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REPORT OF THE RIVER MASTER OF THE DELAWARE RIVER

FOR THE PERIOD DECEMBER 1, 2007–NOVEMBER 30, 2008

Open-File Report 2014–1111

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

CALENDAR FOR REPORT YEAR 2008

DECEMBER 2007

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Report of the River Master of the Delaware River for the period December 1, 2007–November 30, 2008

By Bruce E. Krejmas, Gary N. Paulachok, and Stephen F. Blanchard

Open-File Report 2014–1111

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

U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2014

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Contents

Figures

Tables

Conversion Factors and Vertical Datum

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

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 1983.

Elevation, as used in this report, refers to the distance above a vertical datum.

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:
°F=(1.8x°C)+32

CHEMICAL CONCENTRATIONS

In this report, concentrations of chloride and dissolved oxygen are given in milligrams per liter (mg/L). Milligrams per liter represents the mass of solute (milligrams) per unit volume (liter) of water.

RIVER MASTER LETTER OF TRANSMITTAL AND SPECIAL REPORT

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

June 12, 2014

The Honorable
John G. Roberts, Jr.
Chief Justice of the United States

The Honorable
Jack A. Markell
Governor of Delaware

The Honorable
Christopher J. Christie
Governor of New Jersey

The Honorable
Andrew M. Cuomo
Governor of New York

The Honorable
Thomas W. Corbett
Governor of Pennsylvania

The Honorable
Bill de Blasio
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:

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 hereby transmitting the 55th Annual Report of the River Master of the Delaware River for the 12-month period from December 1, 2007, to November 30, 2008. In this report, this period is referred to as the River Master report year or the report year.

During the 2008 River Master report year, monthly precipitation in the upper Delaware River Basin ranged from 57 percent of the long-term average in November 2008 to 242 percent of the long-term average in February 2008. Total precipitation during the report year was 5.94 inches more than the 67 report-year average. Precipitation during the December to May period, when reservoirs in the Delaware River Basin typically refill, was 6.02 inches more than the 67-year average. Precipitation during the report

year was below normal in January, April, May, June, August, and November, and above normal in the other six months.

On December 1, 2007, when the report year began, combined storage in the New York City reservoirs in the upper Delaware River Basin—Pepacton, Cannonsville, and Neversink Reservoirs—was 217.748 billion gallons (Bgal) or 80.4 percent of combined storage capacity. Combined storage in these three reservoirs remained high from December 2007 to May 2008. Reservoir storage decreased moderately from June to late October, then increased steadily through the end of November. During the report year, operations in the basin were conducted as stipulated by the Decree.

On May 29, 2008, the Delaware River Master Advisory Committee met at the Beltzville State Park Environmental Center in Lehighton, Pennsylvania, to discuss hydrologic conditions in the basin and operational procedures for the 2008 reservoir-releases season. During the report year, the following individuals served as members of the Advisory Committee:

Delaware	John H. Talley
New Jersey	Mark N. Mauriello
New York	Mark Klotz
New York City	Paul Rush
Pennsylvania	Cathleen Curran Myers

The River Master informed the Advisory Committee that, on the basis of information provided by New York City, the interim excess-release quantity beginning June 15, 2008, was 11.068 Bgal. Based on reservoir releases components of the Flexible Flow Management Program, the interim excess-release quantity was used for various purposes. In late September, the Delaware River Basin Commission (DRBC) requested supplemental releases from the interim excess-release quantity to help maintain the Trenton flow objective.

During the report year, the River Master and staff participated in a number of water-supply-related meetings of the DRBC. The Deputy Delaware River Master met periodically with representatives of the Decree Parties as a member of the Decree Parties Work Group and DRBC's Regulated Flow Advisory Committee. Issues of particular interest to the River Master involved management of reservoir releases and streamflow in the upper Delaware River Basin.

The U.S. Geological Survey (USGS) continued 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, Hydrologist.

During the year, the River Master's office continued the weekly distribution of a summary hydrologic report. These reports contain provisional 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 USGS Montague, New Jersey 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 also was provided to Advisory Committee members. The weekly and monthly hydrologic reports were also posted on the River Master's Web site: *http://water.usgs.gov/osw/odrm/*.

The first section of this report documents Delaware River operations during the report year. During the year, the City of New York diverted 149.924 Bgal from the Delaware River Basin and released 252.729 Bgal from Pepacton, Cannonsville, and Neversink Reservoirs to the Delaware River. The River Master directed releases from these reservoirs to the Delaware River that totaled 47.064 Bgal.

The second 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 New York City's water supply 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 stipulated limits.

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

Sincerely yours,

/Signed/

Robert R. Mason, Jr.
Acting Delaware River Master

DELAWARE RIVER OPERATIONS

Abstract

A Decree of the Supreme Court of the United States, entered June 7, 1954, established the position of Delaware River Master within the U.S. Geological Survey (USGS). 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 55th Annual Report of the River Master of the Delaware River. It covers the 2008 River Master report year, the period from December 1, 2007, to November 30, 2008.

During the report year, precipitation in the upper Delaware River Basin was 49.79 inches (in.) or 114 percent of the 67 report-year average. Combined storage in Pepacton, Cannonsville, and Neversink Reservoirs remained high from December 2007 to May 2008. Reservoir storage decreased seasonally from June to late October, then increased gradually through the end of November. Delaware River operations during the year were conducted as stipulated by the Decree.

Diversions from the Delaware River Basin by New York City and New Jersey were in full compliance with 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, New Jersey, on 107 days during the report year. Releases were made at conservation rates—rates designed to relieve thermal stress and protect the fishery and aquatic habitat 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, 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, New Jersey, and Reedy Island Jetty, Delaware, was monitored at various locations. Data on water temperature, specific conductance, dissolved oxygen, and pH were collected continuously by electronic instruments at four sites. Data on water temperature and specific conductance were collected intermittently at one site. In addition, selected water-quality data were collected at 19 sites on a twice-monthly basis and at 3 sites on a monthly basis.

Introduction

An Amended Decree of the Supreme Court of the United States, entered June 7, 1954, authorized diversions of water from the Delaware River Basin and provided for releases of water from three New York City reservoirs—Pepacton, Cannonsville, and Neversink—to the upper Delaware River. The Decree stipulates that these diversions and releases are to be made under the supervision and direction of the Delaware River Master. The Decree also stipulates that reports on Delaware River operations be made to the Court not less frequently than annually. This report documents operations from December 1, 2007, to November 30, 2008, or the 2008 River Master report year. This report also presents information on the quality of water 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 (USGS) data-collection stations. These records were collected, computed, and furnished by the offices of the USGS at Troy, New York; Exton and New Cumberland, Pennsylvania; and Lawrenceville, 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 Alliance Energy. Quantitative precipitation forecasts and selected precipitation data (table 1) were provided by the National Weather Service (NWS) office in Binghamton, New York.

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 vi.

- **Balancing Adjustment**.—An operating procedure used by the River Master to correct for inaccuracies inherent in the design of releases from New York City reservoirs to meet the Montague flow objective. The balancing adjustment is computed as 10 percent of the difference between the cumulative adjusted directed release and the cumulative directed release required for exact forecasting. The balancing adjustment is applied to the following day's release design. The maximum daily balancing adjustment is intentionally limited to preclude unacceptably large variations in the adjusted flow objective.
- **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 Pepacton, Cannonsville, and Neversink Reservoirs designed to maintain specified minimum flows in stream channels immediately below the reservoirs (tailwaters). The conservation rates shown in table 2[1] are defined as follows:
  - **L1.—**Conservation releases when New York City combined reservoir storage is in the L1 zone.
  - **Normal**.—Conservation releases when New York City combined reservoir storage is in the normal (L2) zone.
  - **Watch**.—Conservation releases when New York City combined reservoir storage is in the drought watch (L3) zone.
  - **Warning**.—Conservation releases when New York City combined reservoir storage is in the drought warning (L4) zone.

[1]All numbered tables in the section "Delaware River Operations" are grouped at the end of this section, beginning on page 25.

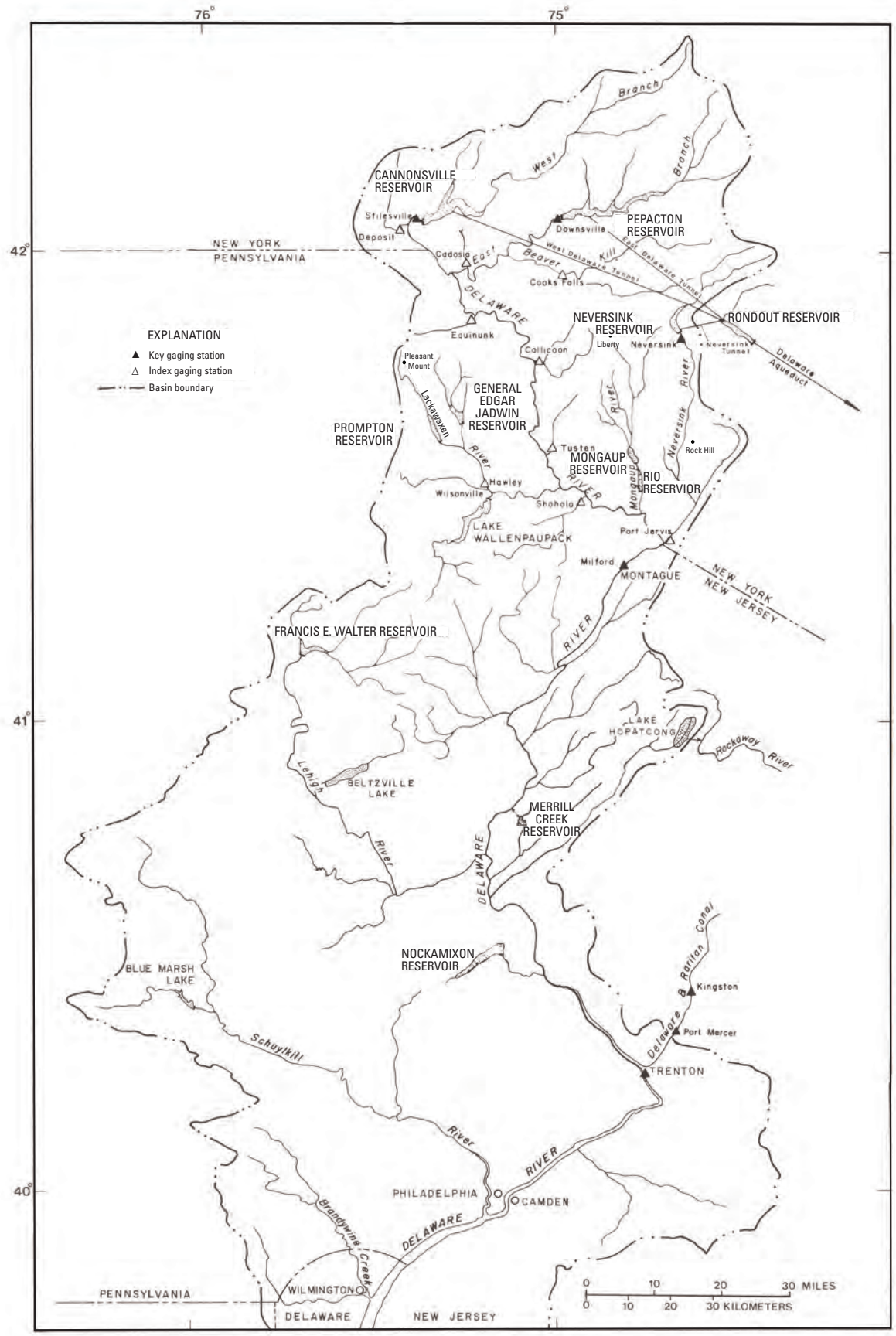


Figure 1. Delaware River Basin above Wilmington, Delaware.

- **Drought.—**Conservation releases when New York City combined reservoir storage is in the drought (L5) zone.

The combined storage zones for the New York City Delaware Basin reservoirs are shown in figure 2.

- **Daily interim excess-release credits**.—Daily interim excess-release credits 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, New Jersey, and 1,750 cubic feet per second (ft^3/s). The daily credit cannot exceed the 24-hour period releases from Pepacton, Cannonsville, and Neversink Reservoirs routed to Montague and made in accordance with direction, 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.

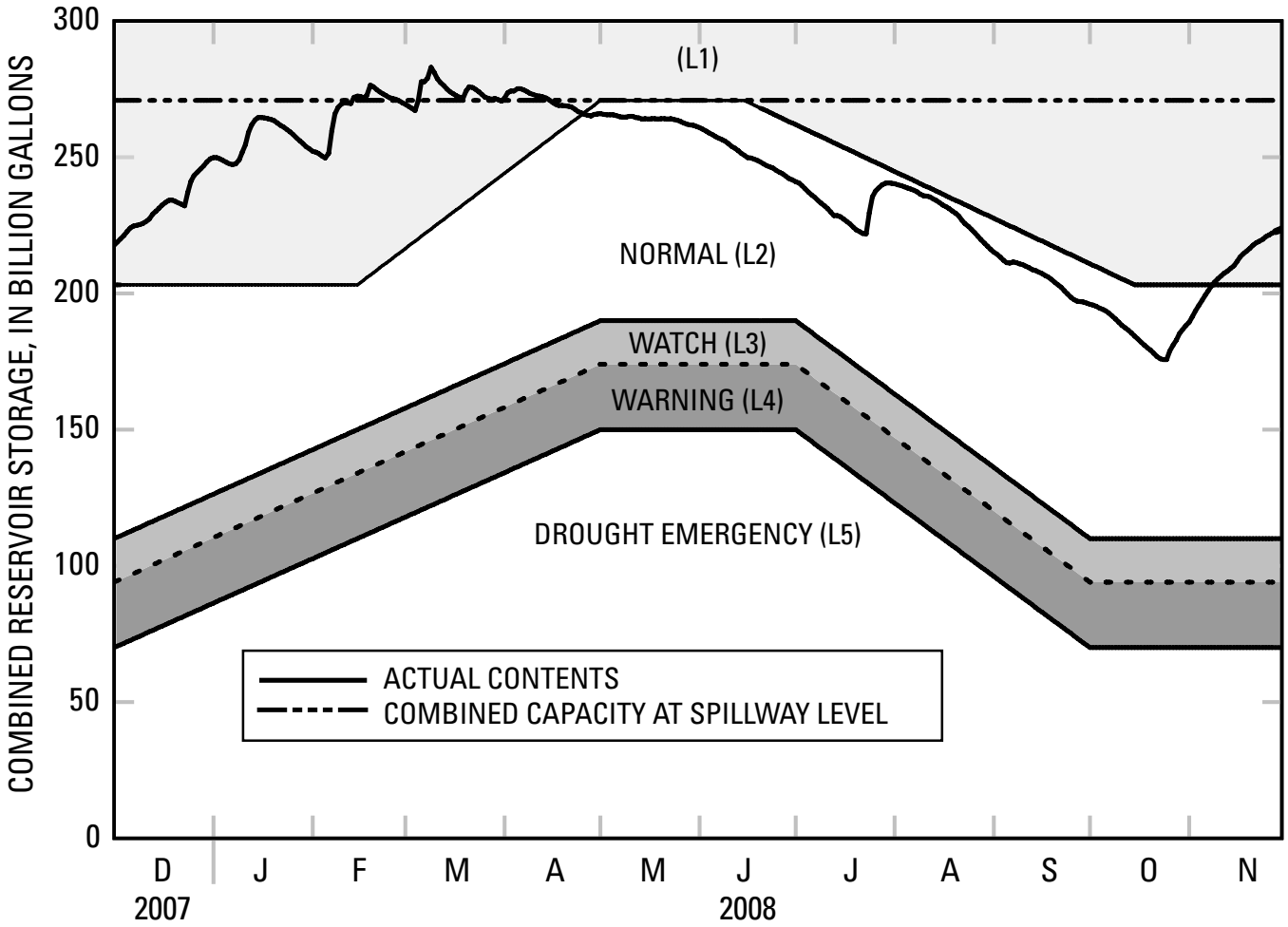


Figure 2. Operation curves and actual contents for New York City reservoirs in the Delaware River Basin, December 1, 2007, to November 30, 2008.

- **Diversions**.—The out-of-basin 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 out-of-basin transfer of water by New Jersey from the Delaware River through the Delaware and Raritan Canal.
- **Excess quantity**.—As defined by the Decree, the excess quantity of water is equal to 83 percent of the amount by which the estimated consumption by New York City during the year is less than the City's estimate of continuous safe yield [1,665 million gallons per day (Mgal/d) stipulated by the 1954 Decree] from all its sources of supply obtainable without pumping, except that the excess quantity shall not exceed 70 Bgal. 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 applicable excess quantity, whichever occurs first. During the 2008 report year, the excess-release quantity was used in support of an Interim Excess Release Quantity, as set forth in Section 4.C. of the Flexible Flow Management Program (FFMP) agreement.
- **Index gaging stations**.—Specific sites on tributaries of the upper Delaware River where systematic observations of gage height and discharge are made. These stations are used mainly during the directed-releases season to help estimate inflows of surface water to the upper Delaware River.
- **Key gaging stations**.—Specific sites 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 made. These stations are used on a year-round basis in River Master operations.
- **Maximum reservoir depletion**.—The minimum water surface level or elevation below which a reservoir ceases to continue making delivery of quantities of water for all purposes for which the reservoir was designed. This also is referred to as minimum full-operating level.
- **Rate of flow**.—Mean discharge for a specified 24-hour period, in cubic feet per second or million gallons per day.
- **Interim Excess Release Quantity**.—For an interim period from October 1, 2007, to May 31, 2011, an Interim Excess Release Quantity (IERQ) shall be applicable. The IERQ is computed as 83 percent of the difference between the highest year's consumption of the New York City water supply system during the period 2002–2006 of 1,257 Mgal/d and New York City's current estimate of continuous safe yield of the New York City water supply system of 1,290 Mgal/d obtainable without pumping. During the 2008 report year, the IERQ was available for release of 17,125 (ft^3/s)-d. New York City released the IERQ at rates designed to increase the flow at Montague as required by the FFMP and applicable temporary program agreements, and to maintain a flow at Trenton of 3,000 ft^3/s during basinwide normal storage conditions for the period from June 15 to the following March 15. The total IERQ released during the 2008 seasonal period did not exceed the FFMP-specified limit of 70 billion gallons.
- **Rate of flow at Montague**.—Daily mean discharge of the Delaware River at Montague, New Jersey, 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.

- **Salt Front**.—The salt front is defined as the 250 parts-per-million isochlor, or line of equal chloride concentration, in the Delaware Estuary. One part per million is one part of solute (in this case, chloride) per one million parts solvent (river water). The 7-day average location of the salt front is used as an indicator of salinity intrusion in the Delaware Estuary.
- **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 March 9 and a 25-hour day on November 2.
- **Uncontrolled runoff at Montague**.—Runoff from the 3,480 square mile (mi^2) drainage area above Montague, New Jersey, excluding the drainage area above Pepacton, Cannonsville, Neversink, Wallenpaupack, and Rio Dams, but including spillway overflow at these dams.

Precipitation

Precipitation in the Delaware River Basin above Montague, New Jersey, totaled 49.79 in. during the 2008 report year and was 5.94 in. greater than, or 114 percent of, the long-term (67 report-year) average. Monthly precipitation ranged from 57 percent of the long-term average in November 2008 to 242 percent of the long-term average in February 2008. Data on monthly precipitation during the report year and long-term average precipitation are presented in table 1. These data were computed from records for a network of 10 geographically distributed stations operated by the NWS; the New York City Department of Environmental Protection, Bureau of Water Supply; and the River Master office.

The seasonal period from December to May typically is when surface-water and groundwater reservoirs in the Delaware River Basin refill. During this period in 2007–2008, total average precipitation at the network stations was 26.32 in., which is 130 percent of the 67 report-year average. During June to November, total average precipitation at the network stations was 23.47 in., which is 100 percent of the long-term average. The maximum monthly precipitation was 9.02 in. in July 2008, measured at Liberty, New York; the minimum monthly precipitation was 0.94 in. in August 2008, measured at Downsville, New York (locations shown on fig. 1).

Operations

December to May

Operations on December 1, 2007, were conducted as prescribed by the FFMP, which is posted on the River Master's Web site at *http://water.usgs.gov/osw/odrm/document_archive/FFMP_original.pdf*. 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 rates shown in table 2.

From December 2007 to May 2008, the first half of the report year, total precipitation was 6.02 in. above average. Monthly precipitation ranged from 67 percent of the long-term average in May 2008 to 242 percent in February 2008 (table 1). Runoff in the upper basin was normal in December and April, above normal in January, February, and March, and below normal in May.

