate - Col. 5, when positive; otherwise Col. 6 = 0.
Col. 7 = Col. 14 (4 days earlier).
Col. 8 = Design rate - Col. 5 + Col. 7, when positive; otherwise Col. 8 = 0.
Col. 9 = Col. 7 from Table 10.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 10), when positive; otherwise Col. 11 = 0.
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by minus 10, limited to ±60.

Table 9. New York City reservoir release design data—Continued
(River Master daily operation record)

[ft^3/s, cubic feet per second; $(ft^3/s)\cdot d$, cubic feet per second days]

Advance estimate of discharge of Delaware River at Montague, N.J. exclusive of New York City reservoir releases										Computation of balancing adjustment					
Date of advance estimate	Powerplant release forecasts		Uncontrolled runoff		Montague date	Discharge (ft^3/s)	Indicated deficiency	Balancing adjustment (ft^3/s)	Directed release (ft^3/s)	Adusted directed release		Actual deficiency		Cumulative difference $(ft^3/s)\cdot d$	Balancing adjustment (ft^3/s)
	Lake Wallenpaupack (ft^3/s)	Rio Reservoir (ft^3/s)	Current condition (ft^3/s)	Weather adjustment (ft^3/s)						Daily (ft^3/s)	Cumulative $(ft^3/s)\cdot d$	Daily (ft^3/s)	Cumulative $(ft^3/s)\cdot d$		
2000	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
The estimated discharge at Montague was greater than the Montague design rate from Oct. 3 to Oct. 10, 2000															
Oct. 8	0	89	1,869	5	Oct. 11	1,963	0	-60	0	0	6,083	181	2,862	3,221	-60
9	0	89	1,592	9	12	1,690	120	-60	60	60	6,143	271	3,133	3,010	-60
10	0	89	1,439	2	13	1,530	280	-60	220	220	6,363	320	3,453	2,940	-60
11	0	71	1,374	0	14	1,445	365	-60	305	305	6,668	335	3,788	2,880	-60
12	0	0	1,299	0	15	1,299	511	-60	451	451	7,119	461	4,249	2,870	-60
13	0	124	1,201	6	16	1,331	479	-60	419	418	7,537	518	4,767	2,770	-60
14	0	106	1,151	68	17	1,325	485	-60	425	424	7,961	544	5,311	2,650	-60
15	0	0	1,107	129	18	1,236	574	-60	514	512	8,473	282	5,593	2,880	-60
The estimated discharge at Montague was greater than the Montague design rate from Oct. 19 to Oct. 28, 2000															
Oct. 26	0	0	1,823	39	Oct. 29	1,862	0	-60	0	0	8,473	39	5,632	2,841	-60
27	0	124	1,726	39	30	1,889	0	-60	0	0	8,473	40	5,672	2,801	-60
28	0	71	1,655	24	31	1,750	60	-60	0	0	8,473	187	5,859	2,614	-60
29	0	71	1,526	0	Nov. 1	1,597	213	-60	153	153	8,626	162	6,021	2,605	-60
30	0	71	1,425	0	2	1,496	314	-60	254	254	8,880	244	6,265	2,615	-60
31	0	88	1,365	0	3	1,453	357	-60	297	295	9,175	225	6,490	2,685	-60
Nov. 1	0	0	1,302	0	4	1,302	508	-60	448	447	9,622	357	6,847	2,775	-60
2	0	0	1,239	20	5	1,259	551	-60	491	489	10,111	429	7,276	2,835	-60
3	0	124	1,248	18	6	1,390	420	-60	360	364	10,475	374	7,650	2,825	-60
4	0	106	1,213	25	7	1,344	466	-60	406	404	10,879	514	8,164	2,715	-60
5	0	106	1,187	9	8	1,302	508	-60	448	447	11,326	507	8,671	2,655	-60
6	0	106	1,164	0	9	1,270	540	-60	480	478	11,804	488	9,159	2,645	-60
7	0	53	1,130	594	10	1,777	33	-60	0	0	11,804	130	9,289	2,515	-60
The estimated discharge at Montague was greater than the Montague design rate from Nov. 11 to Nov. 23, 2000															
Nov. 21	0	53	1,995	24	Nov. 24	2,072	0	-60	0	0	11,804	55	9,344	2,460	-60
22	0	35	1,897	24	25	1,956	0	-60	0	0	11,804	155	9,499	2,305	-60
The estimated discharge at Montague was greater than the Montague design rate from Nov. 26 to Nov. 30, 2000															

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 quantitative precipitation forecasts.
Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4.
Col. 6 = Design rate - Col. 5, when positive; otherwise Col. 6 = 0.
Col. 7 = Col. 14 (4 days earlier).
Col. 8 = Design rate - Col. 5 + Col. 7, when positive; otherwise Col. 8 = 0.
Col. 9 = Col. 7 from Table 10.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 10), when positive; otherwise Col. 11 = 0
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by minus 10, limited to ±60.