On December 1, 2007, when the 2008 report year began, Pepacton Reservoir contained 109.186 Bgal of water in storage above the point of maximum depletion, or 77.9 percent of the 140.190 Bgal storage capacity. Cannonsville Reservoir contained 78.498 Bgal, or 82.0 percent of the 95.706 Bgal storage capacity. Neversink Reservoir contained 30.064 Bgal, or 86.0 percent of the 34.941 Bgal storage capacity. Combined storage in these reservoirs on December 1, 2007, was 217.748 Bgal, or 80.4 percent of combined capacity. Daily storage in Pepacton, Cannonsville, and Neversink Reservoirs is given in tables 3, 4, and 5, respectively, and combined storage during the report year is shown in figure 2.

On February 15, 2008, the Decree Parties agreed to a temporary increase in the controlled releases from Pepacton, Cannonsville, and Neversink Reservoirs to facilitate a maintenance inspection of a portion of the Delaware Aqueduct. This agreement is given in Appendix A.

For the period April 15 to April 30, 2008, the Decree Parties agreed to a temporary wet spring releases schedule adjustment. This agreement is given in Appendix B.

From December to May, inflow to the City's Delaware Basin reservoirs typically exceeds outflow and storage increases. The average inflow to Pepacton, Cannonsville, and Neversink Reservoirs for this 6-month period, computed on the basis of the 67 report-year period from December 1940 to May 2007, was 302.5 Bgal. During the corresponding 6 months of the report year, inflow to the three reservoirs totaled 407.1 Bgal. Evaporation loss is not included in the computations.

Combined storage increased steadily from December 2007 to mid-February 2008, when the reservoirs filled. Combined storage remained high until mid-April, then slowly decreased. The combined storage of the reservoirs was about 96 percent of usable capacity on May 31, 2008.

Combined storage in the three New York City reservoirs was 216.317 Bgal on November 30, 2007, and 261.320 Bgal on May 31, 2008, a net increase of 45.003 Bgal or 16.6 percent of total capacity. The maximum combined storage during the December to May period was 282.973 Bgal on March 9, 2008. Maximum storage in Pepacton Reservoir during the December to May period was 144.286 Bgal on March 9; maximum storage in Cannonsville Reservoir was 102.949 Bgal on March 9; and maximum storage in Neversink Reservoir was 35.738 Bgal on March 9, 2008. Pepacton Reservoir spilled from February 13–29, and March 4 to April 16. Cannonsville Reservoir spilled from January 12–20, February 7–26, March 5 to April 15, and April 20–22. Neversink Reservoir spilled from February 18 to March 14, March 19–24, and April 2–13. The combined spill volume from the three reservoirs during this period was 115.200 Bgal.

During the December to May period, diversions to Rondout Reservoir by New York City totaled 59.523 Bgal (325 Mgal/d). The forecasted discharge at Montague, exclusive of water released from the City's Delaware Basin 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 was greater than the applicable flow objective on all days. Applicable design rates for the USGS gaging station Delaware River at Montague, New Jersey, are presented in table 6.

June to November

Monthly precipitation for the June to November period was above average in July, September, and October, and below average in June, August, and November. Total precipitation during the period was 23.47 in. or 0.08 in. less than the 67-year average (table 1).

Combined storage in the three New York City reservoirs was 260.888 Bgal on June 1, 2008, and 223.733 Bgal on November 30, 2008, a net decrease of 37.155 Bgal or about 13.7 percent of total capacity. During the June to November period, maximum storage in Pepacton Reservoir was 135.312 Bgal on June 1; 91.416 Bgal in Cannonsville Reservoir on June 1; and 34.160 Bgal in Neversink Reservoir on June 1. Maximum combined storage in the three reservoirs was 260.888 Bgal on June 1, 2008. None of the three reservoirs spilled during this period.

Releases were directed to meet the Montague flow objective on 107 days between June 1 and November 30, 2008, when the forecasted discharge at Montague, exclusive of water released from the New York City reservoirs, was less than the flow objective. Releases at rates designed to protect the fishery and aquatic habitat were made at other times during the period.

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, fell below the flow objective on three days and releases were directed. The observed flow was greater than the Montague flow objective on all days in this period.

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 2008 calendar year, as stipulated by the FFMP.

- The estimated continuous safe yield from all the City's sources, obtainable without pumping, is 1,290 Mgal/d, or a total during calendar year 2008 of 1.290 Bgal/d x 366 days = 472.140 Bgal.
- The estimated consumption that the City must provide for, from all its sources of supply during calendar year 2008, is 458.805 Bgal.

On the basis of the FFMP and the above-noted values, the aggregate quantity of the Interim Excess Release Quantity (IERQ) was 83 percent of (472.140 - 458.805), or 11.068 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.

On June 9, 2008, the Decree Parties agreed to a temporary program of emergency thermal releases from Cannonsville Reservoir to mitigate thermal stress conditions downstream of the confluence of the West Branch and East Branch Delaware Rivers. An agreement established an IERQ Extraordinary Needs Bank to provide additional protection for thermal stress conditions from July 11 to September 15, 2008. This agreement is shown in Appendix C.

On June 15, 2008, the beginning of the seasonal IERQ period, the Montague flow objective was increased to 1,850 ft^3/s. Storage in the New York City reservoirs declined seasonally through the summer, then increased slowly from late October to the end of the report year.

Effective October 1, 2008, the Parties to the Decree approved a temporary releases program for a possible 2008 Rondout-West Branch Tunnel shutdown. This agreement is shown in Appendix D.

From June 15 to November 30, 2008, the forecasted flow at Montague, exclusive of releases from the New York City reservoirs, was less than the flow objective on 104 days and releases were directed by the River Master. On 19 days during the June 15 to November 30 period, the observed flow was less than the flow objective. On 16 of these 19 days, observed flows were within 10 percent of the flow objective. Applicable design rates for the USGS gaging station Delaware River at Montague, New Jersey, are presented in table 6.

The total discharge observed 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 June to October 2008 are shown in figure 3. In developing the water budget for Montague, uncontrolled runoff was computed as the residual of observed flow minus releases and spills from all reservoirs, and, consequently, was subject to errors in observations, transit times, and routing of the various components of flow. The conservation release from Rio Reservoir is included in the uncontrolled runoff component. The net effect of these uncertainties is incorporated in the computation of uncontrolled runoff. From June 1 to November 30, 2008, diversions from the three New York City Delaware Basin reservoirs to Rondout Reservoir totaled 90.401 Bgal.

Summary of Operations

From December 1, 2007, to November 30, 2008, diversions from the three New York City reservoirs in the upper Delaware River Basin to Rondout Reservoir totaled 149.924 Bgal, and all releases from the three reservoirs to the Delaware River totaled 252.729 Bgal. The River Master directed releases to the Delaware River from these reservoirs that totaled 47.064 Bgal, which included 0.452 Bgal from the IERQ, as requested by DRBC for flow augmentation at Trenton.

During the year, maximum storage in Pepacton Reservoir was 144.286 Bgal (102.9 percent of capacity) on March 9, 2008; 102.949 Bgal (107.6 percent of capacity) in Cannonsville Reservoir on March 9; and 35.738 Bgal (102.3 percent of capacity) in Neversink Reservoir on March 9. Maximum combined storage in the three reservoirs was 282.973 Bgal (104.5 percent of combined capacity) on March 9, 2008. The combined spill volume from the three reservoirs for the report year was 115.200 Bgal.

During the report year, minimum storage in Pepacton Reservoir was 101.226 Bgal (72.2 percent of capacity) on October 23, 2008; 51.733 Bgal (54.1 percent of capacity) in Cannonsville Reservoir on October 24, 2008; and 22.654 Bgal (64.8 percent of capacity) in Neversink Reservoir on October 25, 2008. Minimum combined storage in the three reservoirs was 175.649 Bgal (64.9 percent of combined capacity) on October 24, 2008.

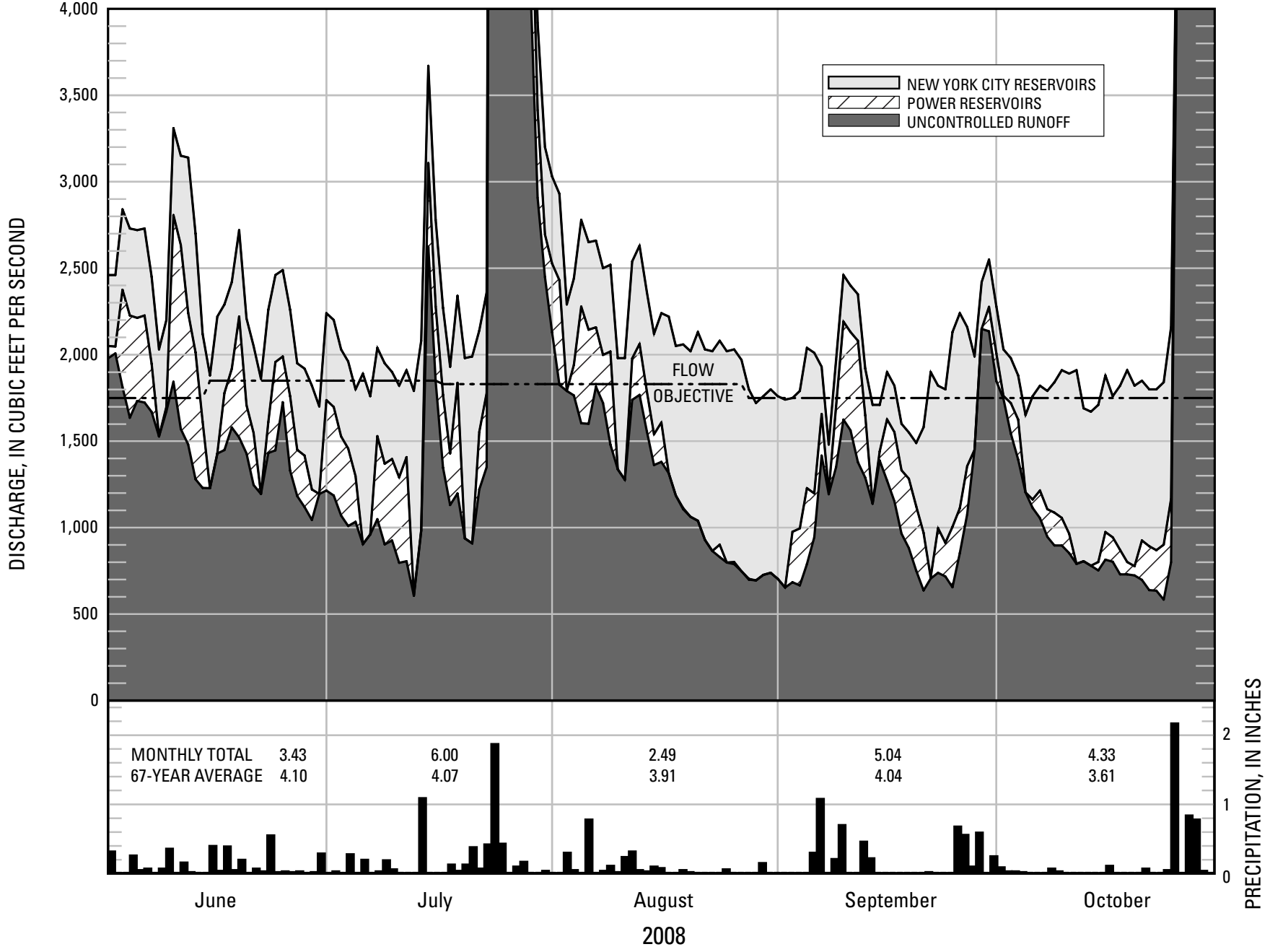


Figure 3. Components of flow, Delaware River at Montague, New Jersey, June 1 to October 31, 2008.

On November 30, 2008, the end of the report year, combined storage in the three reservoirs was 223.733 Bgal or 82.6 percent of combined capacity. From December 1, 2007, to November 30, 2008, the net change in combined storage was +7.416 Bgal, or an increase equivalent to 2.7 percent of combined capacity.

Combined storage for the three reservoirs on the first day of the month was above median in every month from December to April and from August to November, and was below median in every month from May to July (fig. 4). A new record-high combined storage level for the first day of the month was set in March 2008.

Streamflow

Components of Flow, Delaware River at Montague, New Jersey

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 8), and segregation of components of daily mean flow at Montague (table 9).

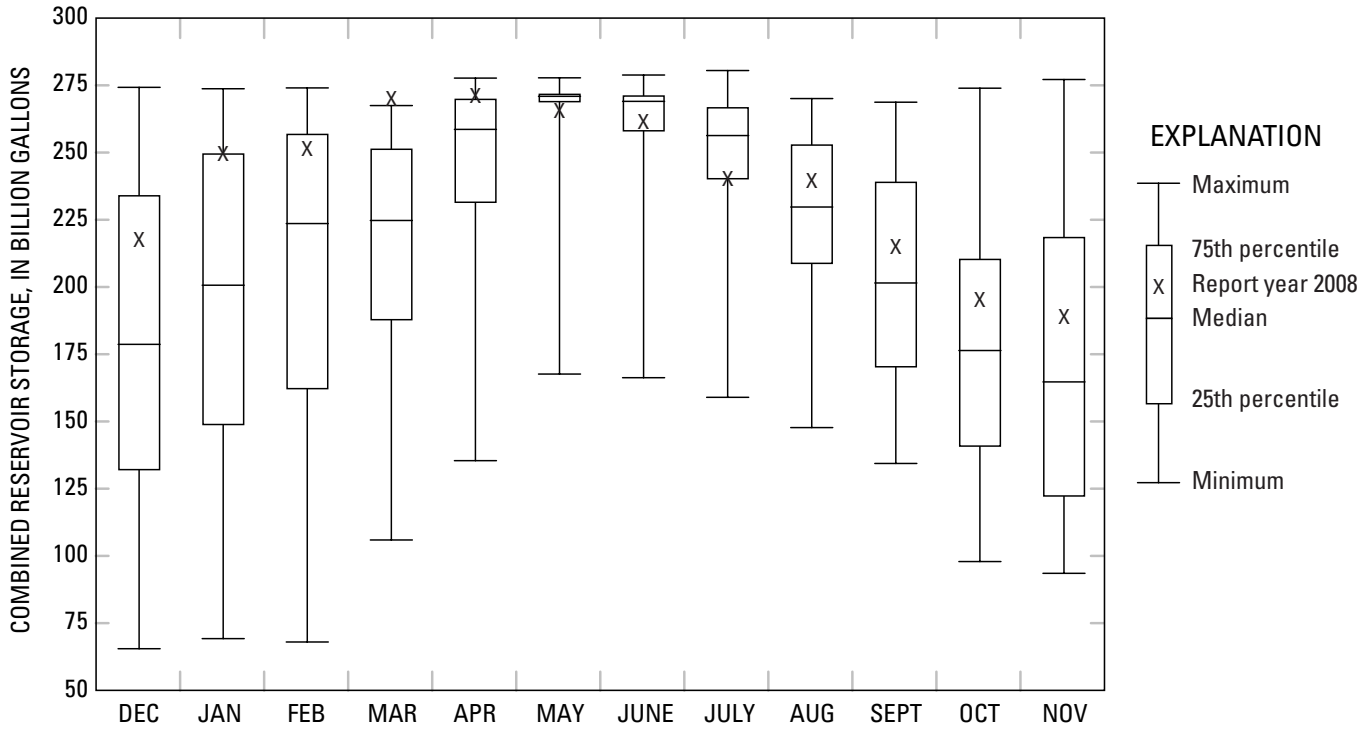


Figure 4. Combined storage in Pepacton, Cannonsville, and Neversink Reservoirs on the first day of the month, December 2007 to November 2008 (this report year), and summary statistics for the reference period, June 1967 to November 2007.

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 spills from New York City reservoirs, Lake Wallenpaupack, and Rio Reservoir.
4. Controlled releases from Pepacton, Cannonsville, and Neversink Reservoirs of New York City.

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

Time of Travel

Following are average times for the effective travel of water from the various sources of controlled supply to Montague, New Jersey. These times were used for flow routing during the 2008 report year.

Source	Travel time, in 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 streamflow records. The travel times generally are suitable for use in the operations of the River Master. Occasionally, however, significant 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 66 hours after the time of release. During winter, the formation of ice, together with lower streamflow, gradually increases the resistance to water flow, resulting in increased travel times. Because ice-affected travel times increase gradually over several days, and releases were not directed to meet the Montague flow objective during periods of ice, no adjustments were made to compensate for increased travel times during these periods of the report year.

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, New Jersey, are presented in table 9. The data are arranged to conform to the downstream movement of water from the various sources to Montague. Summation of data across individual rows in the table is equivalent to routing the various flow contributions to Montague, using the above-noted average travel times. 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, absent real-time information on any changes in stage-discharge relations; (2) daily discharge from New York City's three Delaware Basin reservoirs, measured with venturi meters; (3) precipitation reports for the previous 24 hours; (4) actual powerplant releases converted to daily discharges; (5) advance estimates of power demand converted to daily discharges; (6) advance estimates of uncontrolled runoff at Montague; and (7) average travel times for routing water from various sources. Although uncertainty is inherent in the advance estimates, this information is used by necessity in the daily design and direction of reservoir releases.

The 60-hour travel time of water from Pepacton Reservoir to Montague is greater than the travel time of water from any other reservoir in the upper Delaware River Basin. 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 meet the Montague flow objective were computed from forecasts of releases from Lake Wallenpaupack and Rio Reservoir, and estimates of uncontrolled runoff at Montague. To account for the travel times from these sources to Montague, the computation requires estimates of the following components of flow two or more days in advance: (1) releases from Lake Wallenpaupack; (2) releases from Rio Reservoir; and (3) uncontrolled runoff from the drainage area upstream of Montague. The River Master operations record for computing daily directed release requirements during periods of low flow is given in table 8.

The electric utilities furnished forecasts of power generation and releases. Because the hydroelectric plants were used chiefly for area regulation or meeting peak power demands, the forecasts were subject to various modifying factors including the vagaries of weather on electricity demand. In addition, because the power companies are members of regional transmission organizations, demand for power outside of the local service area may unexpectedly affect generation schedules. Consequently, at times, the actual use of water for power generation differs considerably from the forecasts 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 of these components are given in table 8.

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, New York	241
Oquaga Creek at Deposit, New York	67.6
Equinunk Creek at Equinunk, Pennsylvania	56.3
Callicoon Creek at Callicoon, New York	110
Tenmile River at Tusten, New York	45.6
Lackawaxen River at Hawley, Pennsylvania	290
Shohola Creek near Shohola, Pennsylvania	83.6
Neversink River at Port Jervis, New York	336

During winter, the advance estimate of uncontrolled runoff (current conditions) was made on the basis of observed 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 8 under the heading "Weather Adjustment." Throughout the year, the NWS office in Binghamton, New York, furnished quantitative forecasts of average precipitation and air temperatures for the 3,480 mi^2 drainage basin upstream of Montague, New Jersey. 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 Delaware Basin reservoirs (table 8), 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 total flow is less than the flow objective at Montague, then the deficiency is made up by releases from the City's reservoirs, as directed by the River Master.

When forecasts of precipitation or powerplant releases were revised appreciably after a release was directed, the release required from the City's reservoirs was recomputed. Commonly, this procedure resulted in a reduced release requirement for New York City reservoirs for that day. Only final values for releases from New York City reservoirs are given in table 8.

Analysis of Forecasts

Forecasts of streamflow at Montague, developed on the basis of anticipated contributions from the components described previously but 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 compared favorably with forecasted flows.

The forecasted flow of the Delaware River at Montague, exclusive of releases from the New York City Delaware Basin reservoirs, was less than the flow objective on most days from June to October 2008. The following tabulation compares total forecasted and total actual power reservoir releases from June 8 to October 25. The tabulation also compares total forecasted and total observed uncontrolled runoff from June 8 to October 25, except for a brief period of higher flow from July 24 to August 2, when no releases were directed by the River Master.

Releases and Runoff	Forecasted flow [(ft^3/s)-d]	Actual flow [(ft^3/s)-d]
Power releases		
Lake Wallenpaupack	24,424	25,895
Rio Reservoir	9,306	11,710
Runoff from uncontrolled area	135,958	150,557

For the June to October period shown in the tabulation above, actual releases from Lake Wallenpaupack and Rio Reservoir averaged 6.0 and 25.8 percent greater than forecasted releases, respectively. Observed runoff from the uncontrolled area was about 10.7 percent greater than forecasted runoff.

On any given day, forecasted releases and actual releases can differ considerably. The ranges of actual daily releases from June 8 to October 25, 2008, are as follows: actual daily releases at Lake Wallenpaupack differed from forecasted releases by 173 ft^3/s less to 322 ft^3/s greater, and actual daily releases at Rio Reservoir differed from forecasted releases by 833 ft^3/s less to 851 ft^3/s greater. On the basis of observed flows at Montague, total directed releases from New York City's Delaware Basin reservoirs during the report year were about 18 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 suitable for use in designing releases from New York City's Delaware Basin 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 were 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 reasonably accurate, but often the actual timing of precipitation events may be 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 substantially 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 the equivalent of 800 Mgal/d. The Decree specifies that the diversion rate shall be computed as the aggregate total diversion beginning June 1 of each year divided by the total number of days elapsed since the preceding May 31.

Daily 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 10. A running account of the average rates of combined diversions from the three reservoirs, computed as stipulated by the Decree, also is shown. The following tabulation shows allowable maximum diversion rates and average actual diversions for various periods during the report year.

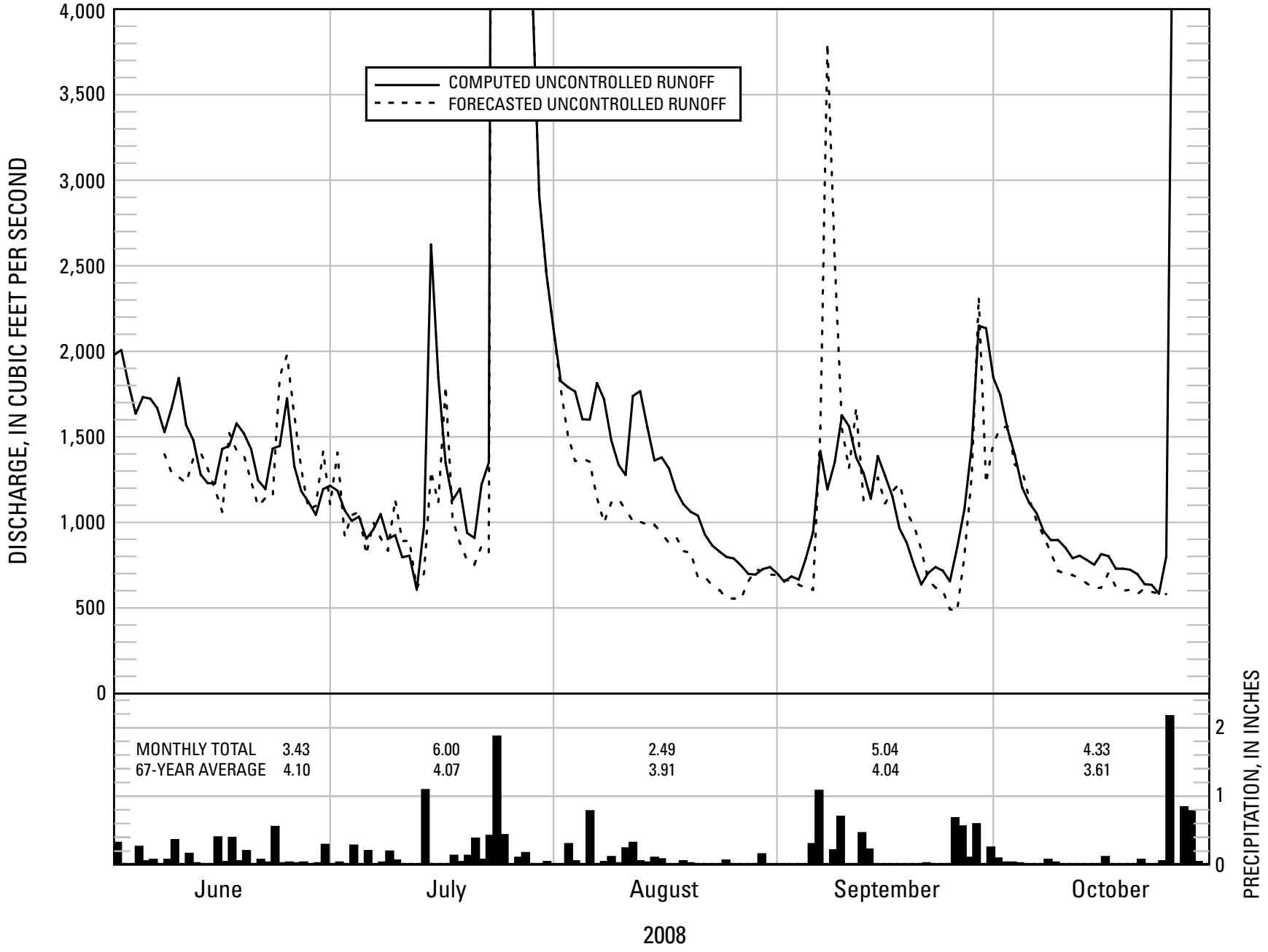


Figure 5. Uncontrolled runoff component, Delaware River at Montague, New Jersey, June 1 to October 31, 2008.

Effective dates	Allowable diversion (Mgal/d)	Average actual diversion (Mgal/d)
December 1, 2007 to May 31, 2008	800	489
June 1 to November 30, 2008	800	494

During the report year, a total of 149.924 Bgal of water was diverted to the New York City water-supply system. The allowable diversion was 319.748 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.

+Elevation of mouth of inlet channel of diversion works.

Daily 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.

On December 1, 2007, combined storage in the three reservoirs was 217.748 Bgal, or 80.4 percent of combined capacity. Combined storage increased in early winter, remained high throughout winter and spring, declined seasonally until late October, then increased from late October to the end of November. The three reservoirs spilled a total of 115.200 Bgal during the year. Combined storage reached a maximum for the report year on March 9, 2008, at 282.973 Bgal. Combined storage was 223.733 Bgal, or 82.6 percent of combined capacity, on November 30, 2008.

Comparison of River Master Operations Data With Other Streamflow Records

River Master operations are conducted on a day-to-day basis and, by necessity, use preliminary data on streamflow. In this section, records used in River Master operations are compared to final data published for selected USGS gaging stations. 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 the New York City Department of Environmental Protection. 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, New York, is 0.5 mile downstream from Downsville 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 gaging-station records are rated good, which means that about 95 percent of the daily discharges are within 10 percent of the true discharge.

The following tabulation compares releases from Pepacton Reservoir (table 9), reported by New York City, to the final records for the USGS gaging station on East Branch Delaware River at Downsville, New York (table 11), for the flow objectives shown.

Flow objective (ft^3/s)	85	110	140	700
Number of USGS daily mean discharge values used in comparison	100	29	90	41
New York City-measured mean flow (ft^3/s)	85.1	110	141	701
USGS-computed mean flow (ft^3/s)	83.6	114	143	718
Percent difference	+1.8	-3.5	-1.4	-2.4

The differences at the four flow objectives are less than 4 percent. The instruments connected to the venturi meters were recalibrated periodically by New York City to improve the accuracy of the recorded flow data.

The USGS gaging station on West Branch Delaware River at Stilesville, New York, 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 gaging-station records are rated fair at flows greater than 100 ft^3/s and poor at flows less than 100 ft^3/s. A rating of "fair" means that about 95 percent of the daily discharges are within 15 percent of the true discharge, whereas a rating of "poor" means that daily discharges have less than "fair" accuracy. The records include runoff from the area between the dam and the gaging station, and seepage near the base of the dam.

The following tabulation compares releases from Cannonsville Reservoir (table 9), reported by New York City, to the final records for the USGS gaging station on West Branch Delaware River at Stilesville, New York (table 12), for the flow objectives shown.

Flow objective (ft^3/s)	110	215	1,500
Number of USGS daily mean discharge values used in comparison	46	30	37
New York City-measured mean flow (ft^3/s)	110	215	1,500
USGS-computed mean flow (ft^3/s)	118	212	1,500
Percent difference	-6.8	+1.4	0

The differences at the three flow objectives are less than 7 percent.

The USGS gaging station on Neversink River at Neversink, New York, is 1,650 ft 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 92.6 mi^2 at the gaging station. The gaging-station records are rated good, which means that about 95 percent of the daily discharges are within 10 percent of the true discharge.

The following tabulation compares releases from Neversink Reservoir (table 9), reported by New York City, to the final records for the USGS gaging station on Neversink River at Neversink, New York (table 13), for the flow objectives shown.

Flow objective (ft^3/s)	60	65	70	85	100
Number of USGS daily mean discharge values used in comparison	56	43	28	29	103
New York City-measured mean flow (ft^3/s)	60.3	65.0	69.6	85.1	101
USGS-computed mean flow (ft^3/s)	60.2	64.7	70.7	81.5	101
Percent difference	+0.2	+0.5	-1.6	+4.4	0

The differences at the five flow objectives are less than 5 percent.

Delaware River at Montague, New Jersey

The River Master's operations record for the Delaware River at Montague, New Jersey (table 9), showed about 0.4 percent more discharge for the report year than the published USGS record for the gaging station (table 14). Daily values for the two records agreed closely, except during ice-affected periods.

Diversion Tunnels

Records of diversions through the East Delaware, West Delaware, and Neversink Tunnels (fig. 1) were furnished by the New York City Department of Environmental Protection. 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 a City computer and, on 5-minute intervals, release and diversion quantities for the preceding 5-minute period were computed using the instantaneous rate-of-flow data from each instrument. These 5-minute quantities were then 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 corrected when necessary.

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.

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 (assumed constant) rate of leakage is about 8.0 Mgal/d. Because the powerplant was not in operation for the equivalent of 153 days during the 2008 report year, the estimated quantity of unmeasured leakage was about 1.2 Bgal.

The West Delaware Tunnel is used to divert water from Cannonsville Reservoir to Rondout Reservoir. 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 Neversink Tunnel is used to divert water from Neversink Reservoir to Rondout Reservoir. A hydroelectric powerplant 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 current-meter measurement made in 1999 showed a leakage rate of 16.2 ft^3/s (10.5 Mgal/d). When the powerplant is operating, the leakage is included in the recorded flow. No leakage occurs when the main valve on the tunnel is closed. During the 2008 report year, the powerplant operated part of the day on most days and was not operated the equivalent of 240 days. Using the leakage rate noted above and records of powerplant operation, about 2.5 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 and its tributaries in New Jersey, to areas outside of the Delaware River Basin, without compensating releases. These diversions may not exceed 100 Mgal/d as a monthly average, and the daily mean diversion 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 diversions by New Jersey (table 15).

The following tabulation shows 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, 2007 to Nov. 30, 2008	100	97.8	April

The maximum daily mean diversion was 102 Mgal on April 11, 2008. Diversions by New Jersey did not exceed the limits stipulated by the Decree.

Conformance of Operations Under the Amended Decree of the U.S. Supreme Court Entered June 7, 1954

From December 1, 2007, to November 30, 2008, 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 did not exceed 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 meet the applicable flow objectives at Montague, New Jersey. During the report year, New York City complied fully with all directives and requests of the River Master.

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

Table 1. Precipitation in the Delaware River Basin above Montague, New Jersey.
(Source: National Weather Service, New York City Department of Environmental Protection, and Office of the Delaware River Master)

[All values, except percentages, in inches]

Month	Long-Term Monthly Average*	December 2007 to November 2008			
		Amount	Percent of Long-Term Average	Excess (+) or Deficit (-)	
				Month	Cumulative
December	3.38	5.33	158	+1.95	+1.95
January	3.06	2.15	70	-0.91	+1.04
February	2.60	6.30	242	+3.70	+4.74
March	3.33	6.52	196	+3.19	+7.93
April	3.78	3.22	85	-0.56	+7.37
May	4.15	2.80	67	-1.35	+6.02
June	4.10	3.43	84	-0.67	+5.35
July	4.07	6.00	147	+1.93	+7.28
August	3.91	2.49	64	-1.42	+5.86
September	4.04	5.04	125	+1.00	+6.86
October	3.61	4.33	120	+0.72	+7.58
November	3.82	2.18	57	-1.64	+5.94
12 months	43.85	49.79	114		

*Reference period is December 1940 to November 2007.

Table 2. Conservation release rates for New York City reservoirs in the Delaware River Basin. (Source: Flexible Flow Management Program-Table 3 with 35 million gallons available)

[All values in cubic feet per second]

Storage Zone	Winter		Spring	Summer			Fall	
	Dec 1–Mar 31	Apr 1–Apr 30	May 1–May 31	Jun 1–Jun 15	Jun 16–Jun 30	Jul 1–Aug 31	Sept 1–Sept 30	Oct 1–Nov 30
Cannonsville								
L1-a	1,500	1,500	*	*	1,500	1,500	1,500	1,500
L1-b	250	*	*	*	*	350	275	250
L1-c	110	110	225	275	275	275	140	110
L2	80	80	215	260	260	260	115	80
L3	70	70	100	175	175	175	95	70
L4	55	55	75	130	130	130	55	60
L5	50	50	50	120	120	120	50	50
Pepacton								
L1-a	700	700	*	*	700	700	700	700
L1-b	185	*	*	*	*	250	200	185
L1-c	85	85	120	150	150	150	100	85
L2	65	65	110	140	140	140	85	60
L3	55	55	80	100	100	100	55	55
L4	45	45	50	85	85	85	40	40
L5	40	40	40	80	80	80	30	30
Neversink								
L1-a	190	190	*	*	190	190	190	190
L1-b	100	*	*	*	*	120	85	95
L1-c	65	65	90	110	110	110	75	60
L2	45	45	85	100	100	100	70	45
L3	40	40	50	75	75	75	40	40
L4	35	35	40	60	60	60	30	30
L5	30	30	30	55	55	55	25	25

*Storage zone does not apply during this period. Releases will be made in accordance with zone L1-c.

Table 3. Storage in Pepacton Reservoir, New York, for year ending November 30, 2008.
(River Master daily operations record; gage reading at 0800 hours)

[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]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	109,186	127,372	132,326	140,153	140,950	137,181	135,312	126,219	128,866	119,155	108,733	108,040
2	109,364	127,706	132,182	139,987	141,524	136,981	135,167	126,028	128,778	118,664	108,540	109,056
3	109,543	127,794	131,862	139,877	141,449	136,890	134,986	125,505	128,761	118,225	108,282	110,046
4	109,916	127,829	131,505	139,748	141,320	136,872	134,714	125,053	128,673	117,770	108,024	110,974
5	110,436	127,917	131,043	141,727	141,635	136,890	134,426	124,516	128,567	117,350	107,718	111,906
6	110,941	127,970	131,487	143,200	141,617	136,726	134,138	123,962	128,497	117,266	107,380	112,794
7	111,089	128,058	134,228	142,734	141,449	136,690	133,923	123,445	128,304	117,434	107,028	113,634
8	111,040	128,497	136,599	142,882	141,264	136,708	133,563	122,912	128,128	117,166	106,676	114,396
9	110,908	129,324	137,820	144,286	141,116	136,799	133,240	122,378	127,952	116,763	106,340	115,077
10	110,794	130,866	138,719	143,182	141,023	137,108	132,880	121,814	127,741	116,562	105,940	115,642
11	111,138	132,165	139,234	142,435	140,876	137,273	132,487	121,300	127,670	116,194	105,573	116,110
12	111,677	134,102	139,455	142,024	140,950	137,108	132,093	120,753	127,565	115,759	105,193	116,511
13	112,464	135,294	139,730	141,691	140,876	137,255	131,719	120,174	127,216	115,376	104,779	116,863
14	112,778	136,308	141,061	141,283	140,820	137,000	131,291	120,174	126,848	115,077	104,399	117,283
15	113,371	136,981	141,209	141,005	140,597	137,054	130,989	119,818	126,464	114,645	103,987	117,719
16	113,997	137,328	141,116	140,801	140,190	137,054	130,635	119,257	126,149	114,279	103,657	118,411
17	114,595	137,565	140,894	140,708	139,877	137,072	130,528	118,714	125,800	113,865	103,294	119,019
18	115,041	137,766	141,524	140,634	139,712	137,000	130,475	118,208	125,384	113,453	102,994	119,529
19	115,476	137,748	142,528	140,579	139,619	136,908	130,457	117,702	125,019	112,991	102,570	119,953
20	115,809	137,510	142,136	141,727	139,491	136,818	130,263	117,216	124,690	112,563	102,163	120,361
21	116,160	137,108	141,746	142,211	139,381	136,654	130,032	116,830	124,378	112,086	101,742	120,770
22	116,528	136,726	141,394	142,043	139,105	136,563	129,802	116,394	123,911	111,694	101,367	121,112
23	116,863	136,381	141,116	141,764	138,811	136,399	129,678	116,043	123,428	111,235	101,226	121,351
24	119,461	136,018	140,820	141,394	138,480	136,253	129,448	121,985	122,912	110,811	101,258	121,643
25	121,436	135,584	140,671	140,950	138,351	136,091	129,077	125,050	122,447	110,355	101,304	122,087
26	122,705	135,130	140,542	140,690	137,966	135,910	128,567	126,237	121,968	109,965	102,884	122,327
27	123,653	134,696	140,523	140,560	137,784	135,693	128,058	127,093	121,453	109,640	103,971	122,447
28	124,516	134,156	140,394	140,560	137,565	135,475	127,582	128,040	120,958	109,396	104,859	122,601
29	125,331	133,671	140,209	140,727	137,657	135,385	127,041	128,673	120,446	109,186	106,052	122,688
30	126,149	133,150		140,597	137,383	135,403	126,638	128,919	120,072	108,943	106,740	122,808
31	126,953	132,791		140,449		135,385		128,884	119,597		107,396	
Change	+17,994	+5,838	+7,418	+240	-3,066	-1,998	-8,747	+2,246	-9,287	-10,654	-1,547	+15,412
Equiv. Mgal/d	+580.5	+188.3	+255.8	+7.7	-102.2	-64.5	-291.6	+72.5	-299.6	-355.1	-49.9	+513.7
Equiv. ft^3/s	+898	+291	+396	+12.0	-158	-99.7	-451	+112	-463	-549	-77.2	+795
Change for year +13,849 Mgal				Equivalent for year +37.8 Mgal/d						Equivalent for year +58.5 ft^3/s		

Table 4. Storage in Cannonsville Reservoir, New York, for year ending November 30, 2008.
(River Master daily operations record; gage reading at 0800 hours)

[Storage in millions of gallons above elevation 1,040,00 ft. Add 2,584 million gallons for total contents above sill outlet tunnel, elevation 1,020,50 ft. Storage at spillway level is 95,706 million gallons]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	78,498	93,288	89,226	94,276	96,334	94,733	91,416	84,082	82,319	69,662	61,779	56,092
2	79,341	93,075	89,134	93,729	97,283	94,641	91,127	83,880	82,117	69,344	61,626	56,886
3	80,115	92,679	89,104	93,120	97,750	94,459	90,762	83,533	81,871	68,788	61,447	57,753
4	80,874	92,009	88,754	92,542	97,830	94,337	90,427	83,200	81,683	68,232	61,218	58,534
5	81,625	91,431	88,480	93,759	98,281	94,307	90,093	82,579	81,394	67,794	61,040	59,450
6	82,305	90,883	89,530	99,070	98,426	94,155	89,743	82,348	81,206	67,728	60,842	60,231
7	82,767	90,564	93,774	99,697	98,136	93,866	89,408	82,175	80,903	67,848	60,463	60,915
8	83,157	90,503	96,832	100,792	97,798	93,713	89,089	81,727	80,543	67,848	60,011	61,575
9	83,692	91,066	97,750	102,949	97,299	93,577	88,876	81,264	80,129	67,794	59,499	62,173
10	84,299	92,086	97,878	102,578	96,961	93,729	88,389	80,917	79,700	67,649	58,913	62,708
11	84,733	93,120	97,557	101,226	96,639	93,637	87,826	80,474	79,673	67,556	58,290	63,141
12	85,253	95,387	97,090	100,244	96,430	93,440	87,464	79,700	79,507	67,330	57,899	63,549
13	86,424	96,607	96,575	99,553	96,253	93,196	87,016	79,065	79,258	67,050	57,496	63,905
14	87,320	97,090	96,929	98,812	96,012	93,044	86,482	79,120	79,051	66,936	56,934	64,237
15	88,115	97,283	96,993	98,168	95,738	92,999	86,048	79,037	78,733	66,770	56,397	64,631
16	88,861	97,122	96,736	97,653	95,371	92,892	85,644	78,816	78,305	66,630	55,897	65,204
17	89,423	96,848	96,317	97,202	95,189	92,877	85,557	78,498	78,070	66,439	55,262	65,930
18	89,910	96,559	96,478	96,784	95,158	92,862	85,470	78,180	77,766	66,286	54,591	66,465
19	89,804	96,253	98,587	96,414	95,387	92,847	85,369	77,531	77,338	66,032	54,124	66,885
20	89,256	95,931	98,490	97,283	95,691	92,953	85,253	76,965	76,854	65,599	53,704	67,292
21	88,617	95,447	98,023	98,329	95,899	93,090	85,065	76,758	76,343	65,001	53,144	67,808
22	87,898	94,946	97,492	98,394	95,931	93,166	84,877	76,633	75,652	64,644	52,595	68,232
23	87,334	94,383	97,041	98,023	95,493	93,364	84,906	76,840	74,947	63,969	52,047	68,550
24	89,043	93,911	96,655	97,621	94,961	93,212	84,877	78,360	74,423	63,192	51,733	68,841
25	91,081	93,333	96,205	97,170	94,641	93,044	84,791	80,516	73,887	62,517	51,756	69,291
26	91,933	92,740	95,899	96,607	94,352	92,801	84,704	81,495	73,278	62,123	52,304	69,596
27	92,375	92,101	95,645	96,317	94,200	92,527	84,603	81,958	72,682	61,893	53,132	70,086
28	92,740	91,462	95,311	96,140	93,972	92,283	84,501	82,406	72,020	61,919	53,669	70,404
29	92,907	90,823	94,793	96,173	94,185	92,009	84,386	82,593	71,384	62,033	54,463	70,682
30	93,196	90,229		95,996	94,459	91,903	84,313	82,536	70,801	61,970	55,054	71,093
31	93,333	89,804		95,754		91,659		82,463	70,165		55,579	
Change	+15,885	-3,529	+4,989	+961	-1,295	-2,800	-7,346	-1,850	-12,298	-8,195	-6,391	+15,514
Equiv. Mgal/d	+512.4	-113.8	+172.0	+31.0	-43.2	-90.3	-244.9	-59.7	-396.7	-273.2	-206.2	+517.1
Equiv, ft^3/s	+793	-176	+266	+48.0	-66.8	-140	-379	-92.3	-614	-423	-319	+800