Table 10. 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 discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled		Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other			Total	Daily	Cumul.
1999	Col. 1	Col. 2	Col. 3	Col. 4	1999	Col. 5	Col. 6	1999	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Nov. 28	0	46	40	25	Nov. 30	34	117	Dec. 1	0	111	151	5,388	5,650		
29	0	46	42	25	Dec. 1	93	142	2	0	113	235	4,492	4,840		
30	0	46	42	25	2	99	131	3	0	113	230	3,967	4,310		
Dec. 1	0	45	42	23	3	97	110	4	0	110	207	3,683	4,000		
2	0	45	42	26	4	233	89	5	0	113	322	3,515	3,950		
3	0	45	42	25	5	103	89	6	0	112	192	3,486	3,790		
4	0	45	42	25	6	153	106	7	0	112	259	3,619	3,990		
5	0	45	42	25	7	231	106	8	0	112	337	3,401	3,850		
6	0	46	42	25	8	101	106	9	0	113	207	3,070	3,390		
7	0	46	45	25	9	106	92	10	0	116	198	2,856	3,170		
8	0	45	42	25	10	99	35	11	0	112	134	2,794	3,040		
9	0	45	42	25	11	131	0	12	0	112	131	2,697	2,940		
10	0	45	42	23	12	139	0	13	0	110	139	2,561	2,810		
11	0	45	42	23	13	94	0	14	0	110	94	2,606	2,810		
12	0	45	42	23	14	240	0	15	0	110	240	3,900	4,250		
13	0	46	42	23	15	302	0	16	0	111	302	5,287	5,700		
14	0	45	43	26	16	635	88	17	0	114	723	5,223	6,060		
15	0	45	45	25	17	443	92	18	0	115	535	4,440	5,090		
16	0	45	45	25	18	268	0	19	0	115	268	4,087	4,470		
17	0	45	45	25	19	102	57	20	0	115	159	3,736	4,010		
18	0	45	45	25	20	319	57	21	0	115	376	4,499	4,990		
19	0	45	45	25	21	352	128	22	0	115	480	4,895	5,490		
20	0	45	45	25	22	332	120	23	0	115	452	4,553	5,120		
21	0	45	45	25	23	347	181	24	0	115	528	3,867	4,510		
22	0	45	45	25	24	90	109	25	0	115	199	3,306	3,620		
23	0	45	45	25	25	96	0	26	0	115	96	3,699	3,910		
24	0	45	45	25	26	88	0	27	0	115	88	3,507	3,710		
25	0	45	45	25	27	246	70	28	0	115	316	3,299	3,730		
26	0	45	43	25	28	412	53	29	0	113	465	2,952	3,530		
27	0	45	43	25	29	285	0	30	0	113	285	2,922	3,320		
28	0	45	43	25	30	313	156	31	0	113	469	2,748	3,330		
Total	0	1,401	1,340	767		6,583	2,234		0	3,508	8,817	115,055	127,380		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled	Total	Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other				Daily	Cumul.
1999/2000	Col. 1	Col. 2	Col. 3	Col. 4	1999/2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Dec. 29	0	45	43	25	Dec. 31	576	163	Jan. 1	0	113	739	2,578	3,430		
30	0	45	43	25	Jan. 1	92	0	2	0	113	92	2,485	2,690		
31	0	45	43	25	2	135	0	3	0	113	135	2,542	2,790		
Jan. 1	0	45	43	25	3	634	0	4	0	113	634	2,643	3,390		
2	0	45	43	25	4	620	89	5	0	113	709	3,068	3,890		
3	0	45	45	25	5	539	145	6	0	115	684	3,101	3,900		
4	0	43	45	25	6	466	195	7	0	113	661	2,646	3,420		
5	0	45	45	25	7	536	0	8	0	115	536	2,419	3,070		
6	0	45	48	25	8	165	0	9	0	118	165	2,337	2,620		
7	0	45	45	25	9	149	21	10	0	115	170	2,615	2,900		
8	0	45	45	25	10	570	81	11	0	115	651	4,734	5,500		
9	0	45	45	25	11	632	177	12	0	115	809	5,526	6,450		
10	0	45	45	23	12	599	0	13	0	113	599	4,608	5,320		
11	0	45	45	25	13	610	50	14	0	115	660	3,995	4,770		
12	0	45	45	26	14	311	46	15	0	116	357	3,727	4,200		
13	0	45	45	26	15	52	85	16	0	116	137	3,047	3,300		
14	0	45	45	26	16	80	71	17	0	116	151	2,833	3,100		
15	0	45	45	26	17	633	166	18	0	116	799	2,385	3,300		
16	0	45	45	26	18	484	248	19	0	116	732	2,252	3,100		
17	0	45	45	25	19	586	148	20	0	115	734	2,451	3,300		
18	0	45	45	25	20	584	117	21	0	115	701	2,384	3,200		
19	0	45	45	25	21	453	212	22	0	115	665	2,620	3,400		
20	0	45	45	25	22	101	121	23	0	115	222	2,563	2,900		
21	0	45	45	25	23	181	103	24	0	115	284	2,501	2,900		
22	0	45	45	25	24	565	124	25	0	115	689	2,896	3,700		
23	0	45	45	25	25	593	0	26	0	115	593	2,592	3,300		
24	0	45	45	25	26	671	0	27	0	115	671	2,614	3,400		
25	0	45	45	25	27	712	0	28	0	115	712	2,773	3,600		
26	0	45	45	25	28	488	103	29	0	115	591	2,794	3,500		
27	0	45	45	25	29	101	18	30	0	115	119	2,466	2,700		
28	0	45	45	25	30	215	88	31	0	115	303	2,282	2,700		
Total	0	1,393	1,388	778		13,133	2,571		0	3,559	15,704	90,477	109,740		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled		Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other			Total	Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Jan. 29	0	45	45	23	Jan. 31	699	85	Feb. 1	0	113	784	2,503	3,400		
30	0	45	45	23	Feb. 1	686	74	2	0	113	760	2,527	3,400		
31	0	45	45	23	2	646	223	3	0	113	869	2,518	3,500		
Feb. 1	0	45	45	25	3	569	145	4	0	115	714	2,271	3,100		
2	0	45	43	25	4	435	177	5	0	113	612	2,475	3,200		
3	0	45	43	25	5	161	159	6	0	113	320	2,367	2,800		
4	0	45	43	25	6	336	238	7	0	113	574	2,313	3,000		
5	0	45	43	25	7	594	578	8	0	113	1,172	2,515	3,800		
6	0	45	43	25	8	637	496	9	0	113	1,133	2,454	3,700		
7	0	45	43	25	9	521	138	10	0	113	659	2,528	3,300		
8	0	45	45	25	10	580	7	11	0	115	587	2,388	3,090		
9	0	45	45	25	11	609	0	12	0	115	609	2,716	3,440		
10	0	45	45	23	12	160	0	13	0	113	160	2,467	2,740		
11	0	45	45	23	13	98	248	14	0	113	346	2,541	3,000		
12	0	45	45	23	14	448	270	15	0	113	718	3,959	4,790		
13	0	45	45	25	15	538	206	16	0	115	744	6,941	7,800		
14	0	46	45	25	16	535	74	17	0	116	609	7,635	8,360		
15	0	45	48	25	17	500	0	18	0	118	500	6,422	7,040		
16	0	45	45	25	18	520	71	19	0	115	591	5,774	6,480		
17	0	45	45	25	19	0	106	20	0	115	106	5,409	5,630		
18	0	45	45	25	20	0	87	21	0	115	87	5,098	5,300		
19	0	45	45	25	21	38	67	22	0	115	105	4,610	4,830		
20	0	45	45	25	22	274	0	23	0	115	274	4,531	4,920		
21	0	45	45	25	23	223	170	24	0	115	393	4,772	5,280		
22	0	45	46	25	24	284	166	25	0	116	450	6,364	6,930		
23	0	45	46	25	25	206	124	26	0	116	330	10,554	11,000		
24	0	46	45	25	26	0	195	27	0	116	195	17,089	17,400		
25	0	43	43	25	27	0	117	28	0	111	117	28,472	28,700		
26	0	43	43	25	28	0	819	29	0	111	819	29,270	30,200		
Total	0	1,303	1,294	713		10,297	5,040		0	3,310	15,337	181,483	200,130		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled	Total	Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other				Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Feb. 27	0	45	43	25	Feb. 29	0	875	Mar. 1	0	113	875	18,612	19,600		
28	0	46	45	25	Mar. 1	0	787	2	0	116	787	15,097	16,000		
29	0	46	45	26	2	14	822	3	0	117	836	13,647	14,600		
Mar. 1	0	45	45	23	3	470	567	4	0	113	1,037	11,450	12,600		
2	0	45	45	23	4	0	379	5	0	113	379	10,708	11,200		
3	0	45	45	25	5	0	571	6	0	115	571	9,714	10,400		
4	0	45	45	25	6	63	433	7	0	115	496	9,059	9,670		
5	0	46	45	25	7	0	460	8	0	116	460	9,024	9,600		
6	0	46	45	25	8	56	606	9	0	116	662	10,322	11,100		
7	0	46	45	25	9	0	401	10	0	116	401	12,983	13,500		
8	0	45	45	25	10	0	851	11	0	115	851	13,834	14,800		
9	0	45	45	25	11	215	872	12	0	115	1,087	23,798	25,000		
10	0	46	45	25	12	1,219	1,543	13	0	116	2,762	24,622	27,500		
11	0	45	46	25	13	894	851	14	0	116	1,745	17,939	19,800		
12	0	45	46	25	14	1,560	645	15	0	116	2,205	13,679	16,000		
13	0	45	45	25	15	1,730	713	16	0	115	2,443	11,042	13,600		
14	0	45	45	25	16	1,738	883	17	0	115	2,621	13,464	16,200		
15	0	45	45	26	17	1,729	1,053	18	0	116	2,782	15,002	17,900		
16	0	43	45	26	18	1,735	862	19	0	114	2,597	12,089	14,800		
17	0	43	45	26	19	1,512	858	20	0	114	2,370	10,116	12,600		
18	0	45	45	26	20	1,043	695	21	0	116	1,738	9,146	11,000		
19	0	45	45	26	21	964	681	22	0	116	1,645	8,229	9,990		
20	0	45	45	25	22	934	631	23	0	115	1,565	7,370	9,050		
21	0	45	45	25	23	541	578	24	0	115	1,119	6,766	8,000		
22	0	43	45	25	24	511	514	25	0	113	1,025	5,662	6,800		
23	0	45	45	25	25	0	344	26	0	115	344	5,531	5,990		
24	0	45	45	25	26	89	379	27	0	115	468	5,437	6,020		
25	0	45	45	25	27	1,604	354	28	0	115	1,958	6,567	8,640		
26	0	45	45	25	28	540	142	29	0	115	682	12,303	13,100		
27	0	45	45	25	29	542	422	30	0	115	964	10,621	11,700		
28	0	46	45	25	30	471	422	31	0	116	893	9,391	10,400		
Total	0	1,396	1,395	777		20,174	20,194		0	3,568	40,368	363,224	407,160		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled	Total	Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other				Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Mar. 29	0	45	45	25	Mar. 31	469	273	Apr. 1	0	115	742	8,013	8,870		
30	0	45	45	25	Apr. 1	0	188	2	0	115	188	7,337	7,640		
31	0	45	45	25	2	52	227	3	0	115	279	6,796	7,190		
Apr. 1	0	43	43	25	3	528	245	4	0	111	773	7,496	8,380		
2	0	46	45	25	4	547	312	5	0	116	859	14,725	15,700		
3	0	45	45	25	5	506	390	6	0	115	896	13,089	14,100		
4	0	45	45	25	6	538	730	7	0	115	1,268	10,817	12,200		
5	0	43	45	25	7	431	383	8	0	113	814	9,173	10,100		
6	0	45	45	25	8	37	362	9	0	115	399	10,186	10,700		
7	0	45	45	25	9	78	475	10	0	115	553	12,032	12,700		
8	0	45	45	25	10	550	351	11	0	115	901	10,984	12,000		
9	0	50	45	25	11	548	532	12	0	120	1,080	9,800	11,000		
10	0	42	42	25	12	619	206	13	0	109	825	9,166	10,100		
11	0	45	39	23	13	660	284	14	0	107	944	8,259	9,310		
12	0	45	45	23	14	566	248	15	0	113	814	7,533	8,460		
13	0	43	45	23	15	0	103	16	0	111	103	7,436	7,650		
14	0	43	45	23	16	45	152	17	0	111	197	7,272	7,580		
15	0	43	45	23	17	1,158	163	18	0	111	1,321	8,968	10,400		
16	0	43	45	25	18	1,073	202	19	0	113	1,275	14,612	16,000		
17	0	50	45	25	19	994	493	20	0	120	1,487	12,393	14,000		
18	0	50	111	25	20	725	330	21	0	186	1,055	10,759	12,000		
19	0	46	45	25	21	0	691	22	0	116	691	16,293	17,100		
20	0	45	45	25	22	0	844	23	0	115	844	17,141	18,100		
21	0	46	45	25	23	78	861	24	0	116	939	16,545	17,600		
22	0	46	45	25	24	1,117	992	25	0	116	2,109	13,675	15,900		
23	0	46	45	25	25	1,118	865	26	0	116	1,983	11,601	13,700		
24	0	46	45	25	26	1,083	887	27	0	116	1,970	10,114	12,200		
25	0	46	45	25	27	1,137	617	28	0	116	1,754	9,130	11,000		
26	0	45	45	25	28	638	337	29	0	115	975	8,300	9,390		
27	0	45	45	25	29	0	472	30	0	115	472	7,353	7,940		
Total	0	1,357	1,405	740		15,295	13,215		0	3,502	28,510	316,998	349,010		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled	Total	Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other				Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Apr. 28	0	46	45	25	Apr. 30	52	361	May 1	0	116	413	6,611	7,140		
29	0	46	45	32	May 1	521	312	2	0	123	833	5,774	6,730		
30	0	51	45	51	2	418	273	3	0	147	691	5,212	6,050		
May 1	0	71	45	51	3	421	43	4	0	167	464	4,969	5,600		
2	0	71	45	51	4	530	234	5	0	167	764	4,259	5,190		
3	0	70	45	51	5	508	160	6	0	166	668	3,866	4,700		
4	0	70	45	51	6	0	0	7	0	166	0	3,674	3,840		
5	0	70	45	51	7	34	358	8	0	166	392	3,382	3,940		
6	0	70	45	53	8	727	631	9	0	168	1,358	2,984	4,510		
7	0	70	45	51	9	489	351	10	0	166	840	3,194	4,200		
8	0	70	45	51	10	164	0	11	0	166	164	7,310	7,640		
9	0	70	45	51	11	0	53	12	0	166	53	8,091	8,310		
10	0	71	15	51	12	469	89	13	0	137	558	9,705	10,400		
11	0	71	25	53	13	0	177	14	0	149	177	11,674	12,000		
12	0	71	45	53	14	0	780	15	0	169	780	11,451	12,400		
13	0	71	45	51	15	0	259	16	0	167	259	9,974	10,400		
14	0	71	45	51	16	0	436	17	0	167	436	8,567	9,170		
15	0	71	45	50	17	493	582	18	0	166	1,075	7,219	8,460		
16	0	71	45	50	18	818	543	19	0	166	1,361	8,243	9,770		
17	0	70	45	50	19	640	816	20	0	165	1,456	13,279	14,900		
18	0	70	45	50	20	0	787	21	0	165	787	13,748	14,700		
19	0	70	45	50	21	111	780	22	0	165	891	11,944	13,000		
20	0	70	45	50	22	973	779	23	0	165	1,752	12,683	14,600		
21	0	70	45	53	23	899	773	24	0	168	1,672	16,460	18,300		
22	0	70	45	53	24	837	773	25	0	168	1,610	26,122	27,900		
23	0	70	45	53	25	1,013	1,046	26	0	168	2,059	20,473	22,700		
24	0	70	45	53	26	740	1,042	27	0	168	1,782	15,450	17,400		
25	0	70	45	53	27	0	921	28	0	168	921	12,611	13,700		
26	0	70	45	53	28	0	826	29	0	168	826	10,506	11,500		
27	0	70	45	51	29	71	737	30	0	166	808	9,126	10,100		
28	0	70	45	51	30	589	337	31	0	166	926	7,408	8,500		
Total	0	2,112	1,345	1,548		11,517	15,259		0	5,005	26,776	295,969	327,750		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled	Total	Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other				Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
May 29	0	70	45	54	May 31	579	244	June 1	0	169	823	6,198	7,190		
30	0	70	45	53	June 1	709	337	2	0	168	1,046	5,256	6,470		
31	0	73	121	53	2	654	319	3	0	247	973	4,530	5,750		
June 1	0	94	161	53	3	0	266	4	0	308	266	3,856	4,430		
2	0	96	161	53	4	104	280	5	0	310	384	3,536	4,230		
3	0	96	161	53	5	715	53	6	0	310	768	6,282	7,360		
4	0	96	161	53	6	609	862	7	0	310	1,471	22,919	24,700		
5	0	96	161	53	7	704	1,560	8	0	310	2,264	18,326	20,900		
6	0	96	161	53	8	1,717	1,060	9	0	310	2,777	12,413	15,500		
7	0	96	161	54	9	1,698	856	10	0	311	2,554	9,435	12,300		
8	0	96	161	53	10	1,521	556	11	0	310	2,077	7,713	10,100		
9	0	96	161	53	11	1,200	546	12	0	310	1,746	8,744	10,800		
10	0	96	161	53	12	1,003	450	13	0	310	1,453	10,037	11,800		
11	0	94	161	53	13	997	248	14	0	308	1,245	11,247	12,800		
12	0	94	161	51	14	957	837	15	0	306	1,794	11,300	13,400	0	0
13	0	94	162	53	15	943	709	16	0	309	1,652	9,939	11,900	0	0
14	0	94	161	54	16	972	539	17	0	309	1,511	8,580	10,400	0	0
15	0	94	162	54	17	854	496	18	0	310	1,350	7,590	9,250	0	0
16	0	94	162	53	18	901	511	19	0	309	1,412	8,189	9,910	0	0
17	0	94	161	53	19	841	489	20	0	308	1,330	7,752	9,390	0	0
18	0	94	161	53	20	894	496	21	0	308	1,390	6,352	8,050	0	0
19	0	94	161	53	21	799	496	22	0	308	1,295	6,547	8,150	0	0
20	0	94	161	53	22	503	457	23	0	308	960	7,342	8,610	0	0
21	0	94	161	53	23	465	220	24	0	308	685	6,297	7,290	0	0
22	0	94	161	54	24	0	457	25	0	309	457	5,254	6,020	0	0
23	0	94	161	54	25	0	454	26	0	309	454	4,817	5,580	0	0
24	0	94	161	56	26	363	433	27	0	311	796	5,913	7,020	0	0
25	0	94	221	70	27	302	181	28	0	385	483	5,712	6,580	0	0
26	0	133	275	53	28	0	0	29	0	461	0	5,079	5,540	0	0
27	0	118	217	54	29	0	376	30	0	389	376	4,665	5,430	0	0
Total	0	2,832	4,791	1,615		21,004	14,788		0	9,238	35,792	241,820	286,850		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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.

Col. 12 = Col. 11 - Col. 8 - 1,750 ft^3/s computed algebraically, but not greater than Col. 7; except that part of Col. 8 contributing to the excess-release increment of Col. 11.
Col. 13 = Season limit of cumulative credit beginning June 15, 2000 = 13,556(ft^3/s)·d. One half of this quantity [6,778

Table 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled		Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other			Total	Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
June 28	0	94	161	53	June 30	0	447	July 1	0	308	447	4,065	4,820	0	0
29	0	96	195	53	July 1	0	238	2	0	344	238	3,468	4,050	0	0
30	0	94	263	68	2	0	149	3	0	425	149	2,906	3,480	0	0
July 1	0	94	263	68	3	317	0	4	0	425	317	2,778	3,520	0	0
2	0	94	263	68	4	341	0	5	0	425	341	2,944	3,710	0	0
3	0	93	261	65	5	370	0	6	0	419	370	2,521	3,310	0	0
4	0	93	209	53	6	317	0	7	0	355	317	2,148	2,820	0	0
5	0	94	158	53	7	337	89	8	0	305	426	1,909	2,640	0	0
6	0	94	158	53	8	0	78	9	0	305	78	1,707	2,090	0	0
7	0	94	158	51	9	14	0	10	0	303	14	1,663	1,980	0	0
8	0	94	158	70	10	431	0	11	0	322	431	1,597	2,350	0	0
9	0	94	201	53	11	424	0	12	0	348	424	1,468	2,240	0	0
10	0	94	203	53	12	455	0	13	0	350	455	1,365	2,170	0	0
11	73	94	203	53	13	329	0	14	73	277	329	1,311	1,990	60	60
12	131	94	221	53	14	434	0	15	131	237	434	1,608	2,410	131	191
13	434	94	288	51	15	0	202	16	433	0	202	5,035	5,670	433	624
14	0	94	200	53	16	0	248	17	0	347	248	8,095	8,690	0	624
15	0	94	200	53	17	563	282	18	0	347	845	5,768	6,960	0	624
16	0	94	179	53	18	493	170	19	0	326	663	4,091	5,080	0	624
17	0	94	159	53	19	548	170	20	0	306	718	2,866	3,890	0	624
18	0	94	161	53	20	645	18	21	0	308	663	2,439	3,410	0	624
19	0	94	161	53	21	630	0	22	0	308	630	2,202	3,140	0	624
20	0	94	161	53	22	657	57	23	0	308	714	1,888	2,910	0	624
21	0	94	159	53	23	742	0	24	0	306	742	1,662	2,710	0	624
22	0	94	159	53	24	912	0	25	0	306	912	1,582	2,800	0	624
23	0	94	198	53	25	821	0	26	0	345	821	1,514	2,680	0	624
24	0	94	176	53	26	1,328	0	27	0	323	1,328	2,739	4,390	0	624
25	0	94	159	53	27	1,527	241	28	0	306	1,768	2,586	4,660	0	624
26	0	94	159	53	28	729	35	29	0	306	764	2,430	3,500	0	624
27	0	94	178	53	29	453	0	30	0	325	453	2,442	3,220	0	624
28	0	96	246	53	30	438	88	31	0	395	526	2,949	3,870	0	624
Total	638	2,916	6,018	1,713		14,255	2,512		637	10,010	16,767	88,746	111,160		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (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.

Col. 12 = Col. 11 - Col. 8 - 1,750 ft^3/s computed algebraically, but not greater than Col. 7; except that part of Col. 8 contributing to the excess-release increment of Col. 11.
Col. 13 = Season limit of cumulative credit beginning June 15, 2000 = 13,556(ft^3/s)·d. One half of this quantity [6,778 (ft^3/s)·d] available for release.

Table 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallenpaupack	Rio Reservoir		Controlled Releases			Computed uncontolled		Excess Release Credits	
									N.Y.C. Reservoirs		Powerplants				
Date	Amount				Date			Date	Directed	Other			Total	Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
July 29	0	96	246	53	July 31	400	160	Aug. 1	0	395	560	3,145	4,100	0	624
30	0	96	201	53	Aug. 1	585	92	2	0	350	677	3,253	4,280	0	624
31	0	96	161	53	2	566	468	3	0	310	1,034	2,686	4,030	0	624
Aug. 1	0	96	161	53	3	535	525	4	0	310	1,060	2,820	4,190	0	624
2	0	94	212	53	4	399	333	5	0	359	732	2,459	3,550	0	624
3	0	94	240	53	5	0	0	6	0	387	0	2,213	2,600	0	624
4	0	94	241	53	6	0	173	7	0	388	173	2,719	3,280	0	624
5	0	94	241	51	7	408	648	8	0	386	1,056	3,078	4,520	0	624
6	0	94	195	51	8	495	375	9	0	340	870	2,620	3,830	0	624
7	0	94	286	59	9	386	709	10	0	439	1,095	2,326	3,860	0	624
8	0	96	373	90	10	412	160	11	0	559	572	2,339	3,470	0	624
9	0	130	582	84	11	437	71	12	0	796	508	4,186	5,490	0	624
10	0	128	673	53	12	0	0	13	0	854	0	9,446	10,300	0	624
11	0	94	348	51	13	0	230	14	0	493	230	5,527	6,250	0	624
12	0	93	240	51	14	526	142	15	0	384	668	4,078	5,130	0	624
13	0	93	232	51	15	664	50	16	0	376	714	3,700	4,790	0	624
14	0	94	159	53	16	530	135	17	0	306	665	3,169	4,140	0	624
15	0	94	159	53	17	575	106	18	0	306	681	2,643	3,630	0	624
16	0	94	159	51	18	439	57	19	0	304	496	2,390	3,190	0	624
17	0	94	159	50	19	0	78	20	0	303	78	2,069	2,450	0	624
18	0	94	158	50	20	56	71	21	0	302	127	1,801	2,230	0	624
19	0	94	159	53	21	545	53	22	0	306	598	1,696	2,600	0	624
20	0	94	215	51	22	464	160	23	0	360	624	1,526	2,510	0	624
21	0	94	246	53	23	707	67	24	0	393	774	1,753	2,920	0	624
22	0	94	183	54	24	623	223	25	0	331	846	1,883	3,060	0	624
23	0	97	300	53	25	447	181	26	0	450	628	1,842	2,920	0	624
24	0	97	345	51	26	0	73	27	0	493	73	1,524	2,090	60	684
25	411	97	333	54	27	0	0	28	411	73	0	1,496	1,980	157	841
26	56	97	198	51	28	332	35	29	56	290	367	1,407	2,120	56	897
27	96	97	198	54	29	307	117	30	96	253	424	1,297	2,070	67	964
28	150	94	198	53	30	337	337	31	150	195	674	1,311	2,330	150	1,114
Total	713	3,007	7,801	1,696		11,175	5,829		713	11,791	17,004	84,402	113,910		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (Col. 1).
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
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Col. 11 = 24 hours of calendar day shown.

Col. 12 = Col. 11 - Col. 8 - 1,750 ft^3/s computed algebraically, but not greater than Col. 7; except that part of Col. 8 contributing to the excess-release increment of Col. 11.
Col. 13 = Season limit of cumulative credit beginning June 15, 2000 = 13,556(ft^3/s)·d. One half of this quantity [6,778 (ft^3/s)·d] available for release.

Table 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled		Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other			Total	Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Aug. 29	145	96	231	70	Aug. 31	354	312	Sept. 1	145	252	666	1,127	2,190	145	1,259
30	358	96	302	70	Sept. 1	369	270	2	358	110	639	1,273	2,380	358	1,617
31	786	94	623	70	2	0	160	3	787	0	160	1,743	2,690	787	2,404
Sept. 1	753	94	588	70	3	0	248	4	752	0	248	1,740	2,740	752	3,156
2	280	94	305	53	4	87	181	5	282	172	268	1,440	2,160	238	3,394
3	0	94	200	53	5	497	0	6	0	347	497	1,486	2,330	0	3,394
4	0	94	173	53	6	707	0	7	0	320	707	1,143	2,170	0	3,394
5	13	94	159	53	7	694	0	8	13	293	694	1,140	2,140	13	3,407
6	218	94	159	53	8	681	0	9	218	88	681	1,043	2,030	192	3,599
7	610	94	470	53	9	593	0	10	617	0	593	900	2,110	360	3,959
8	738	94	593	53	10	0	195	11	740	0	195	995	1,930	180	4,139
9	298	94	200	53	11	603	124	12	298	49	727	1,286	2,360	298	4,437
10	0	102	179	53	12	650	106	13	0	334	756	1,670	2,760	0	4,437
11	55	99	159	53	13	624	89	14	55	256	713	5,216	6,240	55	4,492
12	106	70	159	53	14	674	28	15	106	176	702	3,956	4,940	106	4,598
13	0	70	159	53	15	663	67	16	0	282	730	3,238	4,250	0	4,598
14	0	70	159	51	16	158	89	17	0	280	247	2,953	3,480	0	4,598
15	0	70	136	51	17	110	174	18	0	257	284	2,319	2,860	0	4,598
16	0	70	125	51	18	729	11	19	0	246	740	2,144	3,130	0	4,598
17	0	70	144	51	19	657	106	20	0	265	763	2,222	3,250	0	4,598
18	0	70	169	51	20	702	191	21	0	290	893	2,267	3,450	0	4,598
19	0	70	179	51	21	621	99	22	0	300	720	1,870	2,890	0	4,598
20	0	70	186	51	22	586	0	23	0	307	586	1,717	2,610	0	4,598
21	365	70	243	51	23	0	0	24	364	0	0	1,486	1,850	100	4,698
22	0	70	186	51	24	0	103	25	0	307	103	1,480	1,890	60	4,758
23	0	70	189	51	25	622	67	26	0	310	689	1,461	2,460	0	4,758
24	0	70	190	51	26	802	0	27	0	311	802	1,597	2,710	0	4,758
25	0	70	183	51	27	776	135	28	0	304	911	1,555	2,770	0	4,758
26	0	70	184	51	28	804	309	29	0	305	1,113	1,392	2,810	0	4,758
27	0	70	195	51	29	920	85	30	0	316	1,005	1,339	2,660	0	4,758
Total	4,725	2,453	7,127	1,630		14,683	3,149		4,733	6,477	17,832	55,198	84,240		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (Col. 1).
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 = Col. 5 + Col. 6.
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Col. 12 = Col. 11 - Col. 8 - 1,750 ft^3/s computed algebraically, but not greater than Col. 7; except that part of Col. 8 contributing to the excess-release increment of Col. 11.
Col. 13 = Season limit of cumulative credit beginning June 15, 2000 = 13,556(ft^3/s)·d. One half of this quantity [6,778 (ft^3/s)·d] available for release.

Table 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled	Total	Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other				Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Sept. 28	0	70	198	53	Sept. 30	866	0	Oct. 1	0	321	866	1,253	2,440	0	4,758
29	0	70	200	48	Oct. 1	564	0	2	0	318	564	1,238	2,120	8	4,766
30	0	65	198	28	2	788	0	3	0	291	788	1,231	2,310	0	4,766
Oct. 1	0	45	198	23	3	874	0	4	0	266	874	1,180	2,320	0	4,766
2	0	45	200	25	4	932	0	5	0	270	932	1,148	2,350	0	4,766
3	0	45	200	23	5	1,039	0	6	0	268	1,039	1,313	2,620	0	4,766
4	0	45	200	25	6	930	0	7	0	270	930	3,010	4,210	0	4,766
5	0	45	200	25	7	0	0	8	0	270	0	2,930	3,200	0	4,766
6	0	45	200	25	8	0	0	9	0	270	0	2,170	2,440	0	4,766
7	0	46	200	25	9	0	85	10	0	271	85	1,784	2,140	0	4,766
8	0	46	200	25	10	0	0	11	0	271	0	1,629	1,900	60	4,826
9	60	46	200	25	11	0	0	12	60	211	0	1,539	1,810	60	4,886
10	220	45	200	25	12	23	0	13	220	50	23	1,467	1,760	10	4,896
11	305	45	235	25	13	0	138	14	305	0	138	1,337	1,780	30	4,926
12	451	45	381	25	14	0	89	15	451	0	89	1,260	1,800	50	4,976
13	419	45	348	25	15	0	49	16	418	0	49	1,243	1,710	-40	4,936
14	425	45	354	25	16	0	46	17	424	0	46	1,220	1,690	-60	4,876
15	514	45	442	25	17	0	195	18	512	0	195	1,333	2,040	290	5,166
16	0	45	162	25	18	0	121	19	0	232	121	5,587	5,940	0	5,166
17	0	45	96	25	19	0	96	20	0	166	96	5,328	5,590	0	5,166
18	0	45	45	25	20	0	191	21	0	115	191	3,874	4,180	0	5,166
19	0	45	45	25	21	0	184	22	0	115	184	3,161	3,460	0	5,166
20	0	45	45	25	22	0	0	23	0	115	0	2,845	2,960	0	5,166
21	0	45	45	25	23	0	0	24	0	115	0	2,405	2,520	0	5,166
22	0	45	79	25	24	0	106	25	0	149	106	2,265	2,520	0	5,166
23	0	43	101	25	25	0	177	26	0	169	177	2,104	2,450	0	5,166
24	0	45	101	25	26	0	35	27	0	171	35	1,984	2,190	0	5,166
25	0	45	101	25	27	0	74	28	0	171	74	1,875	2,120	0	5,166
26	0	45	119	25	28	0	74	29	0	189	74	1,697	1,960	39	5,205
27	0	45	130	25	29	0	95	30	0	200	95	1,675	1,970	40	5,245
28	0	46	136	25	30	0	46	31	0	207	46	1,577	1,830	60	5,305
Total	2,394	1,467	5,559	825		6,016	1,801		2,390	5,461	7,817	64,662	80,330		

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 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (Col. 1).
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
Col. 9 = Col. 5 + Col. 6.
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Table 10. 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)—Continued

[Mean discharge in cubic feet per second for 24 hours; Col., Column]

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow Delaware River at Montague, N.J.							
Directed		Pepacton	Cannonsville	Neversink		Lake Wallen-paupack	Rio Reservoir		Controlled Releases			Computed uncon-tolled	Total	Excess Release Credits	
									N.Y.C. Reservoirs		Power-plants				
Date	Amount				Date			Date	Directed	Other				Daily	Cumul.
2000	Col. 1	Col. 2	Col. 3	Col. 4	2000	Col. 5	Col. 6	2000	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Oct. 29	153	45	142	25	Oct. 31	0	142	Nov. 1	153	59	142	1,506	1,860	51	5,356
30	254	45	184	25	Nov. 1	0	121	2	254	0	121	1,445	1,820	70	5,426
31	297	45	227	23	2	0	160	3	295	0	160	1,425	1,880	130	5,556
Nov. 1	448	45	379	23	3	0	71	4	447	0	71	1,382	1,900	150	5,706
2	491	45	421	23	4	0	50	5	489	0	50	1,331	1,870	120	5,826
3	360	45	294	25	5	0	113	6	364	0	113	1,323	1,800	50	5,876
4	406	45	334	25	6	0	35	7	404	0	35	1,261	1,700	-50	5,826
5	448	45	377	25	7	0	39	8	447	0	39	1,264	1,750	0	5,826
6	480	45	408	25	8	0	64	9	478	0	64	1,258	1,800	50	5,876
7	0	45	50	25	9	0	35	10	0	120	35	1,645	1,800	50	5,926
8	0	45	45	25	10	0	53	11	0	115	53	3,682	3,850	0	5,926
9	0	45	43	25	11	0	0	12	0	113	0	4,017	4,130	0	5,926
10	0	45	43	23	12	0	46	13	0	111	46	3,153	3,310	0	5,926
11	0	45	43	25	13	0	117	14	0	113	117	2,680	2,910	0	5,926
12	0	45	45	25	14	0	64	15	0	115	64	3,021	3,200	0	5,926
13	0	45	46	25	15	0	0	16	0	116	0	3,314	3,430	0	5,926
14	0	45	46	25	16	0	0	17	0	116	0	3,024	3,140	0	5,926
15	0	45	46	25	17	0	50	18	0	116	50	2,694	2,860	0	5,926
16	0	45	46	25	18	0	0	19	0	116	0	2,534	2,650	0	5,926
17	0	45	46	25	19	0	46	20	0	116	46	2,378	2,540	0	5,926
18	0	45	46	25	20	0	14	21	0	116	14	2,290	2,420	0	5,926
19	0	45	46	25	21	0	53	22	0	116	53	2,181	2,350	0	5,926
20	0	45	45	25	22	0	71	23	0	115	71	2,014	2,200	0	5,926
21	0	45	45	25	23	0	35	24	0	115	35	1,720	1,870	55	5,981
22	0	45	45	25	24	0	39	25	0	115	39	1,616	1,770	20	6,001
23	0	45	45	25	25	0	18	26	0	115	18	1,937	2,070	0	6,001
24	0	45	45	25	26	0	220	27	0	115	220	2,715	3,050	0	6,001
25	0	45	45	25	27	0	67	28	0	115	67	3,138	3,320	0	6,001
26	0	45	45	25	28	0	53	29	0	115	53	2,902	3,070	0	6,001
27	0	45	45	25	29	0	106	30	0	115	106	2,709	2,930	0	6,001
Total	3,337	1,350	3,717	742		0	1,882		3,331	2,478	1,882	67,559	75,250		

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
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Col. 6 - 24 hours beginning 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 in response to direction (Col. 1).
Col. 8 = Col. 2 + Col. 3 + Col. 4 - Col. 7.
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Col. 11 = 24 hours of calendar day shown.

Col. 12 = Col. 11 - Col. 8 - 1,750 ft^3/s computed algebraically, but not greater than Col. 7; except that part of Col. 8 contributing to the excess-release increment of Col. 11.
Col. 13 = Season limit of cumulative credit beginning June 15, 2000 = 13,556$(ft^3/s)\cdot d$. One half of this quantity [6,778 $(ft^3/s)\cdot d$] available for release.