Change for year -6,355 Mgal | Equivalent for year -17.4 Mgal/d | Equivalent for year -26.9 ft^3/s

Table 5. Storage in Neversink Reservoir, New York, for year ending November 30, 2008.
(River Master daily operations record; gage reading at 0800 hours)

[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]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	30,064	29,172	30,547	34,971	34,365	34,057	34,160	30,739	29,057	26,376	25,533	25,287
2	30,191	29,079	30,487	34,966	34,961	34,135	33,983	30,634	28,955	26,350	25,525	25,521
3	30,346	28,924	30,373	34,941	35,090	34,219	33,789	30,474	28,884	26,270	25,491	25,716
4	30,542	28,968	30,236	34,922	35,065	34,311	33,751	30,222	28,808	26,194	25,366	25,887
5	30,680	28,839	30,195	35,229	35,185	34,414	33,722	30,000	28,690	26,114	25,366	26,076
6	30,795	28,720	30,451	35,434	35,170	34,384	33,708	29,847	28,641	26,097	25,362	26,278
7	30,900	28,601	31,686	35,224	35,110	34,321	33,727	29,647	28,609	26,257	25,172	26,515
8	30,818	28,548	32,439	35,314	35,090	34,262	33,727	29,563	28,561	26,303	24,977	26,714
9	30,712	28,614	32,752	35,738	35,050	34,276	33,727	29,527	28,395	26,299	24,776	26,906
10	30,621	28,964	32,967	35,324	35,041	34,179	33,717	29,482	28,377	26,307	24,580	27,068
11	30,552	29,257	33,144	35,194	35,036	34,052	33,713	29,419	28,368	26,265	24,376	27,193
12	30,401	29,710	33,274	35,150	35,031	33,988	33,698	29,378	28,307	26,270	24,368	27,300
13	30,268	30,023	33,392	35,090	35,016	34,003	33,669	29,333	28,250	26,312	24,356	27,404
14	30,100	30,310	33,997	34,966	34,902	34,008	33,625	29,324	28,180	26,363	24,157	27,554
15	29,865	30,273	34,276	34,848	34,715	34,028	33,634	29,306	28,101	26,409	23,963	27,723
16	29,634	30,137	34,419	34,793	34,557	34,067	33,644	29,261	28,001	26,372	23,757	28,093
17	29,432	29,955	34,513	34,684	34,355	34,179	33,582	29,204	28,001	26,299	23,565	28,425
18	29,222	29,778	34,769	34,533	34,170	34,248	33,321	29,159	27,979	26,219	23,350	28,614
19	29,044	29,856	35,329	34,542	33,934	34,306	33,038	29,114	27,862	26,144	23,318	28,800
20	28,800	29,968	35,185	35,244	33,713	34,340	32,747	29,066	27,826	26,022	23,298	28,946
21	28,530	30,037	35,120	35,254	33,504	34,345	32,463	29,057	27,705	26,009	23,092	29,074
22	28,258	30,110	35,085	35,090	33,365	34,328	32,155	29,030	27,356	25,980	22,882	29,163
23	27,988	30,186	35,080	35,026	33,321	34,340	31,892	28,977	27,236	25,862	22,678	29,252
24	28,570	30,255	35,050	34,971	33,317	34,340	31,620	29,190	27,202	25,800	22,658	29,329
25	28,659	30,319	35,036	34,887	33,326	34,379	31,280	29,919	27,163	25,716	22,654	29,459
26	28,655	30,350	35,070	34,764	33,393	34,384	31,146	29,878	27,018	25,650	23,641	29,518
27	28,583	30,392	35,065	34,695	33,480	34,384	31,127	29,616	26,881	25,608	24,096	29,620
28	28,425	30,438	35,001	34,621	33,563	34,384	30,900	29,464	26,736	25,629	24,368	29,683
29	28,609	30,461	34,966	34,606	33,819	34,404	30,786	29,186	26,587	25,667	24,756	29,769
30	28,950	30,470		34,497	33,993	34,404	30,776	29,106	26,465	25,578	24,969	29,832
31	29,199	30,510		34,350		34,276		29,137	26,431		25,118	
Change	-711	+1,311	+4,456	-616	-357	+283	-3,500	-1,639	-2,706	-853	-460	+4,714
Equiv. Mgal/d	-22.9	+42.3	+153.7	-19.9	-11.9	+9.1	-117	-52.9	-87.3	-28.4	-14.8	+157.1
Equiv. ft^3/s	-35.5	+65.4	+238	-30.7	-18.4	+14.1	-180	-81.8	-135	-44.0	-23.0	+243
-	Change for year -78 Mgal			Equivalent for year -0.2 Mgal/d						Equivalent for year -0.3 ft^3/s		

Table 6. Design rates for Delaware River at Montague, New Jersey, gaging station, December 1, 2007 to November 30, 2008.

[Rates in cubic feet per second]

Effective dates	Montague Design Rate
December 1, 2007 to June 14, 2008	1,750
June 15 to July 16, 2008	1,850
July 17 to August 27, 2008	1,830
August 28 to November 30, 2008	1,750

Table 7. Consumption of water by New York City, 1950 to 2008.
(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
01	1,184.0	128.4	1,312.4	479.026
02	1,135.6	121.1	1,256.7	458.696
03	1,093.7	115.9	1,209.6	441.516
04	1,099.6	117.5	1,217.1	445.461

Table 7. Consumption of water by New York City, 1950 to 2008.—Continued
(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)	
2005	1,107.6	123.8	1,231.4	449.462
06	1,069.2	116.8	1,186.0	432.890
07	1,114.1	122.9	1,237.0	451.505
08	1,082.9	114.8	1,197.7	438.358

Table 8. New York City reservoir release design data.
(River Master daily operation record)

[ft³/s, cubic feet per second; (ft³/s)-d, cubic feet per second days; Col., Column]

Advance estimate of discharge of Delaware River at Montague, New Jersey, exclusive of New York City reservoir releases										Computation of balancing adjustment					
	Powerplant release forecasts		Uncontrolled runoff							Adjusted directed release		Actual deficiency			
Date of advance estimate	Lake Wallenpaupack (ft³/s)	Rio Reservoir (ft³/s)	Current condition (ft³/s)	Weather adjustment (ft³/s)	Montague date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment (ft³/s)	Directed release (ft³/s)	Daily (ft³/s)	Cumulative (ft³/s)-d	Daily (ft³/s)	Cumulative (ft³/s)-d	Cumulative difference (ft³/s)-d	Balancing adjustment (ft³/s)
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	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 (ft³/s) DECEMBER 1, 2007, to JUNE 14, 2008															
The estimated Montague discharge was greater than the Montague design rate from December 1, 2007 to June 7, 2008.															
June 5	0	0	1,351	47	June 8	1,398	352	0	352	352	352	223	223	139	-13
6	0	0	1,272	13	9	1,285	465	0	465	465	817	53	276	541	-50
The estimated Montague discharge was greater than the Montague design rate from June 10, 2008, to June 13, 2008.															
June 11	320	0	1,315	0	June 14	1,635	115	-50	65	65	882	137	413	469	-47
MONTAGUE DESIGN RATE = 1,850 (ft³/s) JUNE 15, 2008, to JULY 16, 2008															
June 12	0	0	1,139	56	June 15	1,195	655	---	655	652	652	622	622	30	-3
13	0	0	999	63	16	1,062	788	---	788	791	1,443	421	1,043	400	-40
14	352	0	896	626	17	1,874	0	---	0	0	1,443	72	1,115	328	-33
15	352	0	1,061	360	18	1,773	77	---	77	77	1,520	0	1,115	405	-40
16	352	0	952	442	19	1,746	104	-3	101	101	1,621	0	1,115	506	-50
17	352	0	1,221	19	20	1,592	258	-40	218	218	1,839	142	1,257	582	-50
18	352	0	1,041	52	21	1,445	405	-33	372	372	2,211	303	1,560	651	-50
19	0	0	1,127	16	22	1,143	707	-40	667	666	2,877	656	2,216	661	-50
20	0	0	1,040	110	23	1,150	700	-50	650	650	3,527	240	2,456	1,071	-50
21	256	0	1,003	851	24	2,110	0	-50	0	0	3,527	0	2,456	1,071	-50
22	256	0	956	1,021	25	2,233	0	-50	0	0	3,527	0	2,456	1,071	-50
23	256	0	1,113	515	26	1,884	0	-50	0	0	3,527	90	2,546	981	-50
24	256	0	1,198	112	27	1,566	284	-50	234	234	3,761	400	2,946	815	-50
25	256	0	1,050	25	28	1,331	519	-50	469	469	4,230	433	3,379	851	-50
26	0	106	947	150	29	1,203	647	-50	597	599	4,829	629	4,008	821	-50
27	0	0	907	511	30	1,418	432	-50	382	382	5,211	655	4,663	548	-50

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 9.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 9), when positive; otherwise Col. 11 = 0.
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by -10, limited to ±50.

Table 8. New York City reservoir release design data.—Continued
(River Master daily operation record)

[ft³/s, cubic feet per second; (ft³/s)-d, cubic feet per second days; Col., Column]

Advance estimate of discharge of Delaware River at Montague, New Jersey, exclusive of New York City reservoir releases										Computation of balancing adjustment					
	Powerplant release forecasts		Uncontrolled runoff							Adjusted directed release		Actual deficiency			
Date of advance estimate	Lake Wallenpaupack (ft³/s)	Rio Reservoir (ft³/s)	Current condition (ft³/s)	Weather adjustment (ft³/s)	Montague date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment (ft³/s)	Directed release (ft³/s)	Daily (ft³/s)	Cumulative (ft³/s)-d	Daily (ft³/s)	Cumulative (ft³/s)-d	Cumulative difference (ft³/s)-d	Balancing adjustment (ft³/s)
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
June 28	448	0	858	245	July 1	1,551	299	-50	249	249	5,460	113	4,776	684	-50
29	448	0	797	611	2	1,856	0	-50	0	0	5,460	153	4,929	531	-50
30	448	0	901	15	3	1,364	486	-50	436	436	5,896	323	5,252	644	-50
July 1	448	0	871	171	4	1,490	360	-50	310	310	6,206	392	5,644	562	-50
2	246	0	823	239	5	1,308	542	-50	492	492	6,698	552	6,196	502	-50
3	0	0	738	75	6	813	1,037	-50	987	985	7,683	945	7,141	542	-50
4	0	0	865	133	7	998	852	-50	802	799	8,482	889	8,030	452	-45
5	384	0	820	89	8	1,293	557	-50	507	511	8,993	321	8,351	642	-50
6	384	0	750	85	9	1,219	631	-50	581	581	9,574	481	8,832	742	-50
7	384	0	709	424	10	1,517	333	-50	283	283	9,857	453	9,285	572	-50
8	384	0	677	213	11	1,274	576	-45	531	530	10,387	560	9,845	542	-50
9	470	0	637	256	12	1,363	487	-50	437	437	10,824	442	10,287	537	-50
10	0	0	615	0	13	615	1,235	-50	1,185	1,183	12,007	1,243	11,530	477	-48
11	0	0	553	151	14	704	1,146	-50	1,096	1,094	13,101	864	12,394	707	-50
12	385	0	538	762	15	1,685	165	-50	115	115	13,216	0	12,394	822	-50
13	385	0	502	613	16	1,500	350	-50	300	300	13,516	0	12,394	1,122	-50
MONTAGUE DESIGN RATE = 1,830 (ft³/s) JULY 17, 2008, to AUGUST 27, 2008															
14	422	0	1,791	5	17	2,218	0	---	0	0	0	62	62	-62	+6
15	385	0	1,016	0	18	1,401	429	---	429	429	429	402	464	-35	+4
16	471	0	880	0	19	1,351	479	---	479	479	908	0	464	444	-44
17	0	0	763	15	20	778	1,052	---	1,052	1,042	1,950	892	1,356	594	-50
18	0	0	721	34	21	755	1,075	+6	1,081	1,081	3,031	921	2,277	754	-50
19	385	0	720	141	22	1,246	584	+4	588	587	3,618	277	2,554	1,064	-50
20	385	0	692	126	23	1,203	627	-44	583	582	4,200	52	2,606	1,594	-50

The estimated Montague discharge was greater than the Montague design rate from July 24, 2008, to August 2, 2008.

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 9.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 9), when positive; otherwise Col. 11 = 0.
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by -10, limited to ±50.

Table 8. New York City reservoir release design data.—Continued
(River Master daily operation record)

[ft³/s, cubic feet per second; (ft³/s)-d, cubic feet per second days; Col., Column]

Advance estimate of discharge of Delaware River at Montague, New Jersey, exclusive of New York City reservoir releases										Computation of balancing adjustment					
	Powerplant release forecasts		Uncontrolled runoff							Adjusted directed release		Actual deficiency			
Date of advance estimate	Lake Wallenpaupack (ft³/s)	Rio Reservoir (ft³/s)	Current condition (ft³/s)	Weather adjustment (ft³/s)	Montague date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment (ft³/s)	Directed release (ft³/s)	Daily (ft³/s)	Cumulative (ft³/s)-d	Daily (ft³/s)	Cumulative (ft³/s)-d	Cumulative difference (ft³/s)-d	Balancing adjustment (ft³/s)
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
July 31	0	0	1,496	8	Aug. 3	1,504	326	-50	276	276	4,476	39	2,645	1,831	-50
Aug. 1	0	106	1,269	89	4	1,464	366	-50	316	316	4,792	0	2,645	2,147	-50
The estimated Montague discharge was greater than the Montague design rate from August 5, 2008, to August 6, 2008.															
Aug. 4	349	213	1,126	17	Aug. 7	1,705	125	-50	75	75	4,867	0	2,645	2,222	-50
5	349	160	980	19	8	1,508	322	-50	272	272	5,139	0	2,645	2,494	-50
6	472	71	1,081	34	9	1,658	172	-50	122	122	5,261	0	2,645	2,616	-50
7	0	0	1,103	34	10	1,137	693	-50	643	643	5,904	493	3,138	2,766	-50
8	0	0	1,027	48	11	1,075	755	-50	705	703	6,607	553	3,691	2,916	-50
9	210	0	944	64	12	1,218	612	-50	562	562	7,169	0	3,691	3,478	-50
10	210	0	844	159	13	1,213	617	-50	567	568	7,737	0	3,691	4,046	-50
11	210	0	896	91	14	1,197	633	-50	583	575	8,312	45	3,736	4,576	-50
12	210	0	968	18	15	1,196	634	-50	584	581	8,893	291	4,027	4,866	-50
13	210	0	911	25	16	1,146	684	-50	634	632	9,525	222	4,249	5,276	-50
14	0	0	823	55	17	878	952	-50	902	906	10,431	516	4,765	5,666	-50
15	0	0	836	81	18	917	913	-50	863	865	11,296	645	5,410	5,886	-50
16	0	0	832	0	19	832	998	-50	948	947	12,243	717	6,127	6,116	-50
17	0	0	821	2	20	823	1,007	-50	957	957	13,200	767	6,894	6,306	-50
18	0	0	675	6	21	681	1,149	-50	1,099	1,091	14,291	791	7,685	6,606	-50
19	0	0	677	4	22	681	1,149	-50	1,099	1,102	15,393	902	8,587	6,806	-50
20	0	0	631	0	23	631	1,199	-50	1,149	1,155	16,548	965	9,552	6,996	-50
21	0	0	605	0	24	605	1,225	-50	1,175	1,179	17,727	929	10,481	7,246	-50
22	0	0	553	3	25	556	1,274	-50	1,224	1,222	18,949	1,032	11,513	7,436	-50
23	0	0	525	29	26	554	1,276	-50	1,226	1,229	20,178	1,029	12,542	7,636	-50
24	0	0	544	10	27	554	1,276	-50	1,226	1,222	21,400	1,082	13,624	7,776	-50
MONTAGUE DESIGN RATE = 1,750 (ft³/s) AUGUST 28, 2008, to NOVEMBER 30, 2008															
25	0	0	655	2	28	657	1,093	---	1,093	1,096	1,096	1,046	1,046	50	-5
26	0	0	705	18	29	723	1,027	---	1,027	1,026	2,122	1,056	2,102	20	-2
27	0	0	708	10	30	718	1,032	---	1,032	1,034	3,156	1,024	3,126	30	-3
28	0	0	694	0	31	694	1,056	---	1,056	1,062	4,218	1,012	4,138	80	-8

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 9.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 9), when positive; otherwise Col. 11 = 0.
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by -10, limited to ±50.

Table 8. New York City reservoir release design data.—Continued
(River Master daily operation record)

[ft³/s, cubic feet per second; (ft³/s)-d, cubic feet per second days; Col., Column]

Advance estimate of discharge of Delaware River at Montague, New Jersey, exclusive of New York City reservoir releases										Computation of balancing adjustment					
Date of advance estimate	Powerplant release forecasts		Uncontrolled runoff		Montague date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment (ft³/s)	Directed release (ft³/s)	Adjusted directed release		Actual deficiency		Cumulative difference (ft³/s)-d	Balancing adjustment (ft³/s)
	Lake Wallenpaupack (ft³/s)	Rio Reservoir (ft³/s)	Current condition (ft³/s)	Weather adjustment (ft³/s)						Daily (ft³/s)	Cumulative (ft³/s)-d	Daily (ft³/s)	Cumulative (ft³/s)-d		
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
Aug. 29	0	0	680	11	Sept. 1	691	1,059	-5	1,054	1,057	5,275	1,047	5,185	90	-9
30	0	0	657	6	2	663	1,087	-2	1,085	1,086	6,361	1,096	6,281	80	-8
31	315	0	661	0	3	976	774	-3	771	774	7,135	774	7,055	80	-8
Sept. 1	315	0	635	0	4	950	800	-8	792	794	7,929	754	7,809	120	-12
2	315	0	615	0	5	930	820	-9	811	812	8,741	522	8,331	410	-41
3	315	0	597	10	6	922	828	-8	820	812	9,553	552	8,883	670	-50
4	248	0	597	953	7	1,798	0	-8	0	0	9,553	93	8,976	577	-50
5	0	851	571	3,228	8	4,650	0	-12	0	0	9,553	539	9,515	38	-4
6	315	195	589	1,960	9	3,059	0	-41	0	0	9,553	49	9,564	-11	+1
7	315	0	1,121	428	10	1,864	0	-50	0	0	9,553	0	9,564	-11	+1
8	315	0	867	448	11	1,630	120	-50	70	70	9,623	0	9,564	59	-6
9	315	89	853	816	12	2,073	0	-4	0	0	9,623	0	9,564	59	-6
10	315	89	1,123	0	13	1,527	223	+1	224	224	9,847	101	9,665	182	-18
11	0	0	1,017	146	14	1,163	587	+1	588	571	10,418	611	10,276	142	-14
12	0	266	959	303	15	1,528	222	-6	216	216	10,634	309	10,585	49	-5
13	290	426	1,066	45	16	1,827	0	-6	0	0	10,634	124	10,709	-75	+8
14	290	426	1,178	3	17	1,897	0	-18	0	0	10,634	199	10,908	-274	+27
15	290	177	1,228	0	18	1,695	55	-14	41	41	10,675	419	11,327	-652	+50
16	290	177	1,061	0	19	1,528	222	-5	217	217	10,892	468	11,795	-903	+50
17	290	124	979	0	20	1,393	357	+8	365	367	11,259	627	12,422	-1,163	+50
18	248	177	842	0	21	1,267	483	+27	510	511	11,770	781	13,203	-1,433	+50
19	0	53	661	0	22	714	1,036	+50	1,086	1,088	12,858	1,038	14,241	-1,383	+50
20	290	177	616	2	23	1,085	665	+50	715	723	13,581	753	14,994	-1,413	+50
21	290	124	597	3	24	1,014	736	+50	786	788	14,369	838	15,832	-1,463	+50
22	290	0	493	0	25	783	967	+50	1,017	1,025	15,394	745	16,577	-1,183	+50
23	290	0	476	7	26	773	977	+50	1,027	1,027	16,421	637	17,214	-793	+50
24	290	0	467	339	27	1,096	654	+50	704	705	17,126	395	17,609	-483	+48
25	0	0	456	811	28	1,267	483	+50	533	540	17,666	300	17,909	-243	+24
26	0	195	503	1,815	29	2,513	0	+50	0	0	17,666	0	17,909	-243	+24
27	0	355	684	546	30	1,585	165	+50	215	215	17,881	0	17,909	-28	+3

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 9.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 9), when positive; otherwise Col. 11 = 0.
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by -10, limited to ±50.