Table 11. 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 1999	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 1999 to date	Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 1999 to date
Dec. 1	399	196	105	651	Jan. 1	397	297	101	656
2	399	196	86	651	2	397	296	135	657
3	357	98	118	650	3	398	296	0	657
4	398	99	0	650	4	398	297	0	658
5	398	97	0	649	5	398	297	0	658
6	400	98	105	649	6	274	204	0	657
7	300	0	105	647	7	398	297	0	657
8	443	0	133	647	8	398	297	0	657
9	449	0	171	647	9	398	297	0	657
10	429	0	262	647	10	449	100	92	657
11	359	0	126	646	11	448	99	126	657
12	437	0	328	647	12	449	98	116	657
13	450	0	99	646	13	449	99	123	658
14	448	0	205	646	14	449	98	102	658
15	449	0	195	646	15	448	98	75	657
16	295	191	97	646	16	424	99	0	657
17	449	296	177	647	17	243	97	0	655
18	400	296	94	648	18	418	99	69	655
19	400	296	92	649	19	449	99	181	655
20	264	294	80	649	20	449	21	7	655
21	397	296	99	649	21	449	0	274	655
22	397	296	92	650	22	448	0	177	655
23	398	296	79	651	23	448	0	213	655
24	398	296	97	651	24	448	0	190	655
25	398	296	94	652	25	449	0	192	655
26	398	296	95	653	26	415	0	168	654
27	398	296	94	653	27	447	262	157	655
28	398	296	128	654	28	447	297	210	657
29	398	297	74	655	29	447	291	207	658
30	398	296	81	655	30	448	296	188	659
31	398	297	95	656	31	449	296	0	659
Total	12,299	5,415	3,606			13,026	5,027	3,103	

Table 11. Diversions to New York City water supply--Continued
Million gallons per day for 24 hour period beginning 0800 local time
(River Master daily operation record)

Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 1999 to date	Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 1999 to date
Feb. 1	448	297	0	660	Mar. 1	398	299	0	660
2	448	297	0	660	2	398	299	0	660
3	447	297	0	660	3	310	21	0	659
4	57	124	0	658	4	397	0	0	658
5	0	0	0	656	5	397	0	0	657
6	0	0	0	653	6	1	0	0	655
7	0	0	10	651	7	0	0	0	652
8	387	461	0	651	8	331	0	60	652
9	449	303	0	652	9	399	0	67	651
10	278	344	0	652	10	398	0	90	650
11	448	484	0	653	11	398	0	56	650
12	447	483	0	654	12	399	0	87	649
13	447	483	0	655	13	400	262	0	649
14	448	483	0	656	14	400	300	0	649
15	448	484	0	657	15	398	299	0	649
16	448	484	0	658	16	398	299	0	650
17	379	309	0	658	17	399	1	0	649
18	449	299	0	658	18	399	0	0	648
19	403	298	0	659	19	399	0	0	647
20	403	298	0	659	20	399	0	0	646
21	403	298	0	659	21	421	0	0	645
22	399	298	0	659	22	399	0	27	645
23	398	300	0	659	23	400	183	39	645
24	398	299	0	659	24	398	200	0	644
25	398	299	0	659	25	398	200	0	644
26	399	299	0	660	26	398	200	0	644
27	400	299	0	660	27	398	100	0	644
28	398	259	0	660	28	398	100	0	643
29	397	298	0	660	29	399	100	0	643
					30	399	148	0	642
					31	399	150	0	642
Total	10,424	8,877	10			11,425	3,161	426	

Table 11. Diversions to New York City water supply--Continued
Million gallons per day for 24 hour period beginning 0800 local time
(River Master daily operation record)

Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 1999 to date	Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 1999 to date
Apr. 1	214	150	0	641	May 1	298	0	91	635
2	397	149	0	641	2	295	0	69	634
3	449	150	0	641	3	288	0	0	633
4	450	282	93	641	4	294	249	164	633
5	235	160	0	640	5	298	259	122	633
6	449	37	132	640	6	300	295	61	634
7	448	0	207	640	7	302	265	77	634
8	449	0	138	640	8	447	297	2	634
9	449	0	170	640	9	449	299	110	635
10	449	0	160	640	10	36	32	0	633
11	449	0	200	640	11	277	196	48	633
12	447	0	134	640	12	408	301	139	633
13	493	0	99	640	13	449	302	139	634
14	499	0	116	640	14	449	302	152	635
15	499	0	101	640	15	300	195	0	634
16	499	0	99	639	16	241	161	0	634
17	523	0	68	639	17	448	298	125	634
18	523	0	74	639	18	195	115	127	634
19	523	0	110	639	19	529	258	0	634
20	523	0	125	639	20	581	297	0	635
21	523	0	0	639	21	581	297	0	636
22	523	0	0	639	22	581	94	210	636
23	524	0	0	638	23	452	0	377	637
24	523	0	78	638	24	23	0	175	636
25	468	0	92	638	25	0	0	322	635
26	448	0	101	638	26	0	0	252	634
27	448	0	242	638	27	0	0	263	633
28	448	0	175	638	28	0	0	261	632
29	299	0	0	637	29	0	0	300	631
30	295	0	18	636	30	278	193	126	631
					31	272	181	231	631
Total	13,466	928	2,732			9,071	4,886	3,943	

Table 11. Diversions to New York City water supply--Continued
Million gallons per day for 24 hour period beginning 0800 local time
(River Master daily operation record)

Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 2000 to date	Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 2000 to date
June 1	286	191	240	717	July 1	446	298	96	546
2	408	198	96	710	2	447	298	87	555
3	260	299	140	706	3	453	298	0	561
4	290	299	142	712	4	453	298	0	566
5	448	299	94	738	5	459	298	166	577
6	75	80	22	645	6	450	298	27	582
7	0	0	0	552	7	449	298	186	592
8	0	0	0	483	8	449	298	0	596
9	0	0	252	458	9	449	298	0	600
10	0	0	377	450	10	0	298	110	595
11	0	0	376	443	11	391	298	73	599
12	0	0	351	435	12	266	177	44	596
13	300	0	322	450	13	274	227	54	595
14	299	0	337	463	14	143	167	88	591
15	299	0	336	474	15	0	0	0	578
16	298	0	338	485	16	0	0	0	565
17	0	0	338	476	17	0	0	0	553
18	0	0	338	468	18	0	0	0	542
19	206	171	103	469	19	0	0	116	533
20	243	297	95	477	20	0	0	220	527
21	300	201	0	478	21	0	144	173	522
22	280	192	157	485	22	0	204	235	521
23	286	191	1	485	23	0	200	338	521
24	448	299	0	496	24	16	90	154	516
25	448	291	0	505	25	0	0	106	509
26	448	201	0	511	26	0	0	245	504
27	6	201	169	506	27	170	0	53	499
28	442	0	160	509	28	3	0	0	491
29	447	266	185	523	29	201	0	87	487
30	447	298	178	536	30	198	0	86	484
					31	300	0	72	482
Total	6,964	3,974	5,147			6,017	4,487	2,816	

Table 11. Diversions to New York City water supply--Continued
Million gallons per day for 24 hour period beginning 0800 local time
(River Master daily operation record)

Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 2000 to date	Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 2000 to date
Aug. 1	300	0	203	482	Sept. 1	450	200	300	521
2	291	0	203	483	2	450	200	226	524
3	0	0	196	478	3	391	200	45	526
4	0	0	213	474	4	391	200	0	526
5	0	0	198	470	5	430	199	0	527
6	0	0	210	466	6	354	199	0	528
7	199	0	291	466	7	449	200	0	529
8	183	0	161	465	8	449	298	73	532
9	205	0	226	464	9	449	298	94	535
10	206	272	215	467	10	449	298	57	537
11	206	298	220	471	11	450	298	106	541
12	196	298	215	474	12	450	298	97	543
13	186	298	215	477	13	449	298	104	546
14	102	215	102	476	14	244	10	15	544
15	198	299	302	481	15	412	249	130	546
16	258	299	212	484	16	449	249	95	548
17	213	299	224	488	17	430	250	78	550
18	198	298	224	491	18	260	184	0	549
19	0	298	223	491	19	352	122	15	549
20	19	298	225	492	20	449	298	231	553
21	281	298	226	495	21	449	289	193	556
22	280	298	193	499	22	448	283	82	558
23	281	298	165	502	23	448	283	78	560
24	279	298	214	505	24	448	283	68	562
25	261	298	238	508	25	449	268	103	565
26	288	199	210	511	26	448	267	88	567
27	292	198	209	513	27	449	150	91	568
28	318	199	98	514	28	433	200	102	569
29	299	199	0	514	29	446	201	88	570
30	299	199	157	515	30	446	201	101	572
31	272	200	110	516					
Total	6,110	5,856	6,098			12,671	6,973	2,660	

Table 11. Diversions to New York City water supply--Continued
Million gallons per day for 24 hour period beginning 0800 local time
(River Master daily operation record)

Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 2000 to date	Date 2000	East Delaware Tunnel	West Delaware Tunnel	Never-sink Tunnel	Average June 1, 2000 to date
Oct. 1	447	201	118	573	Nov. 1	449	0	377	583
2	449	201	91	575	2	449	0	332	585
3	449	46	127	575	3	448	0	297	586
4	448	12	208	576	4	448	0	339	587
5	448	23	121	576	5	447	0	337	588
6	431	8	215	577	6	447	0	344	589
7	264	0	140	575	7	447	0	299	590
8	448	0	155	576	8	446	0	300	591
9	447	0	184	576	9	448	116	303	593
10	320	0	68	575	10	449	59	300	594
11	447	0	205	575	11	448	0	299	595
12	429	0	199	576	12	448	0	300	596
13	300	0	127	574	13	448	0	301	597
14	450	0	219	575	14	448	0	282	598
15	450	0	156	575	15	448	0	302	599
16	448	0	144	575	16	448	0	303	600
17	448	0	196	576	17	447	0	302	601
18	449	0	193	576	18	447	0	339	602
19	448	0	200	577	19	447	0	268	602
20	449	0	177	577	20	447	0	327	603
21	449	0	139	577	21	447	0	250	604
22	448	0	169	578	22	447	0	318	605
23	448	0	160	578	23	447	0	83	604
24	448	0	185	578	24	446	0	0	604
25	451	0	175	579	25	446	0	0	603
26	450	0	195	579	26	447	0	0	602
27	451	0	241	580	27	447	0	0	601
28	469	0	187	580	28	449	0	0	600
29	450	0	243	581	29	449	0	0	599
30	449	0	202	581	30	449	0	0	598
31	412	0	207	582					
Total	13,394	491	5,346			13,428	175	6,902	

Table 12. Daily mean discharge, East Branch Delaware River at Downsville, N.Y. (station number 01417000), for year ending November 30, 2000 (U.S. Geological Survey published record)

[All values except total in cubic feet per second, ft^3/s; total in cubic feet per second days, $(ft^3/s)\cdot d$]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	44	42	41	45	44	450	469	93	92	95	59	47
2	43	42	41	44	44	370	294	90	92	95	50	47
3	43	42	41	44	44	304	202	90	92	95	50	47
4	43	42	41	44	45	226	167	89	92	95	49	47
5	43	42	41	44	44	177	126	88	92	95	49	47
6	43	42	41	44	44	144	252	87	93	95	48	47
7	43	42	41	44	44	108	2130	87	92	95	47	47
8	43	42	41	44	44	81	2410	87	92	95	47	47
9	43	42	41	43	45	65	1870	87	111	95	47	47
10	43	42	41	43	46	69	1480	87	127	95	47	47
11	42	42	41	44	44	232	1230	87	109	106	47	47
12	42	42	41	45	44	344	1860	87	95	83	47	47
13	42	42	41	44	44	463	1950	87	94	69	47	47
14	43	42	42	44	45	1030	1730	87	95	69	47	47
15	42	42	41	44	48	1130	1430	89	95	69	47	47
16	42	42	41	44	162	1070	1180	88	95	69	47	47
17	42	42	41	44	337	814	1070	87	95	69	47	47
18	42	41	41	43	681	574	1130	88	95	69	48	47
19	42	41	41	43	766	1020	1100	88	95	69	47	47
20	42	41	41	43	697	990	775	91	95	69	47	47
21	42	41	41	43	729	820	622	92	95	69	47	47
22	42	41	42	43	1120	690	809	92	95	69	47	47
23	42	40	42	43	1360	858	687	92	95	69	47	47
24	42	41	46	43	1420	1400	446	92	95	69	47	47
25	42	41	47	43	1260	2170	259	92	95	69	46	47
26	42	41	44	43	1090	2190	287	92	95	70	47	47
27	42	41	44	44	876	1880	320	93	95	69	47	47
28	42	40	46	45	765	1590	401	93	95	70	47	47
29	42	40	45	44	622	1340	216	92	95	73	47	47
30	42	40	---	43	532	1120	114	92	95	76	47	47
31	42	41	---	43	---	689	---	92	95	---	47	---
Total	1314	1284	1218	1354	13086	24408	27016	2778	2983	2394	1480	1410
Mean	42.4	41.4	42.0	43.7	436	787	901	89.6	96.2	79.8	47.7	47.0

Year total 80,725 $(ft^3/s)\cdot d$

Mean 221 ft^3/s

Table 13. Daily mean discharge, West Branch Delaware River at Stilesville, N.Y. (station number 01425000), for year ending November 30, 2000 (U.S. Geological Survey published record)

[All values except total in cubic feet per second, ft^3/s; total in cubic feet per second days, $(ft^3/s)\cdot d$]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	47	51	52	815	1930	1230	1180	427	159	585	199	241
2	47	51	52	1830	1640	1100	936	335	159	514	199	371
3	47	52	52	2150	1620	976	752	283	198	312	200	420
4	48	54	52	2180	2700	843	565	279	238	210	203	317
5	47	52	52	2050	4350	600	429	226	238	179	205	340
6	47	52	52	1840	4090	451	405	158	238	156	205	381
7	47	52	52	1640	3480	349	680	157	205	156	202	414
8	50	52	52	1550	2900	288	955	157	255	396	202	135
9	48	52	52	1620	3000	234	951	158	359	528	202	73
10	47	54	52	2040	2980	298	902	197	533	233	202	63
11	47	55	52	2400	2670	496	847	202	689	184	202	60
12	47	54	52	3520	2420	690	1170	203	349	160	231	59
13	47	54	51	4040	2280	996	1570	216	242	162	351	59
14	49	53	59	3370	2130	1560	1840	274	238	158	339	61
15	51	53	58	2690	2040	1820	1860	212	163	159	338	61
16	52	53	56	2170	1940	1750	1720	201	156	142	395	61
17	52	53	55	2310	1870	1510	1550	186	156	127	188	61
18	52	52	55	2490	2130	1260	1430	159	157	139	134	61
19	52	52	54	2340	2560	1450	1500	159	156	165	69	61
20	52	53	53	2140	2410	1580	1270	159	156	177	55	61
21	52	52	53	1930	2330	1570	1020	160	191	183	54	60
22	52	52	53	1720	2510	1520	1120	159	256	235	54	58
23	52	52	55	1500	2710	1790	1130	159	172	200	68	58
24	52	52	56	1220	2760	2860	952	192	284	188	104	58
25	52	53	58	1020	2540	4060	772	183	336	191	110	58
26	52	53	60	931	2260	4130	809	158	335	187	115	59
27	52	52	64	865	1990	3540	813	160	205	181	137	59
28	52	52	77	1260	1830	2840	687	171	199	196	153	59
29	51	52	66	2140	1630	2320	602	239	199	197	152	59
30	51	52	---	2330	1420	1890	487	244	216	200	161	61
31	52	53	---	2170	---	1430	---	212	291	---	201	---
Total	1546	1629	1607	62271	73120	47431	30904	6385	7728	6800	5630	3949
Mean	49.9	52.5	55.4	2009	2437	1530	1030	206	249	227	182	132