Table 8. New York City reservoir release design data.—Continued
(River Master daily operation record)

[ft³/s, cubic feet per second; (ft³/s)-d, cubic feet per second days; Col., Column]

Advance estimate of discharge of Delaware River at Montague, New Jersey, exclusive of New York City reservoir releases										Computation of balancing adjustment					
	Powerplant release forecasts		Uncontrolled runoff							Adjusted directed release		Actual deficiency			
Date of advance estimate	Lake Wallenpaupack (ft³/s)	Rio Reservoir (ft³/s)	Current condition (ft³/s)	Weather adjustment (ft³/s)	Montague date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment (ft³/s)	Directed release (ft³/s)	Daily (ft³/s)	Cumulative (ft³/s)-d	Daily (ft³/s)	Cumulative (ft³/s)-d	Cumulative difference (ft³/s)-d	Balancing adjustment (ft³/s)
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
Sept. 28	0	355	802	662	Oct. 1	1,819	0	+48	0	0	17,881	0	17,909	-28	+3
29	0	213	1,189	359	2	1,761	0	+24	0	0	17,881	0	17,909	-28	+3
30	0	213	1,144	417	3	1,774	0	+24	0	0	17,881	29	17,938	-57	+6
Oct. 1	0	177	1,306	31	4	1,514	236	+3	239	239	18,120	126	18,064	56	-6
2	0	0	1,300	4	5	1,304	446	+3	449	447	18,567	547	18,611	-44	+4
3	0	18	1,134	4	6	1,156	594	+3	597	598	19,165	588	19,199	-34	+3
4	0	142	983	27	7	1,152	598	+6	604	606	19,771	536	19,735	36	-4
5	0	142	879	38	8	1,059	691	-6	685	683	20,454	643	20,378	76	-8
6	0	177	825	0	9	1,002	748	+4	752	753	21,207	663	21,041	166	-17
7	0	177	715	2	10	894	856	+3	859	854	22,061	694	21,735	326	-33
8	0	124	675	22	11	821	929	-4	925	925	22,986	786	22,521	465	-47
9	0	0	691	1	12	620	1,130	-8	1,122	1,119	24,105	959	23,480	625	-50
10	0	177	672	0	13	849	901	-17	884	884	24,989	944	24,424	565	-50
11	0	177	643	0	14	820	930	-33	897	891	25,880	971	25,395	485	-48
12	0	177	616	0	15	793	957	-47	910	909	26,789	949	26,344	445	-44
13	0	177	618	0	16	795	955	-50	905	906	27,695	776	27,120	575	-50
14	0	177	614	91	17	882	868	-50	818	816	28,511	806	27,926	585	-50
15	0	124	584	41	18	749	1,001	-48	953	949	29,460	879	28,805	655	-50
16	0	0	574	25	19	599	1,151	-44	1,107	1,109	30,569	949	29,754	815	-50
17	0	53	606	0	20	659	1,091	-50	1,041	1,044	31,613	974	30,728	885	-50
18	0	177	579	2	21	758	992	-50	942	925	32,538	825	31,553	985	-50
19	0	177	613	3	22	793	957	-50	907	908	33,446	858	32,411	1,035	-50
20	0	177	583	10	23	770	980	-50	930	931	34,377	881	33,292	1,085	-50
21	0	177	576	9	24	762	988	-50	938	939	35,316	849	34,141	1,175	-50
22	0	124	580	1	25	705	1,045	-50	995	994	36,310	584	34,725	1,585	-50

The estimated discharge at Montague was greater than the Montague design rate from October 26, 2008, to November 30, 2008.

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 9.
Col. 10 = Summation of Col. 9.
Col. 11 = Design rate - (Col. 9 + Col. 10 from Table 9), when positive; otherwise Col. 11 = 0.
Col. 12 = Summation of Col. 11.
Col. 13 = Col. 10 - Col. 12.
Col. 14 = Col. 13 divided by -10, limited to ±50.

Table 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey. (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, New Jersey					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncontrolled	Total
									New York City Reservoirs		Powerplants		
Date	Amount								Directed	Other			
2007	Col. 1	Col. 2	Col. 3	Col. 4	2007	Col. 5	Col. 6	2007	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11
Nov. 28	0	85	110	60	Nov. 30	681	656	Dec. 1	0	255	1,337	6,288	7,880
29	0	87	111	60	Dec. 1	508	426	2	0	258	934	5,488	6,680
30	0	82	110	60	2	535	461	3	0	252	996	5,262	6,510
Dec. 1	0	87	111	62	3	598	532	4	0	260	1,130	6,200	7,590
2	0	87	110	65	4	476	532	5	0	262	1,008	5,470	6,740
3	0	85	110	65	5	519	532	6	0	260	1,051	4,589	5,900
4	0	85	110	65	6	515	496	7	0	260	1,011	3,959	5,230
5	0	85	111	65	7	418	496	8	0	261	914	3,635	4,810
6	0	85	110	65	8	218	461	9	0	260	679	3,831	4,770
7	0	85	110	65	9	206	461	10	0	260	667	3,783	4,710
8	0	85	110	65	10	442	213	11	0	260	655	4,025	4,940
9	0	85	111	65	11	534	248	12	0	261	782	4,517	5,560
10	0	85	111	65	12	471	284	13	0	261	755	7,854	8,870
11	0	85	108	65	13	379	532	14	0	258	911	6,971	8,140
12	0	85	189	65	14	246	567	15	0	339	813	5,928	7,080
13	0	85	248	65	15	398	284	16	0	398	682	5,400	6,480
14	0	85	249	65	16	500	248	17	0	399	748	5,153	6,300
15	0	85	249	65	17	952	355	18	0	399	1,307	5,094	6,800
16	0	85	249	74	18	852	284	19	0	408	1,136	4,356	5,900
17	0	85	571	91	19	957	443	20	0	747	1,400	4,673	6,820
18	0	85	1,357	65	20	817	443	21	0	1,507	1,260	4,243	7,010
19	0	85	1,496	65	21	610	319	22	0	1,646	929	3,765	6,340
20	0	85	1,497	65	22	340	319	23	0	1,647	659	3,804	6,110
21	0	85	1,501	65	23	298	603	24	0	1,651	901	16,748	19,300
22	0	85	1,496	65	24	527	567	25	0	1,646	1,094	17,060	19,800
23	0	90	1,505	65	25	643	709	26	0	1,660	1,352	11,488	14,500
24	0	187	1,504	65	26	699	709	27	0	1,756	1,408	8,736	11,900
25	0	189	1,501	65	27	728	851	28	0	1,755	1,579	7,566	10,900
26	0	186	1,502	65	28	743	390	29	0	1,753	1,133	8,214	11,100
27	0	186	1,502	65	29	858	709	30	0	1,753	1,567	10,680	14,000
28	0	186	1,502	65	30	1,225	727	31	0	1,753	1,952	9,095	12,800
Total	0	3,152	19,661	2,032		17,893	14,857		0	24,845	32,750	203,875	261,470

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 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 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(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, New Jersey					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncontrolled	Total
									New York City Reservoirs		Powerplants		
Date	Amount								Directed	Other			
2007/2008	Col. 1	Col. 2	Col. 3	Col. 4	2007/2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11
Dec. 29	0	186	1,501	65	Dec. 31	1,272	851	Jan. 1	0	1,752	2,123	8,025	11,900
30	0	195	1,504	73	Jan. 1	1,332	567	2	0	1,772	1,899	7,629	11,300
31	0	272	1,504	101	2	1,339	851	3	0	1,877	2,190	6,333	10,400
Jan. 1	0	701	1,507	101	3	1,047	798	4	0	2,309	1,845	5,036	9,190
2	0	701	1,499	91	4	811	443	5	0	2,291	1,254	5,155	8,700
3	0	701	1,496	65	5	770	567	6	0	2,262	1,337	5,201	8,800
4	0	701	1,497	65	6	879	567	7	0	2,263	1,446	5,131	8,840
5	0	701	1,494	65	7	787	567	8	0	2,260	1,354	7,086	10,700
6	0	701	1,491	65	8	906	532	9	0	2,257	1,438	10,705	14,400
7	0	701	1,501	65	9	516	691	10	0	2,267	1,207	17,726	21,200
8	0	701	1,507	65	10	423	603	11	0	2,273	1,026	15,301	18,600
9	0	701	1,510	65	11	712	603	12	0	2,276	1,315	22,409	26,000
10	0	701	1,508	65	12	715	603	13	0	2,274	1,318	15,508	19,100
11	0	701	1,508	65	13	811	709	14	0	2,274	1,520	12,006	15,800
12	0	701	1,501	65	14	718	709	15	0	2,267	1,427	10,206	13,900
13	0	701	1,497	65	15	820	532	16	0	2,263	1,352	8,585	12,200
14	0	701	1,499	65	16	780	461	17	0	2,265	1,241	7,394	10,900
15	0	701	1,499	65	17	996	426	18	0	2,265	1,422	6,513	10,200
16	0	701	1,499	65	18	715	550	19	0	2,265	1,265	6,060	9,590
17	0	701	1,497	65	19	638	443	20	0	2,263	1,081	5,226	8,570
18	0	701	1,497	65	20	799	496	21	0	2,263	1,295	4,422	7,980
19	0	701	1,497	65	21	593	496	22	0	2,263	1,089	4,288	7,640
20	0	701	1,493	65	22	629	727	23	0	2,259	1,356	4,075	7,690
21	0	701	1,496	65	23	599	691	24	0	2,262	1,290	3,648	7,200
22	0	701	1,497	74	24	590	567	25	0	2,272	1,157	3,611	7,040
23	0	701	1,497	101	25	412	567	26	0	2,299	979	3,252	6,530
24	0	701	1,499	101	26	212	496	27	0	2,301	708	3,091	6,100
25	0	701	1,499	101	27	256	496	28	0	2,301	752	2,897	5,950
26	0	701	1,497	101	28	436	390	29	0	2,299	826	2,685	5,810
27	0	701	1,502	101	29	454	532	30	0	2,304	986	2,680	5,970
28	0	701	1,504	101	30	340	532	31	0	2,306	872	3,062	6,240
Total	0	20,281	46,497	2,346		22,307	18,063		0	69,124	40,370	224,946	334,440

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 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(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, New Jersey					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncontrolled	Total
									New York City Reservoirs		Powerplants		
Date	Amount								Directed	Other			
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11
Jan. 29	0	701	1,501	101	Jan. 31	344	426	Feb. 1	0	2,303	770	2,977	6,050
30	0	701	1,499	101	Feb. 1	353	532	2	0	2,301	885	3,874	7,060
31	0	701	1,499	101	2	166	53	3	0	2,301	219	5,050	7,570
Feb. 1	0	701	1,499	101	3	166	89	4	0	2,301	255	4,514	7,070
2	0	701	1,502	101	4	584	248	5	0	2,304	832	4,114	7,250
3	0	701	1,453	101	5	730	284	6	0	2,255	1,014	8,831	12,100
4	0	699	1,213	101	6	761	390	7	0	2,013	1,151	30,936	34,100
5	0	702	931	101	7	763	851	8	0	1,734	1,614	23,752	27,100
6	0	402	636	116	8	1,364	851	9	0	1,154	2,215	16,731	20,100
7	0	673	1,501	189	9	1,427	851	10	0	2,363	2,278	12,159	16,800
8	0	701	1,499	135	10	1,451	851	11	0	2,335	2,302	9,363	14,000
9	0	701	1,497	93	11	1,565	851	12	0	2,291	2,416	8,093	12,800
10	0	701	1,496	144	12	1,534	851	13	0	2,341	2,385	8,774	13,500
11	0	702	1,502	187	13	1,661	851	14	0	2,391	2,512	16,997	21,900
12	0	702	1,505	190	14	1,663	851	15	0	2,397	2,514	14,389	19,300
13	0	702	1,508	190	15	1,679	851	16	0	2,400	2,530	11,370	16,300
14	0	701	1,535	195	16	1,679	851	17	0	2,431	2,530	9,239	14,200
15	0	741	1,600	238	17	1,664	851	18	0	2,579	2,515	12,206	17,300
16	0	752	1,600	204	18	1,682	851	19	0	2,556	2,533	26,511	31,600
17	0	701	1,600	223	19	1,682	851	20	0	2,524	2,533	20,543	25,600
18	0	80	1,606	209	20	1,682	851	21	0	1,895	2,533	15,872	20,300
19	0	80	1,601	251	21	1,682	851	22	0	1,932	2,533	12,935	17,400
20	0	124	1,598	251	22	1,431	851	23	0	1,973	2,282	10,845	15,100
21	0	483	1,595	251	23	1,028	851	24	0	2,329	1,879	8,992	13,200
22	0	743	1,597	251	24	982	851	25	0	2,591	1,833	7,376	11,800
23	0	750	1,600	221	25	812	851	26	0	2,571	1,663	6,666	10,900
24	0	750	1,595	193	26	601	851	27	0	2,538	1,452	6,410	10,400
25	0	750	1,600	73	27	359	851	28		2,423	1,210	5,887	9,520
26	0	750	1,607	220	28	556	851	29	0	2,577	1,407	4,666	8,650
Total	0	18,296	42,975	4,832		32,051	20,744		0	66,103	52,795	330,072	448,970

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 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 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(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, New Jersey					
Directed		Pepacton	Cannons-ville	Never-sink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncon-trolled	Total
									New York City Res-ervoirs		Power-plants		
Date	Amount								Directed	Other			
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11
Feb. 27	0	750	1,606	243	Feb. 29	609	230	Mar. 1	0	2,599	839	4,252	7,690
28	0	750	1,606	303	Mar. 1	0	0	2	0	2,659	0	4,291	6,950
29	0	750	1,604	227	2	41	53	3	0	2,581	94	4,215	6,890
Mar. 1	0	750	1,601	244	3	1,058	390	4	0	2,595	1,448	4,437	8,480
2	0	750	1,600	251	4	1,501	851	5	0	2,601	2,352	28,047	33,000
3	0	750	1,600	237	5	1,677	851	6	0	2,587	2,528	52,985	58,100
4	0	249	1,552	71	6	1,679	851	7	0	1,872	2,530	33,098	37,500
5	0	65	1,160	189	7	1,674	851	8	0	1,414	2,525	36,361	40,300
6	0	65	676	190	8	1,674	851	9	0	931	2,525	63,244	66,700
7	0	65	93	71	9	1,671	851	10	0	229	2,522	45,349	48,100
8	0	63	77	70	10	1,723	851	11	0	210	2,574	30,016	32,800
9	0	65	80	190	11	1,731	851	12	0	335	2,582	22,383	25,300
10	0	65	80	190	12	1,731	851	13	0	335	2,582	17,883	20,800
11	0	65	130	190	13	1,731	851	14	0	385	2,582	15,033	18,000
12	0	65	534	190	14	1,724	851	15	0	789	2,575	14,236	17,600
13	0	367	825	190	15	1,677	851	16	0	1,382	2,528	14,790	18,700
14	0	594	1,443	190	16	1,679	851	17	0	2,227	2,530	12,543	17,300
15	0	693	1,487	190	17	1,679	851	18	0	2,370	2,530	10,300	15,200
16	0	701	1,499	189	18	1,306	851	19	0	2,389	2,157	10,754	15,300
17	0	701	1,497	189	19	1,432	851	20	0	2,387	2,283	29,030	33,700
18	0	701	1,494	190	20	1,234	851	21	0	2,385	2,085	30,630	35,100
19	0	654	1,497	189	21	1,105	851	22	0	2,340	1,956	21,104	25,400
20	0	101	1,505	189	22	946	851	23	0	1,795	1,797	16,608	20,200
21	0	65	1,505	190	23	924	851	24	0	1,760	1,775	13,365	16,900
22	0	73	1,505	201	24	467	851	25	0	1,779	1,318	11,203	14,300
23	0	538	1,550	251	25	493	851	26	0	2,339	1,344	9,017	12,700
24	0	699	1,593	240	26	611	851	27	0	2,532	1,462	7,806	11,800
25	0	699	1,597	187	27	621	851	28	0	2,483	1,472	7,545	11,500
26	0	701	1,600	190	28	589	709	29	0	2,491	1,298	10,211	14,000
27	0	701	1,601	190	29	12	426	30	0	2,492	438	8,970	11,900
28	0	701	1,597	190	30	0	496	31	0	2,488	496	7,716	10,700
Total	0	13,956	37,794	6,011		34,999	22,728		0	57,761	57,727	597,422	712,910

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.
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 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(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, New Jersey					
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncontrolled	Total
									New York City Reservoirs		Powerplants		
Date	Amount								Directed	Other			
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11
Mar. 29	0	701	1,598	183	Mar. 31	341	319	Apr. 1	0	2,482	660	10,758	13,900
30	0	702	1,598	190	Apr. 1	294	461	2	0	2,490	755	15,355	18,600
31	0	701	1,600	190	2	239	674	3	0	2,491	913	15,596	19,000
Apr. 1	0	701	1,604	189	3	293	851	4	0	2,494	1,144	13,462	17,100
2	0	701	1,606	192	4	370	851	5	0	2,499	1,221	17,480	21,200
3	0	701	1,606	190	5	15	851	6	0	2,497	866	16,937	20,300
4	0	661	1,603	190	6	0	851	7	0	2,454	851	14,295	17,600
5	0	600	1,600	190	7	298	851	8	0	2,390	1,149	12,261	15,800
6	0	674	1,598	190	8	301	851	9	0	2,462	1,152	10,586	14,200
7	0	701	1,597	190	9	224	674	10	0	2,488	898	9,114	12,500
8	0	701	1,598	190	10	192	709	11	0	2,489	901	7,910	11,300
9	0	699	1,597	190	11	232	674	12	0	2,486	906	7,808	11,200
10	0	699	1,598	190	12	0	195	13	0	2,487	195	7,918	10,600
11	0	701	1,601	190	13	40	106	14	0	2,492	146	7,012	9,650
12	0	701	1,601	190	14	612	426	15	0	2,492	1,038	5,600	9,130
13	0	701	1,566	162	15	514	177	16	0	2,429	691	4,800	7,920
14	0	701	1,508	99	16	659	106	17	0	2,308	765	4,177	7,250
15	0	701	1,357	101	17	702	124	18	0	2,159	826	3,515	6,500
16	0	687	936	101	18	378	71	19	0	1,724	449	2,877	5,050
17	0	272	531	101	19	0	0	20	0	904	0	3,156	4,060
18	0	184	263	91	20	0	53	21	0	538	53	3,119	3,710
19	0	184	249	65	21	0	213	22	0	498	213	2,949	3,660
20	0	178	421	65	22	1	248	23	0	664	249	2,907	3,820
21	0	187	910	65	23	8	266	24	0	1,162	274	2,814	4,250
22	0	186	1,386	65	24	0	319	25	0	1,637	319	2,144	4,100
23	0	187	1,046	65	25	0	319	26	0	1,298	319	2,003	3,620
24	0	186	597	60	26	0	177	27	0	843	177	1,990	3,010
25	0	186	255	45	27	0	142	28	0	486	142	2,432	3,060
26	0	186	255	45	28	0	337	29	0	486	337	3,997	4,820
27	0	149	128	45	29	4	230	30	0	322	234	4,124	4,680
Total	0	15,219	35,413	4,019		5,717	12,126		0	54,651	17,843	219,096	291,590