Year total 249,000 $(ft^3/s)\cdot d$

Mean 680 ft^3/s

Table 14. Daily mean discharge, Neversink River at Neversink, N.Y. (station number 01436000), for year ending November 30, 2000 (U.S. Geological Survey published record)

[All values except total in cubic feet per second, ft^3/s; total in cubic feet per second days, $(ft^3/s)\cdot d$]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	22	24	24	25	25	37	55	54	52	70	38	23
2	22	24	24	25	24	45	55	62	52	69	25	23
3	22	24	24	23	24	46	55	63	53	61	22	23
4	24	24	24	23	24	44	55	62	54	52	23	23
5	23	23	24	24	24	49	56	56	54	52	22	23
6	23	24	25	24	23	54	109	49	54	52	22	23
7	23	23	25	24	23	54	1750	49	54	52	22	23
8	23	24	25	24	23	50	852	49	53	52	23	23
9	23	24	25	24	22	52	431	55	71	52	23	23
10	23	24	25	25	22	55	83	59	84	52	23	23
11	21	23	25	25	23	54	55	50	68	52	22	22
12	21	22	25	26	22	57	53	49	52	53	22	23
13	21	24	25	25	23	56	53	50	52	53	22	23
14	22	24	25	26	23	54	53	49	52	52	22	24
15	23	24	25	25	23	54	54	607	52	51	22	23
16	23	24	26	25	22	54	56	2750	52	50	22	24
17	23	24	26	26	22	54	55	1380	52	51	23	23
18	23	24	26	26	22	54	54	630	52	51	23	24
19	23	23	27	26	22	54	53	350	51	51	22	24
20	23	23	27	26	22	54	53	156	51	49	23	24
21	23	23	27	25	23	54	54	55	52	49	23	24
22	23	24	27	25	23	55	53	55	51	50	23	24
23	23	24	27	25	23	56	54	52	54	51	23	24
24	23	24	26	24	23	58	56	52	55	50	23	24
25	23	24	26	25	23	189	55	52	55	50	23	24
26	23	24	25	25	23	124	60	52	55	49	23	24
27	23	24	25	25	23	77	62	52	55	50	23	24
28	24	24	25	25	22	56	50	52	54	50	22	24
29	23	24	25	25	22	54	49	52	55	51	22	24
30	23	24	---	25	21	55	49	52	59	52	22	24
31	24	24	---	25	---	57	---	52	70	---	23	---
Total	706	736	735	771	684	1866	4582	7207	1730	1579	716	704
Mean	22.8	23.7	25.3	24.9	22.8	60.2	153	232	55.8	52.6	23.1	23.5

Year total 22,016 $(ft^3/s)\cdot d$

Mean 60.2 ft^3/s

Table 15. Daily mean discharge, Wallenpaupack Creek at Wilsonville, Pa. (station number 01432000), for year ending November 30, 2000 (Record furnished by PPL Corporation)

[All values except total in cubic feet per second, ft^3/s; total in cubic feet per second days, $(ft^3/s)\cdot d$]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	82	298	670	0	0	539	697	0	584	369	643	0
2	97	94	644	0	0	425	776	0	568	0	786	0
3	97	625	577	487	513	414	0	317	535	0	801	0
4	230	611	537	0	557	520	0	341	399	0	907	0
5	103	546	127	0	512	533	689	370	0	583	962	0
6	131	480	255	63	520	0	667	317	0	497	1320	0
7	253	579	602	0	507	0	710	332	408	694	0	0
8	103	171	561	56	37	638	1200	0	495	681	0	0
9	106	97	595	0	29	581	1740	0	386	593	0	0
10	99	553	592	0	521	195	1690	447	412	0	0	0
11	129	636	680	215	589	0	1310	424	437	653	0	0
12	141	607	160	769	553	469	987	455	0	626	23	0
13	92	592	49	1040	670	0	1000	329	0	658	0	0
14	242	262	411	1320	669	0	1040	434	455	645	0	0
15	300	50	551	1690	0	0	901	0	629	673	0	0
16	532	52	568	1740	0	0	896	0	566	238	0	0
17	523	611	501	1730	790	493	951	544	586	0	0	0
18	270	530	577	1730	1100	722	907	515	515	713	0	0
19	104	562	0	1730	1050	735	872	431	0	720	0	0
20	319	547	0	1080	1050	0	901	632	0	641	0	0
21	352	533	0	939	0	0	787	754	536	617	0	0
22	329	99	272	985	0	822	761	656	483	703	0	0
23	347	106	223	746	0	860	487	635	694	0	0	0
24	92	592	268	599	799	886	0	707	641	0	0	0
25	96	613	275	0	1090	955	0	860	492	619	0	0
26	87	579	0	0	1100	1060	363	1150	0	615	0	0
27	246	702	0	1100	1090	0	302	1420	0	824	0	0
28	410	574	0	1060	1100	0	0	1350	332	750	0	0
29	285	99	0	545	0	0	0	456	307	933	0	0
30	305	176	---	496	0	554	0	438	337	866	0	0
31	370	625	---	509	---	585	---	400	354	---	0	---
Total	6872	13201	9695	20629	14846	11986	20634	14714	11151	14911	5442	0
Mean	222	426	334	665	495	387	688	475	360	497	176	0

Year total 144,081 $(ft^3/s)\cdot d$

Mean 394 ft^3/s

Table 16. Daily mean discharge, Delaware River at Montague, N.J. (station number 01438500), for year ending November 30, 2000 (U.S. Geological Survey published record)

[All values except total in cubic feet per second, ft^3/s; total in cubic feet per second days, $(ft^3/s)\cdot d$; e, estimated]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	5650	3430	e3400	19600	8870	7170	7130	4820	4110	2190	2440	1960
2	4830	2680	e3400	16000	7610	6700	6480	4030	4290	2380	2120	1930
3	4310	2790	e3500	14600	7220	6040	5660	3440	4040	2690	2310	1980
4	4000	3400	e3100	12600	8570	5580	4400	3470	4200	2740	2320	2010
5	3950	3890	e3200	11200	15800	5170	4250	3650	3560	2160	2350	1980
6	3790	3900	e2800	10400	14000	4620	7950	3260	2620	2330	2600	1900
7	3990	3420	e3000	9670	12200	3840	24900	2730	3290	2170	4190	1800
8	3850	3070	e3800	9600	10000	3990	20600	2560	4510	2150	3190	1850
9	3390	2620	e3700	11100	10900	4480	15300	2010	3820	2050	2430	1900
10	3160	2900	e3300	13500	12700	4240	12200	1900	3850	2120	2140	1910
11	3040	5500	3090	14800	11900	7800	10100	2250	3450	1940	1890	3940
12	2940	6450	3440	25000	11000	8270	10800	2130	5450	2370	1800	4220
13	2810	5320	2740	27500	10100	10500	11800	2060	10300	2760	1760	3410
14	2810	4770	3000	19800	9280	12100	12900	1860	6260	6240	1780	3020
15	4250	e4200	4790	16000	8410	12300	13300	2260	5140	4950	1800	3300
16	5700	e3300	e7800	13600	7630	10300	11800	5540	4780	4260	1710	3520
17	6050	e3100	8360	16200	7630	9160	10300	8650	4150	3490	1690	3240
18	5080	e3300	7040	17900	10700	8440	9280	6870	3630	2860	2040	2950
19	4470	e3100	6480	14800	16000	9940	9920	4920	3190	3140	5950	2730
20	4010	e3300	5630	12600	13900	15000	9340	3700	2450	3260	5770	2620
21	4990	e3200	5300	11000	12000	14600	8010	3190	2230	3460	4390	2490
22	5490	e3400	4830	9990	17300	13000	8220	2930	2600	2880	3700	2430
23	5110	e2900	4920	9050	18000	14700	8580	2690	2520	2640	3210	2260
24	4500	e2900	5280	8000	17600	18800	7220	2480	2920	1890	2770	1920
25	3620	e3700	6930	6800	15800	27800	5990	2560	3070	1920	2680	1800
26	3910	e3300	11000	5990	13700	22500	5540	2450	2930	2470	2600	2110
27	3710	e3400	17400	6020	12100	17200	7050	4210	2100	2730	2330	3070
28	3730	e3600	28700	8620	11000	13600	6610	4460	1980	2800	2240	3350
29	3530	e3500	30200	13100	9320	11400	5540	3280	2140	2830	2070	3080
30	3320	e2700	---	11700	7870	10000	5430	3010	2090	2660	2070	2920
31	3340	e2700	---	10400	---	8440	---	3660	2360	---	1930	---
Total	127330	109740	200130	407140	349110	327680	286600	107030	114030	84530	82270	77600
Mean	4107	3540	6901	13130	11640	10570	9553	3453	3678	2818	2654	2587

Year total 2,273,190 $(ft^3/s)\cdot d$

Mean 6,211 ft^3/s

Table 17. Diversions by New Jersey; daily mean discharge, Delaware and Raritan Canal at Port Mercer, N.J. (station number 01460440), for year ending November 30, 2000 (U.S. Geological Survey published record)

[All values except total in million gallons per day, Mgal/d; total in Million gallons, Mgal]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	85	86	82	81	89	92	89	92	88	96	88	89
2	83	85	81	80	92	96	88	92	85	96	87	89
3	83	83	81	80	93	93	88	92	92	93	88	90
4	87	86	82	82	90	90	87	93	86	96	88	90
5	92	80	85	83	89	93	86	92	93	92	85	89
6	89	82	92	85	89	90	86	92	94	92	85	90
7	84	85	91	87	91	90	88	93	96	94	85	88
8	81	85	90	88	87	90	89	92	94	96	86	90
9	84	85	89	72	87	90	92	91	95	97	86	90
10	86	89	87	80	90	88	92	94	94	98	87	83
11	86	90	85	88	95	91	91	91	91	96	89	81
12	85	84	83	76	95	89	92	90	77	94	89	79
13	87	85	83	77	93	94	88	87	87	96	89	63
14	89	83	70	81	95	88	90	94	74	95	89	54
15	72	81	65	85	98	90	95	90	85	94	89	81
16	77	82	72	92	94	91	93	94	90	90	90	85
17	81	83	75	61	90	93	93	97	92	95	89	87
18	93	79	70	81	86	90	95	94	89	96	89	87
19	89	83	72	89	92	78	95	92	92	89	88	87
20	87	82	70	91	92	78	92	96	92	74	87	86
21	77	81	71	91	85	87	91	93	92	83	88	87
22	77	81	70	92	65	92	93	94	94	85	88	88
23	79	81	70	92	85	96	92	94	94	87	88	90
24	81	81	72	93	89	79	91	94	96	91	87	91
25	81	80	78	92	92	83	91	96	94	86	90	92
26	80	82	82	90	92	88	90	96	94	78	88	80
27	79	83	79	90	92	89	90	85	94	81	90	85
28	81	83	81	76	93	89	89	92	95	85	89	90
29	83	87	81	82	93	90	89	94	92	87	87	88
30	85	92	--	87	94	89	90	97	97	86	91	91
31	87	87	--	89	--	90	---	86	97	---	90	---
Total	2590	2596	2289	2613	2707	2766	2715	2869	2825	2718	2729	2560
Mean	83.5	83.7	78.9	84.3	90.2	89.2	90.5	92.5	91.1	90.6	88.0	85.3

Year total 31,977 Mgal

Mean 87.4 Mgal/d

QUALITY OF WATER IN THE DELAWARE ESTUARY

Introduction

This section describes the water-quality monitoring program for the Delaware Estuary during the River Master 2000 report year, December 1, 1999, to November 30, 2000. This program is conducted by the U.S. Geological Survey (USGS), in cooperation with the Delaware River Basin Commission (DRBC). Selected data collected for this program are presented and water-quality conditions are summarized. The DRBC and others use these data to assess water-quality conditions and track the movement of the "salt front" in the Delaware Estuary.

Water-Quality Monitoring Program

As part of a long-term program, the quality of water in the Delaware Estuary between Trenton, N.J., and Reedy Island Jetty, Del., is monitored at various locations (fig. 6). Data on temperature, specific conductance, dissolved oxygen, and pH were collected by electronic instruments at four sites -- Trenton, Benjamin Franklin Bridge (Philadelphia), Chester, and Reedy Island Jetty. Water-quality monitors at Benjamin Franklin Bridge and Chester were not operated from December 1999 to March 2000. Monitors at Trenton and Reedy Island Jetty were operated continuously throughout the report year.

From March to November, water-quality data were obtained on a bi-monthly basis at 18 sites between Biles Channel and Mahon River (sample sites A-S on fig. 6). These data were collected by the State of Delaware for the DRBC. At each of these sites, water samples were collected near the center of the channel and analyzed for 28 physical properties and chemical constituents including temperature, chloride, alkalinity, specific conductance, dissolved oxygen, pH, nutrients, and trace metals. These analyses consist of field measurements and laboratory determinations.

During the 2000 report year, water-quality data were obtained on a monthly basis at three additional sites in lower Delaware Bay (sites T-V on fig. 6). Water samples were collected during March, May, July, August, September and November and were analyzed for the same physical properties and chemical constituents as noted for the 18-site network.

Data obtained from the water-quality monitors are processed and stored in the USGS's National Water Information System data base. These data are published annually by the USGS in water resources data reports for New Jersey and Pennsylvania. Water-quality data for the other sampling sites are not presented in this report but are available from the DRBC. All data collected before 1999 are available from STORET, the U.S. Environmental Protection Agency's electronic storage and retrieval system for water-quality data.

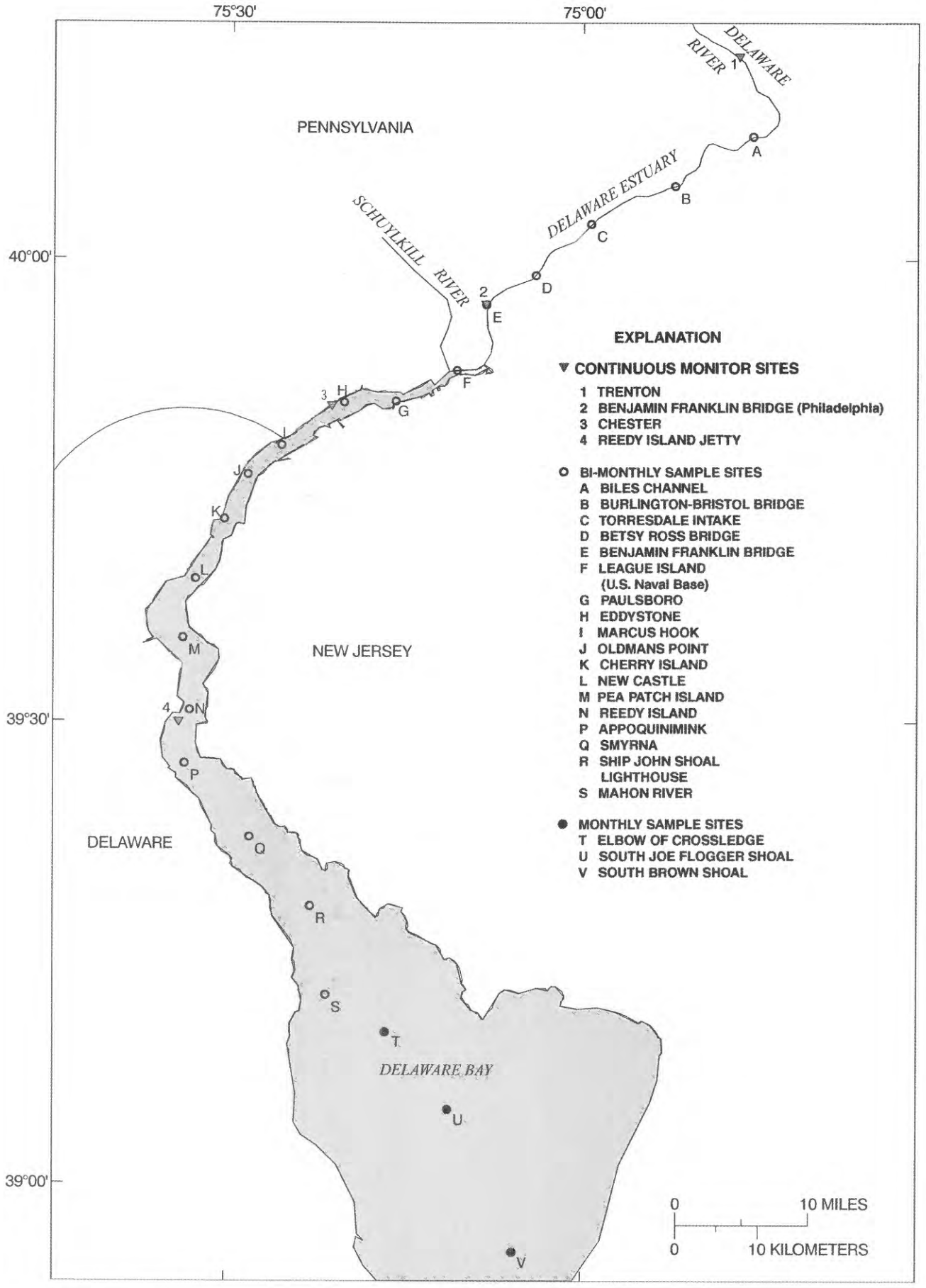

Figure 6. Location of water-quality monitoring sites on the Delaware Estuary.

Water Quality During the 2000 Report Year

Streamflow

Streamflow has a major effect on the quality of water in the Delaware Estuary. High freshwater flows commonly result in improved water quality by limiting the upstream movement of seawater and reducing the concentration of dissolved substances. High flows also aid in maintaining lower water temperatures during warm weather and in supporting higher concentrations of dissolved oxygen. Under certain conditions, however, high streamflows can transport large quantities of nutrients to the estuary, which may result in noxious algal blooms.

Streamflow from the Delaware River Basin above Trenton, N.J., is the major source of freshwater inflow to the Delaware Estuary. During the report year, monthly mean streamflow measured at the USGS gaging station Delaware River at Trenton, N.J., was highest during March 2000 (25,390 ft^3/s) and lowest during October (4,345 ft^3/s; table 18). Monthly mean streamflows were greater than long-term mean monthly flows in March, May, June, July, and August, and were less than the long-term flows in the other months. The greatest flow deficiency was in November 2000, when monthly mean streamflow was about 42 percent of the long-term mean monthly flow. Long-term monthly mean streamflow was computed on the basis of data for the period from 1913 to 1999. The highest daily mean streamflow during the report year was 56,200 ft^3/s on February 29, 2000. The lowest daily mean streamflow was 3,030 ft^3/s on November 9, 2000.

Water Temperature

Water temperature can influence water quality by affecting various physical, chemical, and biological properties of water. Generally, increases in water temperature have detrimental effects on water quality by decreasing the saturation level of dissolved oxygen and increasing the biological activity of aquatic organisms. Although the primary factors that affect water temperature in the Delaware Estuary are climatic, various kinds of water use, especially powerplant cooling, also can have notable effects.

Water-temperature records for the monitor site at Benjamin Franklin Bridge, Philadelphia, Pa., show that monthly mean temperatures during the report year were approximately equal to the long-term mean monthly temperatures in April and May, and were less than long-term mean monthly temperatures from June to November 2000. Long-term mean water temperatures were computed using data for the period from 1964 to 1999 (fig. 7).

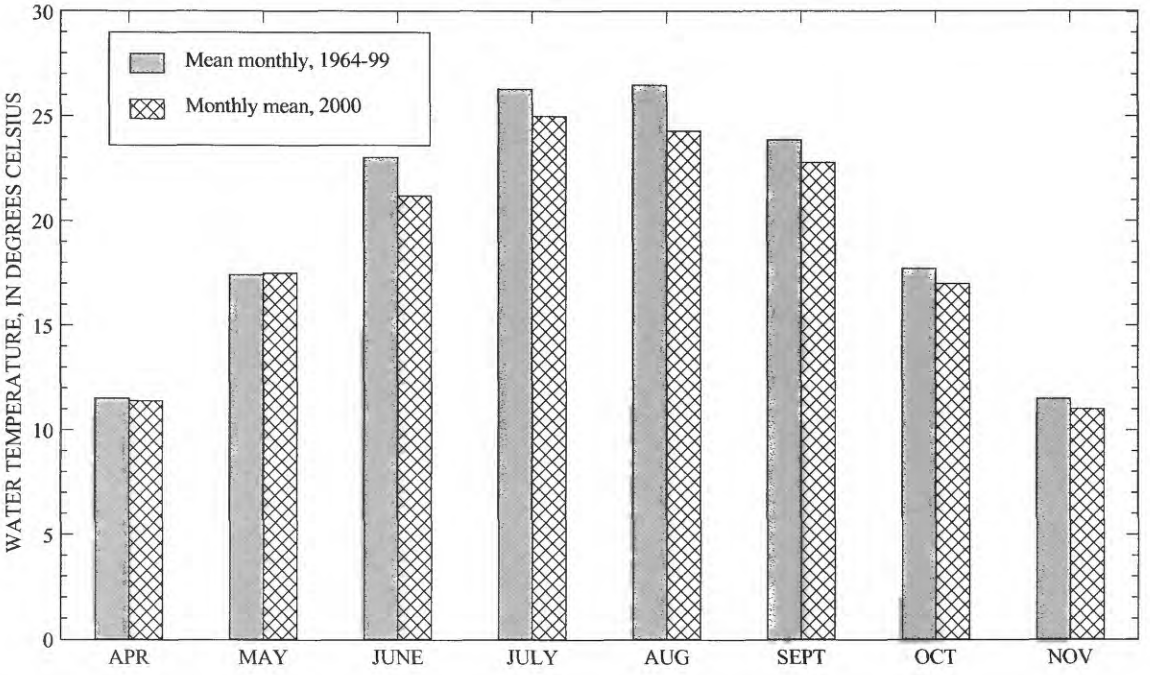

Figure 7. Water temperature in the Delaware Estuary at Benjamin Franklin Bridge at Philadelphia, Pa., April to November.

Specific Conductance and Chloride

Specific conductance is a measure of the capacity of water to conduct an electrical current and is a function of the types and quantities of dissolved substances in water. As concentrations of dissolved ions increase, specific conductance of the water increases. Specific conductance measurements are good indicators of dissolved solids content and total ion concentrations. Seawater and some man-made contaminants can cause the specific conductance of estuary water to increase substantially. Dilution associated with high streamflows results in decreased levels of dissolved solids and lower specific conductance whereas low streamflows have the opposite effect.

The upstream movement of seawater and the accompanying increase in chloride concentrations is an important concern for water supplies obtained from the Delaware Estuary. Water with chloride concentrations greater than 250 mg/L (milligrams per liter) is considered undesirable for domestic use, and water with concentrations exceeding 50 mg/L is unsatisfactory for some industrial processes. Chloride concentrations in the estuary increase in a downstream direction, with proximity to the Atlantic Ocean.

Chloride concentration was not measured directly at the Reedy Island Jetty, Del., monitor site. Instead, a mathematical relation between specific conductance and chloride concentration has been developed on the basis of long-term field measurements of specific conductance and laboratory analyses of chloride; this relation can be used to estimate chloride concentrations from specific conductance values. Chloride concentrations estimated from the relation are presented in

table 19. The specific conductance-chloride relation is less reliable when chloride concentrations are less than 30 mg/L, because other dissolved ions may be present in amounts large enough to affect the relation. Therefore, chloride concentrations estimated from specific conductance data are not presented when concentrations of less than 30 mg/L would result from the relation. Instead, estimated values less than 30 mg/L are reported as < 30 mg/L. Chloride concentrations at Chester, Pa. (table 20) were measured directly by Kimberly Clark Chester Operations and are not derived from specific conductance data.

At Reedy Island Jetty, the highest daily maximum daily chloride concentration was 8,800 mg/L on November 12, 2000 (table 19). Daily maximum chloride concentrations during the report year exceeded 1,000 mg/L on 97 percent of the days. The lowest daily minimum chloride concentrations for the report year were less than 30 mg/L on March 22-28, 2000 (table 19). Daily minimum chloride concentrations exceeded 1,000 mg/L on 56 percent of the days. From December 1999 to February 2000, daily maximum chloride concentrations at Reedy Island Jetty ranged from 1,900 to 7,700 mg/L. From July to November, daily maximum chloride concentrations ranged from 2,100 to 8,800 mg/L.

At Chester, the highest daily maximum chloride concentration was 309 mg/L on November 13, 2000 (table 20). During the report year, daily maximum concentrations exceeded 50 mg/L on 43 percent of the days. The lowest daily minimum chloride concentration was 23 mg/L on June 14, 2000 (table 20). Daily minimum concentrations exceeded 50 mg/L on 23 percent of the days. Chloride concentrations were persistently high in February and November, when daily minimum concentrations exceeded 50 mg/L on all days of each month.

Dissolved Oxygen

Dissolved oxygen in water is necessary for the respiratory processes of aquatic organisms and in chemical reactions in aquatic environments. Fish and many other clean-water species require relatively high dissolved oxygen concentrations at all times. The major source of dissolved oxygen in the Delaware Estuary is diffusion from the atmosphere, and, to a lesser extent, photosynthetic activity of aquatic plants. The principal factors that affect dissolved oxygen concentrations in the estuary are water temperature, biochemical oxygen demand, freshwater inflow, phytoplankton, turbidity, salinity, and tidal and wind-driven mixing.

Concentrations of dissolved oxygen at several sites on the Delaware Estuary have been measured since 1962 by the USGS. Two of these sites, Delaware River at Benjamin Franklin Bridge at Philadelphia, Pa., and Delaware River at Chester, Pa., have nearly continuous records and are in the reach of the estuary most affected by effluent discharges. The mean and minimum daily mean dissolved oxygen concentrations from July to September at these stations during the 1965-2000 report years is shown in figure 8. An increasing trend in concentration is evident. Although concentrations have increased considerably over this 36-year period, mean concentrations can vary substantially from year to year.

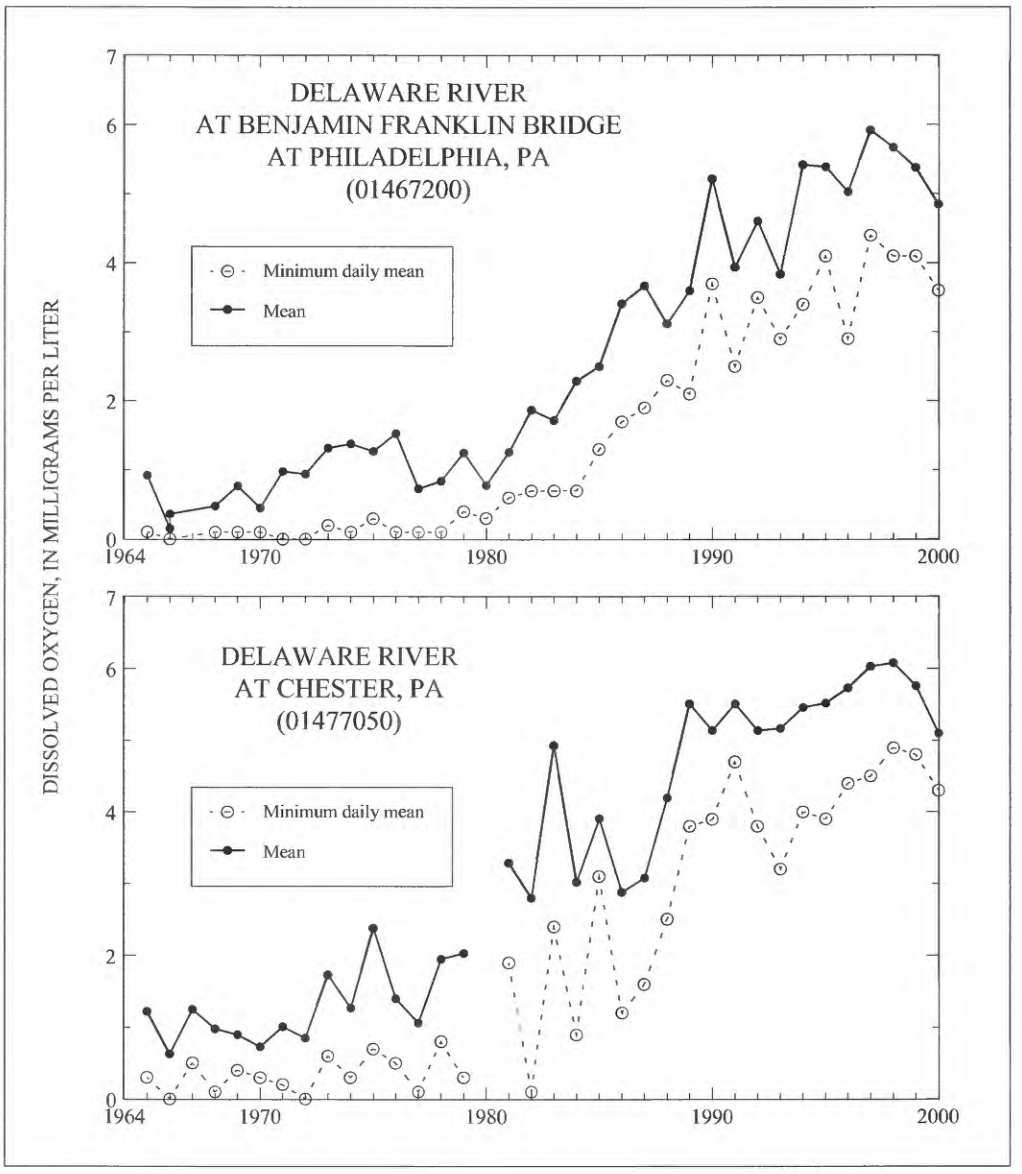

Figure 8. Mean and minimum daily mean dissolved oxygen concentrations from July to September at two monitor sites on the Delaware Estuary, 1965-2000.