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 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(River Master daily operation record)

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

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow, Delaware River at Montague, New Jersey					
Directed		Pepacton	Cannons-ville	Never-sink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncon-trolled	Total
									New York City Reservoirs		Power-plants		
Date	Amount								Directed	Other			
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11
Apr. 28	0	65	79	45	Apr. 30	0	213	May 1	0	189	213	3,518	3,920
29	0	65	80	56	May 1	0	230	2	0	201	230	3,189	3,620
30	0	71	166	85	2	2	230	3	0	322	232	3,126	3,680
May 1	0	111	215	85	3	0	195	4	0	411	195	3,234	3,840
2	0	111	215	85	4	0	177	5	0	411	177	4,002	4,590
3	0	110	215	85	5	0	266	6	0	410	266	3,634	4,310
4	0	110	215	85	6	6	355	7	0	410	361	3,189	3,960
5	0	110	215	85	7	2	496	8	0	410	498	2,932	3,840
6	0	110	215	85	8	0	319	9	0	410	319	2,981	3,710
7	0	110	215	85	9	0	53	10	0	410	53	3,777	4,240
8	0	110	215	85	10	0	0	11	0	410	0	3,840	4,250
9	0	110	215	85	11	0	89	12	0	410	89	3,261	3,760
10	0	110	215	85	12	0	71	13	0	410	71	2,919	3,400
11	0	110	215	85	13	0	0	14	0	410	0	2,690	3,100
12	0	110	215	85	14	3	0	15	0	410	3	2,567	2,980
13	0	110	215	85	15	0	0	16	0	410	0	2,660	3,070
14	0	110	215	85	16	0	71	17	0	410	71	4,709	5,190
15	0	110	215	85	17	0	71	18	0	410	71	5,369	5,850
16	0	110	215	85	18	49	53	19	0	410	102	4,738	5,250
17	0	110	215	85	19	850	142	20	0	410	992	3,908	5,310
18	0	110	215	85	20	778	124	21	0	410	902	3,568	4,880
19	0	110	215	85	21	805	177	22	0	410	982	3,278	4,670
20	0	110	215	85	22	633	142	23	0	410	775	3,425	4,610
21	0	110	215	85	23	410	160	24	0	410	570	3,030	4,010
22	0	110	215	85	24	0	18	25	0	410	18	2,822	3,250
23	0	110	215	85	25	0	0	26	0	410	0	2,590	3,000
24	0	110	215	85	26	1	0	27	0	410	1	2,399	2,810
25	0	110	215	85	27	538	35	28	0	410	573	2,387	3,370
26	0	110	215	85	28	0	89	29	0	410	89	2,151	2,650
27	0	110	215	85	29	366	71	30	0	410	437	1,943	2,790
28	0	110	215	85	30	0	35	31	0	410	35	1,825	2,270
Total	0	3,283	6,345	2,566		4,443	3,882		0	12,194	8,325	99,661	120,180

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 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 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(River Master daily operation record)

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

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow, Delaware River at Montague, New Jersey							
Directed		Pepac-ton	Cannons-ville	Never-sink	Date	Lake Wallenpau-pack	Rio Reservoir	Date	Controlled Releases			Computed uncon-trolled	Total	Interim Excess Release Quantity Credits	
									New York City Reservoirs		Power-plants				
Date	Amount								Directed	Other				Daily	Cumul.
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
May 29	0	110	215	85	May 31	0	71	June 1	0	410	71	1,979	2,460		
30	0	110	213	90	June 1	39	0	2	0	413	39	2,008	2,460		
31	0	114	248	102	2	528	35	3	0	464	563	1,813	2,840		
June 1	0	139	263	101	3	520	71	4	0	503	591	1,636	2,730		
2	0	141	265	101	4	480	0	5	0	507	480	1,733	2,720		
3	0	141	261	101	5	503	0	6	0	503	503	1,724	2,730		
4	0	141	261	101	6	278	0	7	0	503	278	1,669	2,450		
5	352	141	261	101	7	0	0	8	352	151	0	1,527	2,030		
6	465	141	261	101	8	25	0	9	465	38	25	1,672	2,200		
7	0	141	261	101	9	768	195	10	0	503	963	1,844	3,310		
8	0	141	274	101	10	834	230	11	0	516	1,064	1,570	3,150		
9	0	141	657	101	11	761	0	12	0	899	761	1,480	3,140		
10	0	141	444	101	12	734	0	13	0	686	734	1,280	2,700		
11	65	141	265	101	13	313	71	14	65	442	384	1,229	2,120		
12	655	141	410	101	14	0	0	15	652	0	0	1,228	1,880	130	130
13	788	141	549	101	15	0	0	16	791	0	0	1,429	2,220	470	600
14	0	139	272	101	16	329	0	17	0	512	329	1,449	2,290	72	672
15	77	141	260	101	17	339	0	18	77	425	339	1,579	2,420	77	749
16	101	141	258	101	18	362	337	19	101	399	699	1,521	2,720	101	850
17	218	141	260	101	19	279	0	20	218	284	279	1,429	2,210	176	1,026
18	372	141	261	101	20	301	0	21	372	131	301	1,246	2,050	169	1,195
19	667	141	424	101	21	0	0	22	666	0	0	1,194	1,860	110	1,305
20	650	141	408	101	22	179	0	23	650	0	179	1,431	2,260	510	1,815
21	0	141	260	101	23	263	248	24	0	502	511	1,447	2,460	0	1,815
22	0	141	258	101	24	265	0	25	0	500	265	1,725	2,490	0	1,815
23	0	141	258	101	25	430	0	26	0	500	430	1,330	2,260	90	1,905
24	234	141	258	101	26	267	0	27	234	266	267	1,183	1,950	100	2,005
25	469	141	261	101	27	299	0	28	469	34	299	1,118	1,920	136	2,141
26	597	141	357	101	28	0	177	29	599	0	177	1,044	1,820	70	2,211
27	382	141	263	101	29	0	0	30	382	123	0	1,195	1,700	-50	2,161
Total	6,092	4,137	9,166	3,004		9,096	1,435		6,093	10,214	10,531	44,712	71,550		

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 arithmetically, 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, 2008 = 17,125 $(ft^3/s)\cdot d$.

Table 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(River Master daily operation record)

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

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow, Delaware River at Montague, New Jersey							
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncontrolled	Total	Interim Excess Release Quantity Credits	
									New York City Reservoirs		Powerplants				
Date	Amount								Directed	Other				Daily	Cumul.
2008	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
June 28	249	141	261	101	June 30	522	0	July 1	249	254	522	1,215	2,240	236	2,397
29	0	141	261	101	July 1	511	0	2	0	503	511	1,186	2,200	100	2,497
30	436	141	261	101	2	457	0	3	436	67	457	1,070	2,030	213	2,710
July 1	310	141	260	101	3	449	0	4	310	192	449	1,009	1,960	100	2,810
2	492	141	260	101	4	264	0	5	492	10	264	1,034	1,800	50	2,860
3	987	141	743	101	5	0	0	6	985	0	0	905	1,890	140	3,000
4	802	141	557	101	6	0	0	7	799	0	0	961	1,760	10	3,010
5	507	141	269	101	7	481	0	8	511	0	481	1,048	2,040	290	3,300
6	581	141	339	101	8	466	0	9	581	0	466	903	1,950	200	3,500
7	283	141	261	101	9	472	0	10	283	220	472	925	1,900	100	3,600
8	531	141	288	101	10	493	0	11	530	0	493	797	1,820	70	3,670
9	437	141	260	101	11	532	71	12	437	65	603	805	1,910	100	3,770
10	1,185	141	941	101	12	0	0	13	1,183	0	0	607	1,790	40	3,810
11	1,096	141	852	101	13	6	0	14	1,094	0	6	980	2,080	330	4,140
12	115	141	320	101	14	484	0	15	115	447	484	2,624	3,670	115	4,255
13	300	141	260	101	15	433	0	16	300	202	433	1,845	2,780	300	4,555
14	0	141	260	101	16	422	0	17	0	502	422	1,346	2,270	62	4,617
15	429	141	260	101	17	298	0	18	429	73	298	1,130	1,930	107	4,724
16	479	141	260	101	18	640	0	19	479	23	640	1,198	2,340	479	5,203
17	1,052	141	800	101	19	0	0	20	1,042	0	0	938	1,980	230	5,433
18	1,081	142	838	101	20	0	0	21	1,081	0	0	909	1,990	240	5,673
19	588	141	345	101	21	333	0	22	587	0	333	1,220	2,140	390	6,063
20	583	141	340	101	22	429	0	23	582	0	429	1,349	2,360	582	6,645
21	0	141	263	101	23	293	53	24	0	505	346	14,149	15,000	0	6,645
22	0	141	261	101	24	318	833	25	0	503	1,151	15,246	16,900	0	6,645
23	0	142	261	101	25	415	851	26	0	504	1,266	7,530	9,300	0	6,645
24	0	142	263	101	26	0	780	27	0	506	780	4,584	5,870	0	6,645
25	0	141	261	101	27	0	638	28	0	503	638	4,059	5,200	0	6,645
26	0	141	263	101	28	336	443	29	0	505	779	4,176	5,460	0	6,645
27	0	142	263	101	29	293	213	30	0	506	506	2,908	3,920	0	6,645
28	0	141	263	101	30	247	0	31	0	505	247	2,448	3,200	0	6,645
Total	12,523	4,375	11,594	3,131		9,594	3,882		12,505	6,595	13,476	81,104	113,680		

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 arithmetically, 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, 2008 = 17,125 $(ft^3/s)\cdot d$.

Table 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(River Master daily operation record)

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

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow, Delaware River at Montague, New Jersey							
Directed		Pepac-ton	Cannons-ville	Never-sink	Date	Lake Wallenpau-pack	Rio Reservoir	Date	Controlled Releases			Computed uncon-trolled	Total	Interim Excess Release Quantity Credits	
									New York City Reservoirs		Power-plants				
Date 2008	Amount								Directed	Other				Daily	Cumul.
	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
July 29	0	141	260	101	July 31	293	106	Aug. 1	0	502	399	2,129	3,030	0	6,645
30	0	141	258	101	Aug. 1	428	177	2	0	500	605	1,825	2,930	0	6,645
31	276	141	257	101	2	0	0	3	276	223	0	1,791	2,290	276	6,921
Aug. 1	316	141	257	101	3	0	177	4	316	183	177	1,764	2,440	316	7,237
2	0	141	260	101	4	374	301	5	0	502	675	1,603	2,780	0	7,237
3	0	141	263	101	5	384	160	6	0	505	544	1,601	2,650	0	7,237
4	75	141	260	101	6	343	0	7	75	427	343	1,815	2,660	75	7,312
5	272	141	260	101	7	277	0	8	272	230	277	1,721	2,500	272	7,584
6	122	141	260	101	8	466	71	9	122	380	537	1,481	2,520	122	7,706
7	643	141	401	101	9	0	0	10	643	0	0	1,337	1,980	230	7,936
8	705	141	461	101	10	0	0	11	703	0	0	1,277	1,980	230	8,166
9	562	141	320	101	11	240	0	12	562	0	240	1,738	2,540	562	8,728
10	567	141	326	101	12	295	0	13	568	0	295	1,767	2,630	568	9,296
11	583	141	333	101	13	231	0	14	575	0	231	1,554	2,360	575	9,871
12	584	141	339	101	14	177	0	15	581	0	177	1,362	2,120	370	10,241
13	634	141	390	101	15	228	0	16	632	0	228	1,380	2,240	490	10,731
14	902	141	664	101	16	0	0	17	906	0	0	1,314	2,220	470	11,201
15	863	141	623	101	17	0	0	18	865	0	0	1,185	2,050	300	11,501
16	948	141	705	101	18	7	0	19	947	0	7	1,106	2,060	310	11,811
17	957	141	715	101	19	0	0	20	957	0	0	1,063	2,020	270	12,081
18	1,099	141	849	101	20	0	0	21	1,091	0	0	1,039	2,130	380	12,461
19	1,099	141	860	101	21	0	0	22	1,102	0	0	928	2,030	280	12,741
20	1,149	141	913	101	22	0	0	23	1,155	0	0	865	2,020	270	13,011
21	1,175	139	939	101	23	0	71	24	1,179	0	71	830	2,080	132	13,143
22	1,224	139	982	101	24	0	0	25	1,222	0	0	798	2,020	Depleted	
23	1,226	139	989	101	25	13	0	26	1,229	0	13	788	2,030		
24	1,226	139	982	101	26	0	0	27	1,222	0	0	748	1,970		
25	1,093	141	854	101	27	5	0	28	1,096	0	5	699	1,800		
26	1,027	141	784	101	28	0	0	29	1,026	0	0	694	1,720		
27	1,032	142	791	101	29	0	0	30	1,034	0	0	726	1,760		
28	1,056	141	820	101	30	0	0	31	1,062	0	0	738	1,800		
Total	21,415	4,364	17,375	3,131		3,761	1,063		21,418	3,452	4,824	39,666	69,360		

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 arithmetically, 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, 2008 = 17,125 $(ft^3/s)\cdot d$.

Table 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(River Master daily operation record)

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

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow, Delaware River at Montague, New Jersey							
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncontrolled	Total	Interim Excess Release Quantity Credits	
									New York City Reservoirs		Powerplants				
Date 2008	Amount								Directed	Other				Daily	Cumul.
	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Aug. 29	1,054	141	815	101	Aug. 31	0	0	Sept. 1	1,057	0	0	703	1,760	Depleted	
30	1,085	141	852	93	Sept. 1	0	0	2	1,086	0	0	654	1,740		
31	771	133	571	70	2	292	0	3	774	0	292	684	1,750		
Sept. 1	792	85	639	70	3	331	0	4	794	0	331	665	1,790		
2	811	85	657	70	4	439	0	5	812	0	439	789	2,040		
3	820	85	657	70	5	254	0	6	812	0	254	944	2,010		
4	0	85	118	70	6	241	0	7	0	273	241	1,416	1,930		
5	0	85	114	70	7	0	18	8	0	269	18	1,193	1,480		
6	0	85	114	70	8	192	160	9	0	269	352	1,349	1,970		
7	0	85	114	70	9	176	390	10	0	269	566	1,625	2,460		
8	70	84	116	70	10	142	426	11	70	200	568	1,562	2,400		
9	0	84	116	70	11	312	390	12	0	270	702	1,378	2,350		
10	224	85	116	70	12	237	124	13	224	47	361	1,288	1,920		
11	588	85	416	70	13	0	0	14	571	0	0	1,139	1,710		
12	216	85	114	70	14	0	53	15	216	53	53	1,388	1,710		
13	0	91	113	70	15	177	177	16	0	274	354	1,272	1,900		
14	0	85	114	70	16	222	177	17	0	269	399	1,152	1,820		
15	41	85	114	70	17	206	160	18	41	228	366	965	1,600		
16	217	84	114	70	18	240	160	19	217	51	400	882	1,550		
17	365	84	213	70	19	248	124	20	367	0	372	751	1,490		
18	510	85	456	70	20	261	71	21	611	0	332	637	1,580		
19	1,086	85	1,033	70	21	7	0	22	1,188	0	7	705	1,900		
20	715	85	668	70	22	259	0	23	823	0	259	738	1,820		
21	786	85	733	70	23	194	0	24	888	0	194	718	1,800		
22	1,017	85	970	70	24	350	0	25	1,125	0	350	655	2,130		
23	1,027	85	972	70	25	261	0	26	1,127	0	261	852	2,240		
24	704	85	650	70	26	277	0	27	805	0	277	1,078	2,160		
25	533	85	385	70	27	0	0	28	540	0	0	1,450	1,990		
26	0	85	116	70	28	0	0	29	0	271	0	2,149	2,420		
27	215	85	118	70	29	0	142	30	215	58	142	2,135	2,550		
Total	13,647	2,712	12,298	2,154		5,318	2,572		14,363	2,801	7,890	32,916	57,970		

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours ending 2400 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours beginning 0800 of date shown.
Col. 6 - 24 hours beginning 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 arithmetically, 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, 2008 = 17,125 $(ft^3/s)\cdot d$.

Table 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(River Master daily operation record)

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

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow, Delaware River at Montague, New Jersey							
Directed		Pepac-ton	Cannons-ville	Never-sink	Date	Lake Wallenpau-pack	Rio Reservoir	Date	Controlled Releases			Computed uncon-trolled	Total	Interim Excess Release Quantity Credits	
									New York City Reservoirs		Power-plants				
Date 2008	Amount								Directed	Other				Daily	Cumul.
	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Sept. 28	0	85	118	70	Sept. 30	0	160	Oct. 1	0	273	160	1,847	2,280	Depleted	
29	0	85	116	67	Oct. 1	0	18	2	0	268	18	1,744	2,030		
30	0	85	114	60	2	0	177	3	0	259	177	1,544	1,980		
Oct. 1	239	85	111	60	3	0	230	4	239	17	230	1,394	1,880		
2	449	85	302	60	4	0	0	5	447	0	0	1,203	1,650		
3	597	85	453	60	5	0	48	6	598	0	48	1,114	1,760		
4	604	85	461	60	6	0	160	7	606	0	160	1,054	1,820		
5	685	85	538	60	7	0	160	8	683	0	160	947	1,790		
6	752	85	608	60	8	0	191	9	753	0	191	896	1,840		
7	859	85	709	60	9	0	160	10	854	0	160	896	1,910		
8	925	84	781	60	10	0	112	11	925	0	112	853	1,890		
9	1,122	84	976	59	11	0	0	12	1,119	0	0	791	1,910		
10	884	85	739	60	12	0	0	13	884	0	0	806	1,690		
11	897	85	746	60	13	0	0	14	891	0	0	779	1,670		
12	910	85	764	60	14	0	48	15	909	0	48	753	1,710		
13	905	85	761	60	15	0	160	16	906	0	160	814	1,880		
14	818	85	671	60	16	0	142	17	816	0	142	802	1,760		
15	953	85	804	60	17	0	142	18	949	0	142	729	1,820		
16	1,107	85	964	60	18	0	71	19	1,109	0	71	730	1,910		
17	1,041	85	899	60	19	0	53	20	1,044	0	53	723	1,820		
18	942	84	781	60	20	50	177	21	925	0	227	698	1,850		
19	907	84	764	60	21	76	177	22	908	0	253	639	1,800		
20	930	85	786	60	22	56	177	23	931	0	233	636	1,800		
21	938	85	794	60	23	70	248	24	939	0	318	583	1,840		
22	995	85	849	60	24	242	124	25	994	0	366	800	2,160		
23	0	59	119	45	25	0	0	26	0	223	0	5,027	5,250		
24	0	59	82	45	26	0	124	27	0	186	124	8,830	9,140		
25	0	60	84	48	27	159	319	28	0	192	478	6,830	7,500		
26	0	63	97	60	28	0	851	29	0	220	851	11,029	12,100		
27	0	87	108	60	29	0	851	30	0	255	851	8,114	9,220		
28	0	87	110	60	30	0	851	31	0	257	851	5,822	6,930		
Total	18,459	2,536	16,209	1,834		653	5,931		18,429	2,150	6,584	69,427	96,590		

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 arithmetically, 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, 2008 = 17,125 $(ft^3/s)\cdot d$.