Concentrations of dissolved oxygen in the Delaware Estuary generally are greatest near Trenton and decrease in a downstream direction. In an area just below the Benjamin Franklin Bridge, concentrations usually reach minimum levels. During the report year, daily mean concentrations of dissolved oxygen at the Benjamin Franklin Bridge monitor site were lowest in early September, and the lowest recorded daily mean concentration was 3.6 mg/L on September 4 (table 21). From April 1 to June 29, and from October 21 to November 30, 2000, daily mean concentrations of dissolved oxygen were consistently 6.0 mg/L or greater. At Chester, daily mean dissolved oxygen concentrations were lowest during late July, August, and September, and the lowest recorded daily mean concentration was 4.3 mg/L on September 19 (table 22).

Histograms of hourly dissolved oxygen concentrations at the Benjamin Franklin Bridge and Chester monitor sites during the critical summer period -- July to September 2000 -- are presented in figure 9. Hourly concentrations at the Benjamin Franklin Bridge were 4 mg/L or less during 12 percent of this period. In comparison, in 1999, hourly concentrations decreased to levels 4 mg/L or less during 3 percent of the critical period. At Chester, hourly dissolved oxygen concentrations were 4 mg/L or less during 13 percent of the 2000 critical summer period. In 1999, hourly concentrations were consistently greater than 4 mg/L during the critical period. Dissolved oxygen concentrations less than 4 mg/L can have adverse, and possibly lethal, effects on fish and other aquatic organisms.

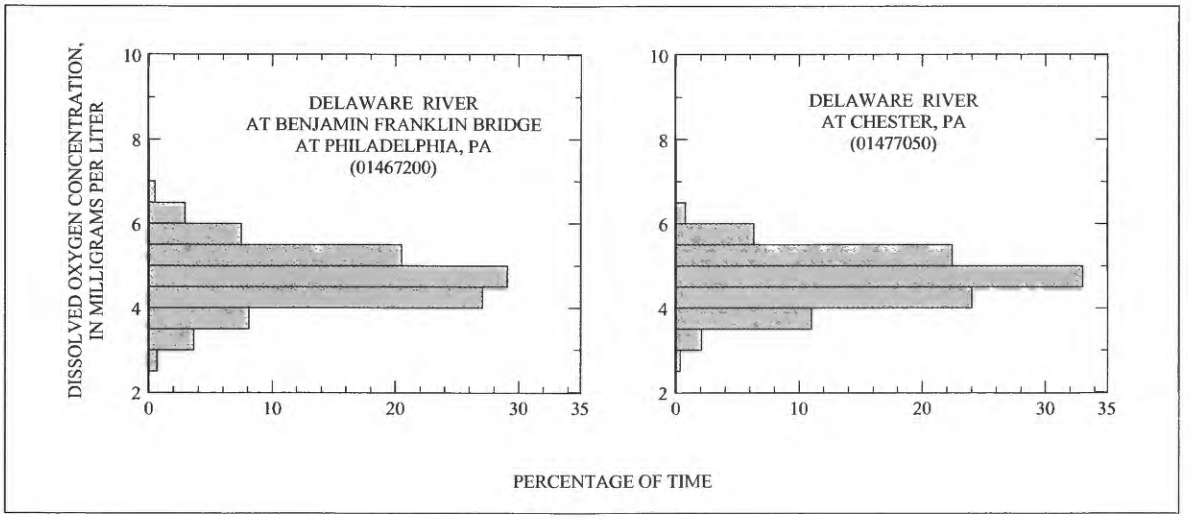

Figure 9. Distribution of hourly dissolved oxygen concentrations at two monitor sites on the Delaware Estuary, July to September 2000.

Hydrogen-Ion Activity (pH)

The pH of a solution is a measure of the effective concentration (activity) of dissolved hydrogen ions. Solutions having a pH less than 7 are characterized as acidic whereas solutions with a pH greater than 7 are considered basic or alkaline. The pH of uncontaminated surface water generally ranges from 6.5 to 8.5. Major factors affecting the pH of surface water include the geologic composition of the drainage basin and human inputs, for example, wastewater discharges. In addition, photosynthetic activity, and dissolved gases including carbon dioxide, hydrogen sulfide, and ammonia can have a considerable effect on pH. During the report year, pH was measured continuously at the Benjamin Franklin Bridge, Chester, and Reedy Island Jetty monitor sites. The range of median pH for these stations is as follows: Benjamin Franklin Bridge, 6.7 to 7.4; Chester, 6.8 to 7.4; and Reedy Island Jetty, 7.1 to 7.8. Generally, the pH of water in the Delaware Estuary is lowest near Trenton, N.J., and increases (that is, becomes more alkaline) in a downstream direction.

Table 18. Daily mean discharge, Delaware River at Trenton, N.J. (station number 01463500), for year ending November 30, 2000 (U.S. Geological Survey published record)

[All values, except total, in cubic feet per second ft^3/s; total in cubic feet per second days, $(ft^3/s)\cdot d$; e, estimated]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	15200	7640	e5600	47300	18500	14900	14600	11500	11400	4410	4390	3300
2	12900	7480	e5800	35500	16500	13600	13000	10400	17700	5200	4190	3180
3	10700	7240	e6200	29900	15100	13200	11800	9110	15200	4960	3970	3120
4	9650	6990	e6100	26300	15200	12200	11100	8210	15400	5040	3740	3170
5	9030	8830	e6100	23100	17700	11200	9270	7670	13500	5350	4210	3500
6	9800	8760	e6200	20800	24200	10800	8800	7570	11000	4960	4160	3400
7	10400	8520	e5800	18900	22000	10100	15900	7090	9250	4300	4100	3180
8	9540	8090	e5400	17300	19300	8860	34700	6270	8540	4180	4930	3120
9	9050	7150	e5700	16900	17700	8200	29100	5730	9710	4110	5420	3030
10	8340	6930	e5700	18400	19900	8570	22700	5340	8710	3980	4440	3350
11	8160	9240	e5800	20900	21300	8730	18500	4700	8010	3910	3870	4140
12	7630	11900	e5600	28500	20500	12500	18400	4480	8560	3660	3600	4560
13	7230	13200	e5300	42000	19100	14400	23900	4570	9620	3880	3380	6540
14	8560	11700	e6000	39100	17600	17500	23800	4420	19000	5210	3260	5790
15	12800	9690	e8300	31400	16500	18700	23600	4590	16500	7880	3190	5470
16	13000	8160	e10000	26400	15700	18200	23200	4870	12500	8990	3120	5310
17	13500	e7700	e12300	28800	15000	15700	20500	9120	10600	7240	3150	5550
18	13400	e5900	e12300	32000	15400	14100	17700	13200	9220	6450	3240	5490
19	12000	e6200	e11000	30600	18600	17300	16400	11300	8120	5810	3960	5010
20	11000	e6900	e10200	26400	23600	20900	16500	9070	7320	6440	6170	4560
21	11800	e7000	e8500	23100	22300	25500	15900	7340	6220	6240	8470	4330
22	12800	e6500	e9500	25500	30000	23700	16400	6300	5460	5750	6980	4120
23	12700	e6300	e9000	25400	33200	22000	17000	6060	5150	5280	6020	3950
24	11900	e6500	e9500	20700	31700	26700	16000	5480	5340	4770	5210	3770
25	10900	e6400	e11000	17700	29400	34200	14100	5000	5490	4420	4640	3540
26	9180	e6200	15300	15900	26200	39300	12400	5090	5780	4360	4220	4100
27	8360	e6400	20000	14400	23000	32300	12700	6320	5570	4650	4190	5020
28	8180	e6000	32500	17000	20600	26100	14000	8530	5230	4830	3990	5540
29	7750	e6000	56200	21400	18800	21600	13600	9000	4880	4640	3640	6220
30	7630	e6200	---	24300	16900	18500	12400	7830	4530	4620	3500	6130
31	7170	e6100	---	21300	---	16600	---	8290	4510	---	3360	---
Total	320260	237820	316900	787200	621500	556160	517970	224450	288020	155520	134710	131490
Mean	10330	7672	10930	25390	20720	17940	17270	7240	9291	5184	4345	4383

Year total 4,292,000 $(ft^3/s)\cdot d$

Mean 11,730 ft^3/s

Table 19. Daily maximum and minimum chloride concentrations estimated from specific conductance, Delaware River at Reedy Island Jetty, Del. (station number 01482800) for year ending November 30, 2000

[Concentrations in milligrams per liter; --, missing data; Max, maximum value; Min, minimum value; <, less than; n.d., not determined]

DAY	DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV	
	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	6500	2400	4000	990	7100	3300	3600	650	3200	550	2700	520	3200	770	2400	320	4600	1600	3900	2000	4200	1900	7200	3900
2	7100	2600	4100	1300	6000	2800	3900	760	3000	580	2500	510	3000	760	2400	340	4000	1400	4000	2100	4400	1900	7700	3700
3	6200	2700	3400	1200	7300	2900	3000	510	2200	440	2300	500	2900	710	2500	400	3300	1300	4300	2100	4500	2000	8100	4000
4	6000	2600	4200	1300	7700	3300	3900	600	2300	390	2600	480	3100	730	2100	410	2600	1000	4100	2000	4300	1900	8100	3500
5	6200	2500	2700	840	7300	3600	3900	780	1700	230	2200	450	3100	810	2200	450	2400	940	5300	2000	4300	1900	8100	4300
6	6000	2500	3400	850	5900	3100	3200	670	1400	250	1900	450	3200	890	2400	460	2800	880	4700	2500	5300	2000	8500	4900
7	5000	2200	4000	1100	5600	2900	3200	590	880	200	2200	410	3000	830	2600	500	2300	790	4700	2300	5500	2100	8400	4800
8	5800	2200	3400	980	5900	2700	2700	560	1400	220	2300	440	3300	820	2700	550	2600	790	4800	2200	6100	2000	8500	5300
9	5400	2100	3200	890	6200	2700	2900	620	570	89	1900	480	2300	680	2900	600	3100	780	4800	2000	6000	2400	8200	5300
10	5600	2200	3900	930	5400	3000	2900	570	520	57	2200	500	2100	580	2700	630	3400	730	5800	2000	6000	2900	8300	5700
11	4200	1500	2800	840	6100	3000	2500	570	1000	54	2400	530	2400	550	3800	660	3700	870	5900	2300	6000	2600	7200	5100
12	4000	1400	1900	420	5600	3000	3000	570	1600	60	3000	550	2900	520	3600	840	4300	980	5600	2500	5200	2700	8800	5100
13	6100	2100	2700	400	6000	2900	1500	390	1800	56	2900	580	---	---	4000	990	4800	1900	5300	2400	5400	2500	8400	5100
14	6700	2000	2600	340	6500	2800	2100	270	1500	96	2800	630	---	---	4100	1200	5800	1700	4800	2400	5300	2800	7900	5000
15	5700	2400	4000	370	5100	2800	1600	210	1500	140	2500	510	---	---	4300	1300	5300	1300	5500	2400	5500	2900	7500	4800
16	5100	2200	4600	1200	6200	2600	990	160	1500	150	2700	510	---	---	4100	1300	4800	1600	4600	2200	6000	3100	7200	4500
17	3300	1800	2400	590	5000	2000	580	78	1200	150	3000	520	1600	350	3900	1300	4100	1400	4300	2100	6500	3300	6300	3900
18	3900	1300	5700	910	5500	2100	1200	77	1700	260	2400	470	1200	330	3900	1400	4400	1500	3400	1900	6300	3200	6400	3800
19	4500	1500	6500	1700	5500	2100	1400	90	2000	500	1500	430	1600	280	3500	1200	4000	1500	4600	1800	6000	3200	6700	3900
20	5200	1500	6800	2400	5100	1900	1400	120	2600	360	2500	380	1900	260	3700	1300	4400	1600	3800	1800	6200	3200	7000	3900
21	4800	1500	5300	2100	3800	1600	1700	76	2000	480	2100	340	2000	280	4200	1300	4200	1500	3700	1600	6000	3200	6000	3900
22	4000	1400	5600	1900	3600	1600	1000	<30	1300	350	1800	320	1400	270	4000	1400	4600	1500	4200	1600	6100	3100	5400	3200
23	4500	1300	5200	2100	3200	1400	480	<30	1500	260	1700	300	1600	230	3700	1300	4500	1700	4300	1600	5700	3200	6100	2900
24	3600	1200	6200	2100	3200	1300	92	<30	1700	170	1500	280	2000	240	4000	1500	4500	1600	4300	1700	5200	3200	7000	3200
25	4100	1200	7500	3200	2800	1300	<30	<30	1500	210	1500	220	2000	280	4700	1700	4800	1800	4600	1700	4800	3000	6500	3600
26	3600	1300	6700	3100	3900	1300	<30	<30	2500	530	1600	150	1700	240	4400	1700	5100	1800	4800	2100	5600	3000	7400	3900
27	3200	1000	5500	3000	3600	1000	700	<30	2800	770	2100	130	1800	200	4800	1600	4600	2000	5000	1900	5400	3200	6600	3600
28	3900	1100	6000	2800	3200	990	1300	<30	1800	450	2500	220	2300	210	5000	1700	4500	1800	4300	1900	5400	3100	6200	3600
29	3600	1300	6800	2600	2900	580	1200	35	2500	470	3500	560	2200	240	4500	1800	4500	2000	4500	1900	6300	3300	6100	3400
30	2600	1000	7200	3600			2200	58	2700	500	3600	810	2200	270	4700	1700	4800	2000	4200	1900	6200	3300	5500	3100
31	2200	880	7600	3200			2800	360			3400	740			4800	1700	4300	2100			6900	3400		
Mean	4800	1800	4700	1600	5200	2300	n.d.	n.d.	1800	300	2400	450	2300	470	3600	1100	4100	1400	4600	2000	5600	2800	7200	4200
Max	7100	2700	7600	3600	7700	3600	3900	780	3200	770	3600	810	3300	890	5000	1800	5800	2100	5900	2500	6900	3400	8800	5700
Min	2200	880	1900	340	2800	580	<30	<30	520	54	1500	130	1200	200	2100	320	2300	730	3400	1600	4200	1900	5400	2900