Table 9. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey.—Continued
(River Master daily operation record)

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

Controlled Releases from New York City Reservoirs					Controlled Releases from Power Reservoirs			Segregation of Flow, Delaware River at Montague, New Jersey							
Directed		Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	Controlled Releases			Computed uncontrolled	Total	Interim Excess Release Quantity Credits	
									New York City Reservoirs		Powerplants				
Date 2008	Amount								Directed	Other				Daily	Cumul.
	Col. 1	Col. 2	Col. 3	Col. 4	2008	Col. 5	Col. 6	2008	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13
Oct. 29	0	84	110	60	Oct. 31	0	390	Nov. 1	0	254	390	4,946	5,590	Depleted	
30	0	85	111	60	Nov. 1	0	426	2	0	256	426	4,788	5,470		
31	0	87	110	62	2	0	390	3	0	259	390	5,051	5,700		
Nov. 1	0	90	113	60	3	457	851	4	0	263	1,308	4,299	5,870		
2	0	87	108	60	4	329	851	5	0	255	1,180	4,045	5,480		
3	0	85	110	60	5	604	851	6	0	255	1,455	3,830	5,540		
4	0	85	110	60	6	341	851	7	0	255	1,192	3,693	5,140		
5	0	85	111	60	7	508	851	8	0	256	1,359	3,275	4,890		
6	0	85	110	60	8	0	851	9	0	255	851	3,074	4,180		
7	0	85	111	60	9	0	851	10	0	256	851	2,873	3,980		
8	0	85	111	60	10	470	355	11	0	256	825	2,619	3,700		
9	0	85	108	59	11	385	266	12	0	252	651	2,437	3,340		
10	0	85	108	62	12	473	18	13	0	255	491	2,424	3,170		
11	0	85	108	60	13	493	142	14	0	253	635	2,492	3,380		
12	0	87	110	60	14	500	177	15	0	257	677	2,696	3,630		
13	0	87	113	60	15	0	71	16	0	260	71	3,969	4,300		
14	0	85	114	60	16	0	142	17	0	259	142	5,429	5,830		
15	0	85	114	60	17	668	18	18	0	259	686	4,565	5,510		
16	0	85	111	60	18	429	195	19	0	256	624	4,000	4,880		
17	0	84	107	60	19	337	426	20	0	251	763	3,556	4,570		
18	0	84	110	60	20	520	142	21	0	254	662	3,364	4,280		
19	0	85	108	60	21	484	195	22	0	253	679	3,168	4,100		
20	0	85	108	60	22	0	89	23	0	253	89	3,158	3,500		
21	0	85	108	60	23	0	213	24	0	253	213	2,524	2,990		
22	0	85	108	60	24	434	213	25	0	253	647	3,010	3,910		
23	0	85	108	60	25	385	638	26	0	253	1,023	3,284	4,560		
24	0	105	108	60	26	472	195	27	0	273	667	3,310	4,250		
25	0	285	108	60	27	0	53	28	0	453	53	3,074	3,580		
26	0	285	108	60	28	0	284	29	0	453	284	2,753	3,490		
27	0	285	108	60	29	0	284	30	0	453	284	2,673	3,410		
Total	0	3,180	3,290	1,803		8,289	11,279		0	8,273	19,568	104,379	132,220		

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 arithmetically, 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, 2008 = 17,125 $(ft^3/s)\cdot d$.

Table 10. Diversions to New York City water-supply system.
(River Master daily operation record)

[Million gallons per day for 24-hour period beginning 0800 local time]

Date 2007	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2007 to date	Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2007 to date
Dec. 1	502	0	0	652	Jan. 1	0	0	267	609
2	461	0	0	651	2	0	191	267	609
3	415	0	0	650	3	0	207	23	607
4	0	0	0	646	4	0	199	256	606
5	0	0	0	643	5	0	199	256	605
6	290	0	2	641	6	0	199	256	605
7	502	0	197	641	7	0	199	256	604
8	503	0	195	641	8	0	199	295	604
9	462	0	173	641	9	0	199	356	603
10	0	0	189	639	10	0	15	118	601
11	0	0	267	637	11	0	0	158	599
12	0	0	267	635	12	0	0	64	597
13	414	0	332	636	13	0	0	0	594
14	85	0	352	635	14	0	0	301	593
15	0	0	354	633	15	0	0	348	592
16	0	0	323	632	16	0	0	358	591
17	0	0	299	630	17	0	0	358	590
18	0	235	255	629	18	213	0	52	588
19	0	204	322	629	19	304	0	0	587
20	0	201	347	629	20	303	0	0	586
21	0	201	350	628	21	304	0	0	585
22	0	201	350	628	22	303	0	0	584
23	0	0	350	626	23	298	0	0	582
24	0	0	352	625	24	298	0	0	581
25	0	0	355	624	25	298	0	0	580
26	0	0	350	623	26	298	0	0	579
27	0	0	344	621	27	299	0	0	578
28	0	0	27	618	28	299	0	0	577
29	0	0	0	615	29	303	0	0	575
30	0	0	0	613	30	299	0	0	574
31	0	0	234	611	31	300	0	0	573
Total	3,634	1,042	6,586			4,119	1,607	3,989	

Table 10. Diversions to New York City water-supply system.—Continued
(River Master daily operation record)

[Million gallons per day for 24-hour period beginning 0800 local time]

Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2007 to date	Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2007 to date
Feb. 1	306	0	197	573	Mar. 1	0	0	0	520
2	310	0	200	573	2	0	0	0	518
3	304	0	199	572	3	0	0	0	516
4	299	0	66	572	4	0	0	0	514
5	298	0	0	570	5	0	0	0	512
6	301	0	0	569	6	0	0	0	510
7	3	0	0	567	7	106	0	17	509
8	0	0	0	565	8	0	0	0	507
9	0	0	0	563	9	0	0	0	505
10	0	0	0	560	10	0	0	0	504
11	0	0	0	558	11	0	0	0	502
12	0	0	0	556	12	0	0	0	500
13	0	0	0	554	13	140	0	182	500
14	0	0	0	552	14	203	0	272	499
15	0	0	0	550	15	204	0	271	499
16	0	0	0	548	16	68	0	271	499
17	0	0	0	545	17	0	0	271	498
18	0	0	0	543	18	0	0	93	497
19	0	0	0	541	19	0	0	1	495
20	0	0	0	539	20	0	0	0	493
21	0	0	0	537	21	0	0	135	492
22	0	0	0	535	22	0	0	201	491
23	0	0	0	533	23	0	0	201	490
24	0	0	0	531	24	169	0	201	490
25	0	0	0	529	25	201	0	205	489
26	0	0	0	527	26	201	0	206	489
27	0	0	0	525	27	202	0	203	489
28	0	0	0	523	28	246	0	251	489
29	0	0	0	522	29	249	0	254	489
					30	247	0	251	489
					31	251	0	253	489
Total	1,821	0	662			2,487	0	3,739	

Table 10. Diversions to New York City water-supply system.—Continued
(River Master daily operation record)

[Million gallons per day for 24-hour period beginning 0800 local time]

Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2007 to date	Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2007 to date
Apr. 1	251	0	254	489	May 1	400	271	0	490
2	254	0	254	489	2	331	299	0	491
3	252	0	254	489	3	295	299	0	491
4	0	0	242	488	4	297	299	0	492
5	0	0	242	488	5	303	299	104	492
6	0	0	243	487	6	211	299	104	493
7	0	0	248	486	7	209	299	104	493
8	0	0	251	485	8	108	299	60	493
9	0	0	256	485	9	21	12	192	492
10	0	0	256	484	10	0	277	195	492
11	0	0	256	483	11	206	300	96	492
12	0	0	353	483	12	199	300	0	492
13	0	0	352	482	13	200	215	0	492
14	240	56	352	483	14	47	101	0	491
15	362	0	351	483	15	110	201	0	491
16	400	0	351	484	16	296	201	0	491
17	400	0	351	485	17	300	200	0	491
18	400	0	347	486	18	300	200	0	491
19	400	0	350	487	19	250	10	0	490
20	400	0	346	488	20	297	0	0	489
21	442	0	261	488	21	271	0	0	489
22	494	0	128	489	22	300	0	0	488
23	497	0	103	489	23	300	261	0	489
24	354	0	77	489	24	300	289	0	489
25	496	270	0	490	25	300	301	0	489
26	406	300	0	490	26	300	301	0	489
27	402	300	0	491	27	300	301	0	490
28	238	105	0	490	28	123	301	0	490
29	401	0	0	490	29	0	100	0	488
30	400	0	0	490	30	144	213	137	488
					31	200	299	182	489
Total	7,489	1,031	6,478			6,918	6,747	1,174	

Table 10. Diversions to New York City water-supply system.—Continued
(River Master daily operation record)

[Million gallons per day for 24-hour period beginning 0800 local time]

Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2008 to date	Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2008 to date
June 1	200	299	195	694	July 1	119	65	74	578
2	200	299	200	697	2	450	208	120	584
3	280	299	32	668	3	499	202	241	595
4	297	299	0	650	4	499	200	203	604
5	380	299	0	656	5	499	0	202	607
6	353	299	0	655	6	499	0	202	609
7	399	299	0	661	7	499	274	68	616
8	399	299	0	666	8	499	299	0	620
9	383	299	0	668	9	499	212	0	623
10	400	271	0	668	10	500	199	0	625
11	400	299	0	671	11	500	199	0	626
12	365	299	0	670	12	500	201	0	628
13	397	298	0	672	13	500	201	0	630
14	385	286	0	672	14	500	201	0	632
15	397	296	0	673	15	499	201	0	633
16	117	26	191	652	16	499	201	0	635
17	0	0	305	632	17	499	201	0	636
18	0	0	301	613	18	499	201	0	637
19	158	0	301	605	19	499	200	0	639
20	197	0	304	600	20	499	200	0	640
21	199	0	304	595	21	500	200	0	641
22	199	0	303	591	22	499	101	0	640
23	202	0	302	587	23	113	0	0	630
24	301	0	348	590	24	0	0	0	619
25	499	0	118	591	25	192	94	176	616
26	500	0	0	588	26	0	200	333	614
27	495	0	221	592	27	0	200	330	613
28	500	0	98	593	28	0	276	359	613
29	500	0	0	589	29	394	300	120	616
30	396	142	26	589	30	413	300	0	618
					31	313	300	108	620
Total	9,498	4,608	3,549			11,980	5,636	2,536	

Table 10. Diversions to New York City water-supply system.—Continued
(River Master daily operation record)

[Million gallons per day for 24-hour period beginning 0800 local time]

Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2008 to date	Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2008 to date
Aug. 1	300	300	104	621	Sept. 1	448	8	0	627
2	300	300	107	623	2	451	200	53	628
3	299	258	106	623	3	450	200	52	628
4	266	300	106	624	4	425	200	53	629
5	248	297	52	623	5	113	20	0	624
6	241	300	52	623	6	0	0	0	617
7	251	300	53	623	7	363	0	0	615
8	245	299	151	624	8	450	189	0	615
9	241	299	0	623	9	450	213	51	616
10	241	299	0	621	10	449	201	64	617
11	250	299	52	621	11	449	201	0	617
12	442	236	52	623	12	449	201	0	618
13	463	207	54	624	13	450	200	0	618
14	448	201	54	625	14	450	200	0	618
15	448	200	103	627	15	449	200	55	619
16	448	17	0	625	16	449	200	52	620
17	449	8	0	622	17	449	133	55	620
18	446	122	104	623	18	448	133	55	620
19	445	100	0	622	19	451	125	106	621
20	448	100	104	622	20	452	0	0	619
21	450	200	324	627	21	452	0	0	618
22	450	201	90	628	22	448	200	106	619
23	450	0	0	626	23	450	200	52	620
24	450	0	0	624	24	450	199	55	620
25	431	132	105	624	25	450	124	58	620
26	448	131	105	625	26	450	125	106	621
27	448	201	106	627	27	450	0	0	620
28	449	201	102	628	28	450	0	0	618
29	448	200	101	629	29	450	200	107	619
30	448	200	0	630	30	450	200	52	620
31	448	92	0	629					
Total	11,839	6,000	2,187			12,595	4,072	1,132	

Table 10. Diversions to New York City water-supply system.—Continued
(River Master daily operation record)

[Million gallons per day for 24-hour period beginning 0800 local time]

Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2008 to date	Date 2008	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 2008 to date
Oct. 1	450	200	53	621	Nov. 1	0	0	0	587
2	450	200	53	621	2	0	0	0	583
3	411	125	150	622	3	0	0	0	579
4	449	0	0	620	4	0	0	0	576
5	449	0	2	619	5	0	0	0	572
6	448	124	207	620	6	0	0	0	568
7	447	125	203	622	7	0	0	0	565
8	447	124	212	623	8	0	0	0	561
9	447	160	208	624	9	0	0	0	558
10	447	129	211	625	10	0	0	0	554
11	447	0	0	624	11	0	0	0	551
12	446	8	1	623	12	0	0	0	548
13	450	138	207	624	13	0	0	0	544
14	449	137	207	625	14	0	0	0	541
15	353	130	206	626	15	0	0	0	538
16	451	182	204	627	16	0	0	0	535
17	401	125	221	628	17	0	0	0	532
18	447	0	0	627	18	0	0	0	529
19	449	8	0	626	19	0	0	0	525
20	448	133	216	627	20	0	0	0	522
21	445	125	208	628	21	0	0	0	519
22	135	125	206	627	22	0	0	0	516
23	0	0	0	623	23	0	0	0	514
24	94	0	14	619	24	0	0	0	511
25	1	0	0	615	25	0	0	1	508
26	0	0	0	611	26	0	0	20	505
27	0	0	0	607	27	0	0	0	502
28	0	0	0	603	28	0	0	0	499
29	0	0	0	599	29	0	0	0	497
30	0	0	0	595	30	0	0	0	494
31	0	0	0	591					
Total	9,461	2,298	2,989			0	0	21	

Table 11. Daily mean discharge, East Branch Delaware River at Downsville, New York (station number 01417000), for report year ending November 30, 2008. (U.S. Geological Survey published record)

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

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	77	715	717	778	1,480	95	135	142	143	111	86	87
2	78	716	717	771	2,200	112	143	142	143	92	85	87
3	77	717	717	768	2,120	110	144	142	143	92	84	86
4	76	717	717	609	2,060	109	144	142	143	92	84	85
5	76	717	718	4,190	2,400	109	145	142	144	92	83	85
6	76	717	637	6,150	2,330	111	143	142	144	92	82	85
7	76	717	463	4,030	2,070	112	143	142	144	92	82	86
8	76	717	718	5,410	1,790	112	143	141	144	91	82	87
9	76	716	720	7,780	1,590	113	143	142	144	90	80	87
10	76	717	720	4,990	1,440	113	142	143	145	90	80	87
11	76	717	725	3,220	1,350	113	141	143	145	88	81	87
12	76	717	729	2,410	1,370	113	140	143	144	87	81	87
13	76	717	847	1,940	1,300	114	140	143	144	92	81	87
14	76	717	1,720	1,580	1,160	115	140	143	144	89	81	87
15	76	717	1,800	1,390	874	115	140	143	145	85	82	87
16	75	717	1,640	1,190	716	115	142	143	144	85	82	87
17	75	717	1,420	1,110	497	115	142	143	144	85	82	86
18	76	717	2,630	1,030	179	115	142	143	144	85	81	85
19	76	717	3,560	1,080	178	115	143	143	144	85	80	85
20	76	717	2,790	2,550	180	115	143	143	144	85	80	86
21	76	717	2,310	2,850	180	115	143	143	144	85	83	86
22	76	717	1,980	2,440	181	115	143	143	144	85	86	85
23	77	717	1,640	2,130	182	115	143	145	144	85	74	85
24	127	717	1,340	1,850	182	115	143	144	145	86	63	85
25	172	717	1,140	1,290	181	115	143	143	145	87	65	199
26	171	717	1,050	1,040	182	115	143	143	145	86	65	277
27	170	717	997	901	182	115	143	143	147	86	79	276
28	169	717	890	1,000	85	115	143	143	147	86	87	275
29	170	717	794	1,040	66	115	143	143	147	85	86	275
30	170	717		910	66	114	142	143	146	85	86	275
31	322	717		941		115		143	146		87	
Total	3,222	22,223	36,846	69,368	28,771	3,505	4,267	4,426	4,479	2,656	2,500	3,644
Mean	104	717	1,271	2,238	959	113	142	143	144	88.5	80.6	121

Year total 185,907 (ft^3/s)-d

Mean 508 ft^3/s

Table 12. Daily mean discharge, West Branch Delaware River at Stilesville, New York (station number 01425000), for report year ending November 30, 2008.
(U.S. Geological Survey published record)

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

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	115	1,500	1,490	1,600	1,860	129	238	256	256	549	108	111
2	117	1,500	1,490	1,590	2,570	211	253	255	257	617	106	109
3	116	1,500	1,500	1,590	2,890	212	255	255	259	644	298	110
4	115	1,500	1,440	1,600	2,930	213	255	733	261	656	449	110
5	115	1,500	1,200	1,770	3,330	212	253	525	259	121	466	112
6	115	1,490	948	4,190	3,320	210	254	273	261	102	528	112
7	115	1,480	593	4,350	3,020	210	253	323	260	101	600	116
8	115	1,490	1,990	5,250	2,690	211	255	262	391	101	734	121
9	117	1,510	2,570	7,790	2,390	211	264	284	454	106	802	125
10	119	1,520	2,600	6,760	2,120	211	619	262	324	102	1,000	124
11	120	1,520	2,290	5,030	1,910	210	431	938	326	102	765	122
12	118	1,530	1,930	3,930	1,810	210	261	852	331	394	771	122
13	187	1,890	1,780	3,370	1,730	210	389	324	336	115	789	120
14	262	2,210	2,010	2,850	1,620	210	514	261	382	103	789	125
15	263	2,260	2,030	2,920	1,530	210	274	259	645	103	690	128
16	263	2,120	1,920	2,510	1,360	213	259	259	597	103	834	127
17	262	1,900	1,730	2,120	941	212	259	260	694	103	998	124
18	542	1,730	2,180	1,810	512	212	258	834	704	209	940	120
19	1,330	1,620	3,550	1,690	263	211	257	872	878	443	839	119
20	1,480	1,510	3,450	2,560	247	213	403	359	883	1,060	807	119
21	1,480	1,500	2,980	3,250	408	213	394	340	910	675	828	119
22	1,480	1,500	2,540	3,120	908	213	265	262	948	762	828	119
23	1,490	1,500	2,210	2,770	1,390	212	262	265	989	997	877	119
24	1,520	1,500	1,910	2,440	1,050	212	259	261	1,000	1,000	137	120
25	1,520	1,500	1,710	2,120	594	212	259	259	988	654	89	122
26	1,520	1,500	1,610	1,860	252	212	258	259	865	397	90	121
27	1,510	1,500	1,590	1,720	250	212	340	261	801	120	96	121
28	1,500	1,510	1,590	1,680	142	212	259	259	806	114	111	121
29	1,500	1,520	1,590	1,680	78	212	256	259	826	112	110	121
30	1,500	1,520		1,620	72	213	256	259	825	111	109	122
31	1,500	1,510		1,610		212		256	862		109	
Total	22,506	49,840	56,421	89,150	44,187	6,476	9,012	11,586	18,578	10,776	16,697	3,581
Mean	726	1,608	1,946	2,876	1,473	209	300	374	599	359	539	119

Year total 338,810 (ft^3/s)-d

Mean 926 ft^3/s

Table 13. Daily mean discharge, Neversink River at Neversink, New York (station number 01436000), for report year ending November 30, 2008.