Table 20. Daily maximum and minimum chloride concentrations, Delaware River at Chester, Pa. (station number 01477050), for year ending November 30, 2000 (Record furnished by Kimberly Clark Chester Operations)

[Concentrations in milligrams per liter; Max, maximum value; Min, minimum value]

DAY	DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV	
	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	44	38	42	38	110	58	60	50	42	40	72	37	39	36	42	36	58	40	47	43	55	46	82	70
2	47	38	45	40	90	66	51	46	35	30	48	35	41	30	46	38	55	40	48	44	55	46	110	79
3	46	40	48	37	120	80	64	52	43	34	44	28	46	33	34	32	55	38	48	43	58	48	160	85
4	46	38	44	38	98	61	65	54	36	26	42	28	44	26	41	30	50	41	58	46	52	46	155	95
5	55	44	41	35	80	74	56	50	42	28	46	32	38	30	40	27	46	42	58	46	52	46	119	87
6	47	38	40	38	86	75	58	39	51	37	42	30	40	38	50	28	41	39	58	45	46	43	135	95
7	43	36	49	40	78	70	45	37	46	38	40	29	42	38	38	30	48	36	50	45	48	43	128	93
8	46	42	50	40	78	73	42	36	48	32	43	30	42	38	45	36	49	46	54	46	50	44	108	93
9	44	40	52	38	94	73	50	35	46	35	46	38	34	27	40	33	41	38	52	48	49	44	100	92
10	50	37	47	42	92	72	52	30	35	31	48	38	32	30	40	37	42	39	55	40	48	46	290	110
11	62	39	42	40	89	64	54	30	40	34	48	34	34	30	41	39	42	36	55	48	48	46	125	92
12	59	38	48	42	100	64	49	35	39	36	36	34	36	30	41	35	41	38	58	49	50	46	210	118
13	53	42	44	38	82	68	50	31	46	36	40	31	45	30	42	32	60	36	50	48	50	44	309	108
14	44	38	48	37	95	65	42	40	35	32	44	40	38	23	44	30	50	35	56	48	52	45	175	155
15	44	36	50	40	96	82	48	40	38	31	68	42	35	27	42	34	50	40	60	52	52	39	177	145
16	42	37	62	39	85	79	46	40	43	31	50	39	36	30	42	35	48	34	60	55	64	56	170	104
17	45	32	45	36	90	80	38	30	36	31	60	41	32	25	40	38	44	36	65	56	67	55	146	138
18	46	37	51	42	100	77	40	31	46	32	55	43	32	24	44	40	48	43	55	48	64	56	140	114
19	51	36	60	40	172	95	34	28	70	36	48	37	36	27	41	34	50	46	56	50	62	58	150	110
20	40	35	46	42	109	90	62	40	50	38	42	38	36	28	45	40	48	45	56	48	74	38	155	100
21	42	36	51	42	90	76	59	25	46	31	40	32	34	30	48	33	46	39	52	43	75	60	154	105
22	42	38	52	42	90	74	52	30	75	30	40	30	38	34	49	36	46	35	55	49	66	59	120	90
23	50	36	49	42	76	68	40	28	38	31	38	34	50	24	48	38	46	36	65	54	58	52	136	85
24	42	32	70	45	73	66	34	25	40	37	38	33	38	29	49	39	48	40	48	45	65	60	167	105
25	80	34	58	47	76	71	30	26	34	29	38	31	38	30	42	38	51	45	55	50	74	53	142	108
26	41	37	68	53	72	60	37	32	34	30	50	30	40	33	44	39	50	42	60	42	78	55	161	128
27	42	40	60	45	75	68	46	28	39	29	48	27	44	29	43	35	52	44	52	43	73	53	250	125
28	44	39	56	48	70	66	41	30	50	36	52	42	43	33	55	38	48	42	60	41	73	53	118	103
29	44	39	54	44	66	61	36	29	52	38	50	25	36	28	55	43	52	38	65	54	74	61	118	70
30	42	38	58	38			42	28	58	36	40	30	45	28	46	39	55	38	52	46	78	68	130	80
31	39	32	132	54			45	31			38	34			42	38	58	43			72	59		
Mean	47	37	54	41	91	72	47	35	44	33	46	34	39	30	44	36	49	40	55	47	61	51	155	103
Max	39	32	40	35	66	58	30	25	34	26	36	25	32	23	34	27	41	34	47	40	46	38	82	70
Min	80	44	132	54	172	95	65	54	75	40	72	43	50	38	55	43	60	46	65	56	78	68	309	155

Table 21. Daily mean dissolved oxygen concentration, Delaware River at Benjamin Franklin Bridge at Philadelphia, Pa. (station number 01467200), for year ending November 30, 2000
(U.S. Geological Survey published record)
[Concentrations in milligrams per liter; --, missing data]

DAY	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	9.2	9.8	7.9	5.7	4.3	4.0	5.6	7.6
2	9.2	9.7	7.8	5.3	4.4	3.7	5.2	7.6
3	9.3	9.7	7.9	5.1	4.6	3.8	4.8	7.6
4	9.2	9.8	8.1	4.8	4.5	3.6	4.9	7.7
5	9.4	9.6	8.2	4.5	4.4	4.3	4.9	---
6	9.5	9.4	8.3	4.5	4.6	4.5	4.8	7.6
7	9.5	9.1	8.3	4.5	4.9	4.8	5.0	7.4
8	9.4	8.9	---	4.8	5.0	4.8	5.3	7.4
9	9.3	8.7	---	5.4	4.9	4.8	5.6	7.3
10	9.5	8.5	---	5.7	4.8	4.7	5.8	7.2
11	9.6	8.0	---	5.9	4.7	4.6	6.2	7.5
12	9.6	7.7	---	6.1	4.6	4.6	6.2	7.5
13	9.8	7.4	8.8	6.4	4.4	4.4	6.1	7.6
14	10.0	6.9	8.5	6.3	4.5	4.3	5.9	7.5
15	10.0	6.5	8.3	---	5.0	4.4	5.8	7.7
16	10.1	6.2	8.0	---	5.0	4.6	5.8	7.9
17	10.0	6.3	8.1	---	5.2	4.9	5.8	8.1
18	10.0	6.3	8.1	5.4	5.2	5.2	5.7	8.3
19	10.0	6.4	7.9	5.6	5.1	5.2	5.7	8.4
20	10.0	6.3	7.9	5.4	5.2	5.1	5.8	8.4
21	9.8	6.4	7.9	5.4	5.0	5.0	6.0	8.6
22	9.5	6.7	7.7	---	---	4.9	6.3	8.9
23	9.8	6.9	7.2	---	---	4.8	6.4	9.2
24	9.7	7.4	6.9	---	4.9	4.7	6.5	9.2
25	9.7	8.1	6.8	5.1	4.8	4.6	6.6	9.2
26	9.7	8.8	6.7	5.0	4.6	5.2	6.5	9.2
27	9.8	8.7	6.7	4.6	4.5	5.2	6.4	9.2
28	9.8	8.4	6.6	4.4	4.4	5.4	6.4	9.4
29	9.7	8.3	6.3	4.4	4.4	5.8	6.9	9.6
30	9.7	8.3	5.9	4.5	4.4	5.7	7.2	9.7
31	---	8.2	---	4.4	4.3	---	7.4	---
Mean	9.7	8.0	7.6	5.2	4.7	4.7	5.9	8.2
Max	10.1	9.8	8.8	6.4	5.2	5.8	7.4	9.7
Min	9.2	6.2	5.9	4.4	4.3	3.6	4.8	7.2

Table 22. Daily mean dissolved oxygen concentration, Delaware River at Chester, Pa. (station number 01477050), for year ending November 30, 2000
(U.S. Geological Survey published record)
[Concentrations in milligrams per liter; --, missing data]

DAY	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	9.6	9.3	7.6	5.3	4.4	4.9	5.4	7.3
2	9.5	9.3	7.5	5.5	4.4	4.6	5.4	7.5
3	---	9.3	7.6	5.8	4.5	4.5	5.3	7.5
4	---	9.2	8.0	5.8	4.4	4.4	5.3	7.3
5	---	9.0	8.2	5.8	4.5	5.0	5.6	7.3
6	---	8.8	8.2	5.9	4.8	5.6	5.3	---
7	---	8.5	8.4	6.2	5.0	5.8	5.2	---
8	---	8.4	8.6	6.4	5.1	5.7	5.3	---
9	---	---	8.6	6.6	5.0	5.4	5.6	---
10	---	---	8.6	6.4	4.9	5.1	5.9	---
11	---	8.2	8.3	6.0	4.8	5.1	6.2	---
12	---	8.1	7.8	5.8	4.8	4.6	6.1	---
13	---	8.0	7.3	5.7	5.0	4.7	6.2	---
14	---	7.6	6.9	5.6	5.1	4.6	5.2	---
15	---	7.3	5.6	5.6	4.9	5.3	5.2	---
16	---	7.0	5.7	5.5	4.5	4.9	5.1	---
17	---	6.7	5.6	5.3	4.6	5.1	5.5	---
18	---	6.3	5.4	5.4	4.5	5.0	5.5	---
19	---	6.2	5.3	5.1	4.5	4.3	5.5	---
20	---	5.9	5.0	5.1	4.6	4.5	5.5	---
21	8.8	5.4	5.4	5.3	4.7	4.5	5.7	---
22	8.7	5.9	5.1	5.3	5.0	4.5	5.7	---
23	8.9	6.4	5.2	5.3	5.3	4.7	5.9	---
24	9.1	6.7	5.9	5.0	5.2	4.6	5.9	---
25	9.1	7.0	6.5	5.0	5.1	4.7	5.7	---
26	9.2	7.3	6.6	5.3	5.2	5.7	5.7	---
27	9.1	7.5	6.3	5.3	5.2	5.5	5.8	---
28	9.1	7.8	5.9	4.8	5.2	5.3	5.9	---
29	9.1	8.2	5.6	4.6	5.3	5.3	6.3	---
30	9.2	8.4	5.4	4.5	5.0	5.5	6.9	---
31	---	8.0	---	4.4	4.7	---	7.2	---
Mean	9.1	7.6	6.7	5.5	4.8	5.0	5.7	7.4
Max	9.6	9.3	8.6	6.6	5.3	5.8	7.2	7.5
Min	8.7	5.4	5.0	4.4	4.4	4.3	5.1	7.3

TEMPORARY MODIFICATION OF SPECIAL THERMAL RELEASES

A RESOLUTION temporarily modifying Docket No. D-77-20 CP (Revision No. 3) to provide additional releases from Cannonsville Reservoir.

WHEREAS, unusual circumstances during the summer 2000 have resulted in continued flows at conservation rates from Cannonsville Reservoir with minimal calls for releases; and

WHEREAS, the State of New York and New York City have negotiated and developed an agreement to provide for additional releases from Cannonsville Reservoir to maintain a minimum daily flow of 200 cfs at the U.S. Geological Survey streamflow-gaging station on the West Branch of the Delaware River at Hale Eddy, New York; and

WHEREAS, Docket No. D-77-20 CP (Revised) authorizes special releases from the New York City reservoirs to relieve thermal stress conditions which are based upon maximum water temperature and not flow levels; and

WHEREAS, DRBC staff has communicated with the DRBC Commissioners and the Parties to the U.S. Supreme Court Decree; and

WHEREAS, the DRBC Commissioners and the Parties to the Decree have decided it is in the public interest to provide additional releases from Cannonsville Reservoir to maintain this minimum flow level at Hale Eddy, New York until October 31, 2000; and

WHEREAS, it is the intention of the DRBC Commissioners to formally approve and ratify the actions set forth herein at the next Commission meeting to insure compliance with all applicable DRBC resolutions; now therefore

BE IT RESOLVED by the undersigned Commissioners and Parties to the Decree:

1. Effective as of August 28, 2000, additional releases of water contained in the Special Thermal Stress Bank, approximately 6000 cfs-days, shall be made subject to the conditions noted below:

2. Additional Releases

   A. 8/28 - 9/15/2000 — Up to an additional 40 cfs each day, above and beyond the existing conservation release schedule of 160 cfs.

   B. 9/16 - 10/31/2000 — Up to an additional 155 cfs each, day above and beyond the existing conservation release schedule of 45 cfs.

3. A. Total additional releases may never exceed the unused balance of the thermal release bank.

   B. Additional releases will not be made when the Delaware River Master is otherwise calling for releases of water to maintain flows at Montague, New Jersey which are adequate to establish a minimum daily flow of 200 cfs at Hale Eddy, New York.

4. This modification will be in effect immediately and end on October 31, 2000.

/S/ Warren T. Lavery
State of New York

/S/ Irene B. Brooks
Commonwealth of Pennsylvania

/S/ Robert R. Jordan
/S/ Kevin C. Donnelly
State of Delaware

/S/ Robert Tudor
State of New Jersey

/S/ Michael A. Principe
The consent of the City of New York to the above action is hereby granted.