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

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	59	85	98	236	190	68	93	103	101	81	64	60
2	60	97	98	225	329	82	97	103	103	70	60	61
3	62	97	98	227	410	82	98	103	103	70	60	60
4	63	78	98	233	432	82	98	104	102	70	60	60
5	63	65	98	2,040	720	82	98	104	101	70	60	61
6	63	65	100	1,670	585	82	98	104	101	71	60	61
7	63	65	101	818	434	83	98	104	101	70	60	61
8	63	65	140	1,980	356	83	98	104	101	70	60	61
9	63	65	167	2,980	325	84	98	104	102	71	60	61
10	63	65	117	1,170	303	82	98	102	104	71	60	60
11	63	66	111	724	278	82	98	104	104	71	60	60
12	63	66	162	555	311	82	98	104	103	71	60	60
13	64	67	180	406	244	83	98	104	104	71	60	61
14	65	67	179	193	190	84	98	103	104	71	60	61
15	65	65	195	189	122	84	98	104	103	70	61	61
16	65	65	188	189	101	84	98	102	101	71	60	59
17	63	65	233	183	104	83	98	102	101	71	60	60
18	86	65	720	183	105	82	98	102	101	71	60	60
19	78	65	1,270	185	104	82	98	104	102	71	60	60
20	65	65	713	1,150	77	82	98	105	102	71	60	60
21	65	66	491	922	63	80	98	104	103	71	60	60
22	65	67	429	400	63	79	98	104	103	71	60	59
23	66	67	389	242	62	79	98	102	103	71	61	60
24	65	87	335	221	61	79	98	104	104	71	54	61
25	65	100	257	242	63	79	98	102	103	70	45	61
26	65	100	270	209	49	79	98	101	103	71	45	60
27	65	100	349	187	42	79	99	101	103	71	54	60
28	65	99	248	186	42	79	101	99	103	71	60	60
29	66	98	220	183	42	80	101	99	103	71	60	60
30	65	98		187	42	81	101	101	103	71	60	60
31	66	98		178		82		101	103		60	
Total	2,017	2,383	8,054	18,693	6,249	2,514	2,944	3,187	3,178	2,132	1,824	1,809
Mean	65.1	76.9	278	603	208	81.1	98.1	103	103	71.1	58.8	60.3

Year total 54,984 (ft^3/s)-d

Mean 150 ft^3/s

Table 14. Daily mean discharge, Delaware River at Montague, New Jersey (station number 01438500), for report year ending November 30, 2008. (U.S. Geological Survey published record)

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

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	7,880	11,900	6,020	7,660	13,800	3,920	2,460	2,240	3,030	1,700	e2,210	5,590
2	6,680	11,300	7,030	6,920	18,400	3,620	2,460	2,200	2,930	1,680	1,960	5,470
3	6,510	10,300	7,540	6,860	18,800	3,680	2,840	2,030	2,290	1,690	1,910	5,700
4	7,590	9,160	7,040	8,450	16,800	3,840	2,730	1,960	2,440	1,720	1,800	5,870
5	6,740	8,670	7,220	32,900	20,800	4,590	2,720	1,800	2,780	1,970	1,570	5,480
6	5,900	8,760	12,100	58,100	19,900	4,310	2,730	1,890	2,650	1,940	1,680	5,540
7	5,230	8,810	34,100	37,500	17,200	3,960	2,450	1,760	2,660	1,860	1,740	5,140
8	4,810	10,700	27,000	40,200	15,500	3,840	2,030	2,040	2,500	1,410	1,710	4,890
9	4,770	14,400	20,000	66,600	13,900	3,710	2,200	1,950	2,520	1,890	1,770	4,180
10	4,710	21,200	16,800	48,100	12,300	4,240	3,310	1,900	1,960	2,410	1,840	3,980
11	4,940	18,600	14,000	32,700	11,300	4,250	3,150	1,820	1,960	2,340	1,820	3,700
12	5,560	25,900	12,700	25,200	11,200	3,760	3,140	1,910	2,530	2,290	1,840	3,340
13	8,870	19,100	13,400	20,700	10,600	3,400	2,700	1,790	2,620	1,850	1,610	3,170
14	8,140	15,700	21,800	17,900	9,650	3,100	2,120	2,080	2,340	1,640	1,590	3,380
15	7,080	13,900	19,200	17,500	9,130	2,980	1,880	3,670	2,100	1,630	1,640	3,630
16	6,480	12,200	16,200	18,700	7,920	3,070	2,220	2,780	2,230	1,830	1,800	4,300
17	6,300	10,900	14,200	17,200	7,250	5,190	2,290	2,270	2,210	1,740	1,690	5,830
18	6,800	10,200	17,300	15,200	6,500	5,850	2,420	1,930	2,010	1,530	1,740	5,510
19	5,900	9,560	31,500	15,200	5,050	5,250	2,720	2,340	2,020	1,470	1,840	4,880
20	6,820	8,540	25,600	33,700	4,060	5,310	2,210	1,980	1,980	1,410	1,750	4,570
21	7,010	7,950	20,300	35,000	3,710	4,880	2,050	1,990	2,090	1,510	1,780	4,280
22	6,340	7,610	17,300	25,300	3,660	4,670	1,860	2,140	2,000	1,830	1,730	3,940
23	6,110	7,660	15,100	20,100	3,820	4,610	2,260	2,360	1,980	1,740	1,720	3,020
24	19,300	7,170	13,100	16,800	4,250	4,010	2,460	15,000	2,040	1,730	1,770	2,990
25	19,800	7,010	11,700	14,300	4,100	3,250	2,490	16,900	1,980	2,070	2,100	3,910
26	14,500	6,500	10,800	12,600	3,620	3,000	2,260	9,300	1,980	2,170	5,250	4,560
27	11,900	6,070	10,400	11,800	3,010	2,810	1,950	5,870	1,920	2,100	9,140	4,250
28	10,900	5,920	9,490	11,500	3,060	3,370	1,920	5,200	1,750	1,920	7,500	3,580
29	11,100	5,780	8,620	13,900	4,820	2,650	1,820	5,460	1,670	2,370	12,100	3,490
30	14,000	5,940		11,800	4,680	2,790	1,700	3,920	1,700	2,490	9,220	3,410
31	12,800	6,210		10,700		2,270		3,200	1,730		6,930	
Total	261,470	333,620	447,560	711,090	288,790	120,180	71,550	113,680	68,600	55,930	94,750	131,580
Mean	8,435	10,760	15,430	22,940	9,626	3,877	2,385	3,667	2,213	1,864	3,056	4,386

Year total 2,698,800 (ft^3/s)-d

Mean 7,374 ft^3/s

Table 15. Diversions by New Jersey; daily mean discharge, Delaware and Raritan Canal at Port Mercer, New Jersey (station number 01460440), for report year ending November 30, 2008.
(U.S. Geological Survey published record)

[All data except total are in million gallons per day, Mgal/d; total in Million gallons, Mgal; e, estimated]

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	96	88	82	95	99	93	95	79	e94	98	e84	90
2	95	89	55	94	98	96	98	82	e94	97	82	88
3	e97	90	67	94	98	98	98	82	e90	95	84	89
4	e97	97	77	97	98	98	96	82	e94	94	81	86
5	e94	97	81	90	98	99	59	83	e90	93	88	83
6	e94	94	82	89	98	100	75	83	e90	92	87	82
7	e90	91	84	91	99	99	75	79	e90	75	86	80
8	90	91	83	e81	99	101	81	80	90	83	90	81
9	93	91	82	e84	99	92	86	80	88	80	89	82
10	95	92	80	e87	101	85	86	84	90	86	88	85
11	94	88	72	e87	102	91	87	e87	92	88	87	86
12	95	86	79	91	100	92	86	89	89	92	88	90
13	92	89	42	89	95	93	83	87	88	91	88	83
14	e90	87	60	95	95	96	80	85	92	90	90	e84
15	89	87	81	98	95	98	81	83	89	89	91	e81
16	e87	88	86	97	96	86	83	e84	91	89	88	e81
17	e87	89	92	96	98	79	85	e85	93	90	92	e84
18	e90	80	92	97	99	87	86	84	91	88	90	e84
19	e90	84	91	95	99	84	84	e81	94	89	91	87
20	89	85	91	e90	100	84	82	e84	98	90	89	89
21	95	88	93	e94	99	87	82	85	99	90	88	90
22	95	94	93	e97	99	91	82	78	98	88	82	89
23	93	93	95	94	99	93	83	87	95	86	80	88
24	86	93	92	95	99	96	82	74	95	84	90	88
25	91	94	93	95	99	97	e81	79	95	84	91	84
26	95	97	94	96	100	98	83	90	95	86	88	83
27	95	96	93	98	99	96	84	99	96	83	86	85
28	94	96	91	99	94	87	80	98	95	86	70	86
29	92	93	91	96	e87	91	81	99	96	76	79	86
30	90	91		98	e94	96	79	e97	99	82	86	84
31	87	91		98		98		e97	96		89	
Total	2,857	2,809	2,394	2,897	2,935	2,881	2,503	2,646	2,886	2,634	2,682	2,558
Mean	92.2	90.6	82.6	93.5	97.8	92.9	83.4	85.4	93.1	87.8	86.5	85.3

Year total 32,682 Mgal

Mean 89.3 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 2008 report year, December 1, 2007, to November 30, 2008. This program is conducted by the USGS, in cooperation with the 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, New Jersey, and Reedy Island Jetty, Delaware, is monitored at various locations (fig. 6). Data on water 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. Data on water temperature and specific conductance were collected in the same manner at Fort Mifflin. Water-quality monitors at Benjamin Franklin Bridge and Chester were not operated from mid-December 2007 to March 2008 whereas monitors at Trenton and Reedy Island Jetty were operated continuously throughout the report year. The monitor at Fort Mifflin was operated in December 2007 and from August to November 2008.

The frequency of water-quality sampling was monthly in March, June, July, August, September, and October, and twice monthly in April and May 2008. Water samples at 22 sites between Biles Channel and South of Brown's Shoal (sites A–W on fig. 6) were collected and analyzed by the State of Delaware for the DRBC. At each of these sites, water samples were collected at a single point near the center of the channel at a depth of 3 feet below the water surface and analyzed for selected physical properties and chemical and biological constituents including routine chemical substances, nutrients, bacteria, and radionuclides. These analyses consist of field measurements and laboratory determinations.

Data obtained from the electronic water-quality monitors are processed and stored in the USGS National Water Information System (NWIS) database. These data are posted online by the USGS in annual 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 DRBC and STORET, an environmental quality database operated by the U.S. Environmental Protection Agency.

Water Quality During the 2008 Report Year

Streamflow

Streamflow has a major effect on the quality of water in the Delaware Estuary. High freshwater inflows commonly result in improved water quality by limiting the upstream movement of seawater and reducing the concentration of dissolved substances. High inflows also aid in maintaining lower water temperatures during warm weather and in supporting higher concentrations of dissolved oxygen. Under

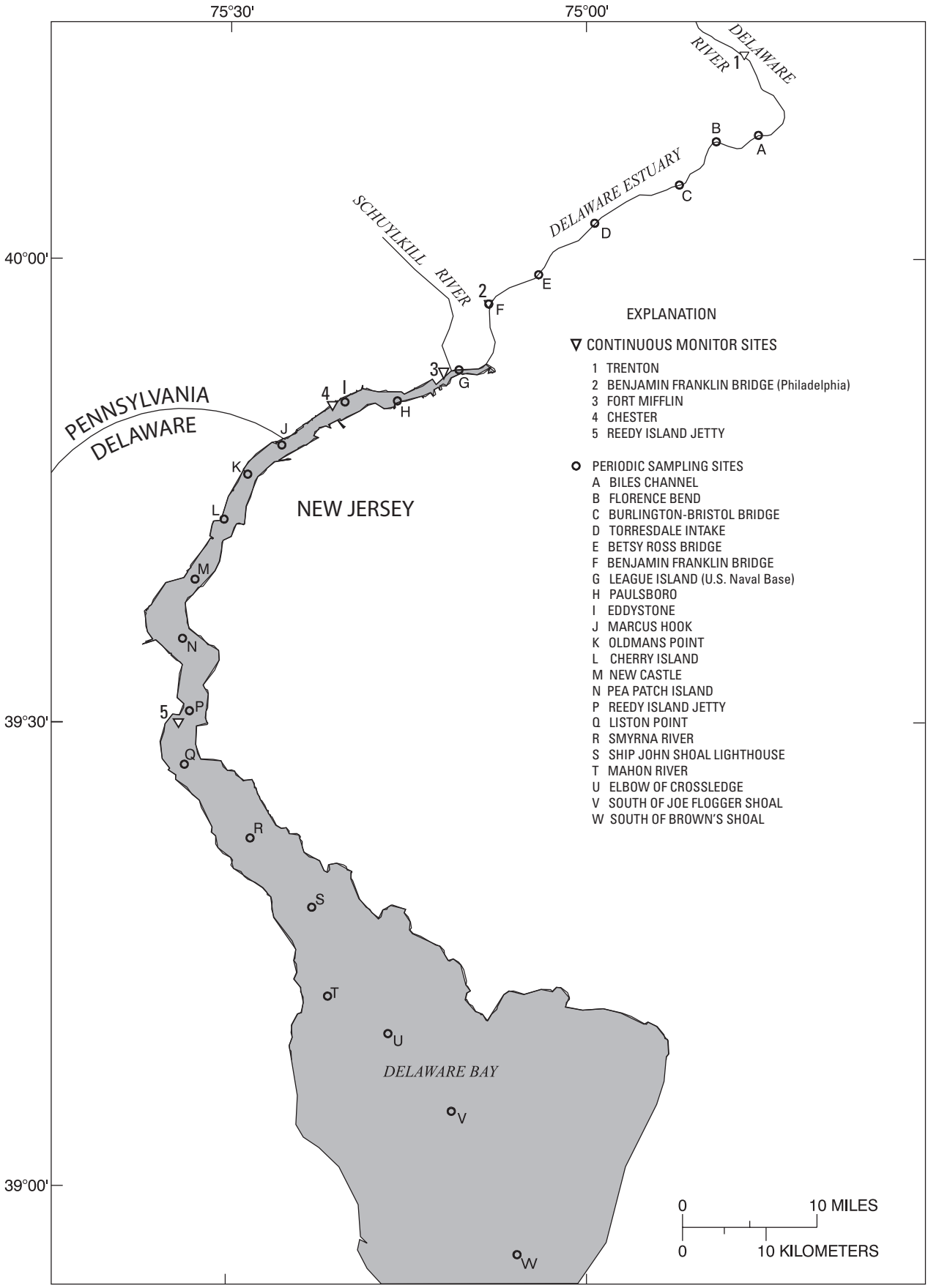


Figure 6. Location of water-quality monitoring sites on the Delaware Estuary.

certain conditions, however, high streamflows can transport large quantities of nutrients to the estuary, which may result in excessive levels of algae.

Streamflow from the Delaware River Basin upstream of Trenton, New Jersey, 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, New Jersey, was greatest during March 2008 (41,490 ft^3/s) and lowest during August 2008 (4,281 ft^3/s; table 16[2]). Monthly mean streamflows were less than long-term mean monthly flows in all months from April to November 2008. The greatest percentage of flow deficiency was in June 2008, when monthly mean streamflow was 62 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 2007. The highest daily mean streamflow during the report year was 100,000 ft^3/s on March 10, 2008. The lowest daily mean streamflow was 3,030 ft^3/s on September 22, 2008.

Water Temperature

Water temperature has an important influence on water quality, as it affects 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 substantial effects.

Water temperature data for the monitor site at the Benjamin Franklin Bridge, Philadelphia, Pennsylvania were collected continuously from April to November 2008. Monthly mean temperatures were greater than the long-term mean monthly temperatures in April, June, July, September, and October 2008 and were less than the long-term means in May, August, and November 2008 (fig. 7). Long-term mean water temperatures were computed using data for the period from 1964 to 2007. The maximum daily mean water temperature of 28.3˚C was recorded on July 22, 2008.

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 also increases. Specific conductance measurements are good indicators of dissolved solids content and total ion concentrations. Seawater and some manmade constituents can cause the specific conductance of estuary water to increase substantially. Dilution associated with high freshwater inflows results in decreased levels of dissolved solids and lower specific conductance, whereas low inflows 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 milligrams per liter (mg/L) is considered undesirable for domestic use, and water with concentrations exceeding 50 mg/L is unsatisfactory for chemically sensitive consumers and some industrial processes. Chloride concentrations in the estuary increase in a downstream direction, with proximity to the Atlantic Ocean.

[2]All numbered tables in the section "Quality of Water in the Delaware Estuary" are grouped at the end of this section, beginning on page 68.

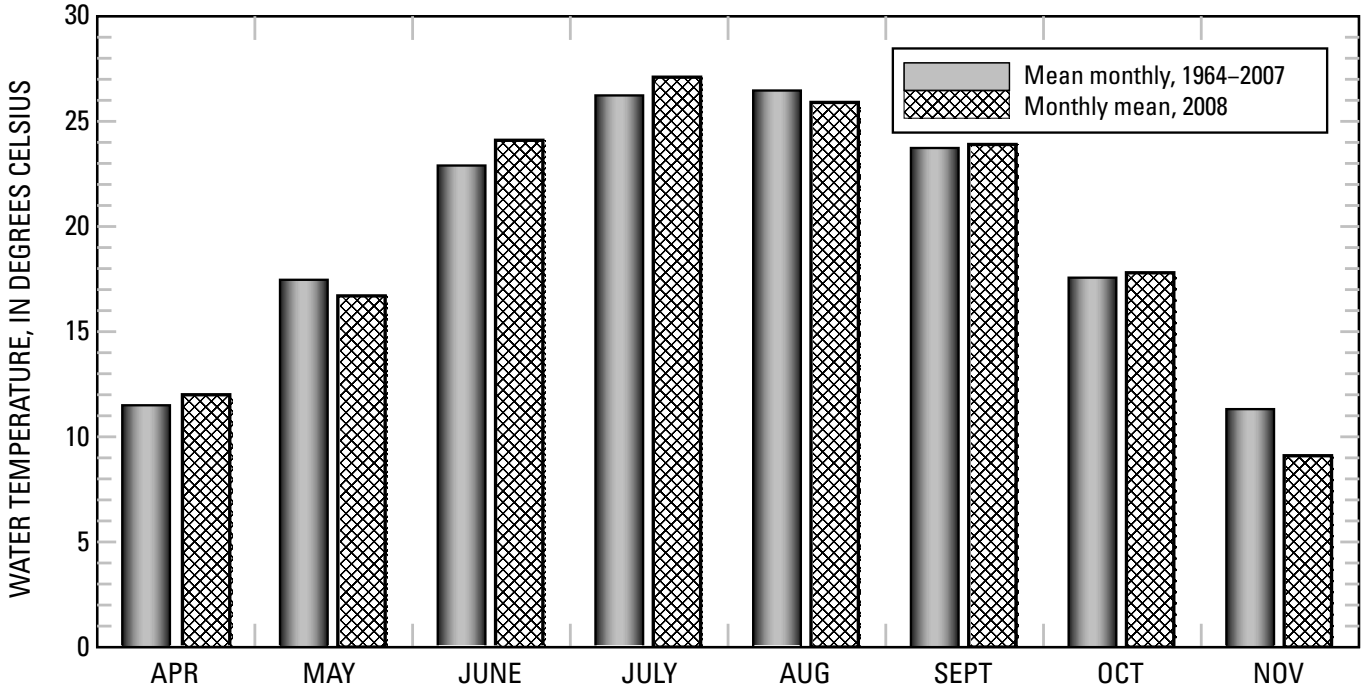


Figure 7. Water temperature in the Delaware Estuary at Benjamin Franklin Bridge at Philadelphia, Pennsylvania, April to November.

Chloride concentration was not measured directly at the monitor sites at Fort Mifflin, Pennsylvania, and Reedy Island Jetty, Delaware. Rather, a mathematical relation between specific conductance and chloride concentration, developed on the basis of long-term field measurements of specific conductance and laboratory analyses of chloride, was used to estimate chloride concentrations from specific conductance values. Chloride concentrations estimated from the relation are presented in table 17. The specific conductance-chloride relation is less reliable when chloride concentrations are less than 30 mg/L, because other chemical substances may be present in quantities large enough to affect the relation. Thus, chloride concentrations estimated from specific conductance data are not presented when concentrations of less than 30 mg/L result from the relation. Instead, estimated values less than 30 mg/L are reported as < 30 mg/L. Chloride concentrations at Chester, Pennsylvania (table 18), were measured directly by Kimberly Clark Chester Operations and are not derived from specific conductance data.

At Fort Mifflin, specific conductance data were collected during the periods December 1–18, 2007, and August 28–November 17, 2008. Because of this short and discontinuous record, chloride concentrations were not computed for this monitor site.

At Reedy Island Jetty, the greatest daily maximum chloride concentration was 9,300 mg/L on October 23, 2008 (table 17). Daily maximum chloride concentrations during the report year exceeded 1,000 mg/L on nearly 89 percent of the days. The lowest daily minimum chloride concentration was <30 mg/L on many days in February and March 2008. Daily minimum chloride concentrations exceeded 1,000 mg/L on nearly 60 percent of the days. From December to May, daily maximum chloride concentrations at Reedy Island Jetty ranged from <30 to 5,700 mg/L. From June to November, daily maximum chloride concentrations ranged from 2,800 to 9,300 mg/L.

At Chester, the greatest daily maximum chloride concentration was 650 mg/L on October 20, 2008 (table 18). During the report year, daily maximum concentrations exceeded 50 mg/L on 67 percent of the days. The lowest daily minimum chloride concentration was 23 mg/L on March 14–15, 2008. Daily minimum concentrations exceeded 50 mg/L on 45 percent of the days. Chloride concentrations were persistently high from June 27 to November 8, 2008, when daily minimum concentrations exceeded 50 mg/L on all days.

Dissolved Oxygen

Dissolved oxygen in water is necessary for the respiratory processes of aquatic organisms and for 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, Pennsylvania, and Delaware River at Chester, Pennsylvania, have nearly continuous records and are in the reach of the estuary most affected by effluent discharges. For these stations, the mean and minimum daily mean dissolved-oxygen concentrations for the 3-month period of July to September during each of the 1965–2008 report years are shown in figure 8. Although concentrations have increased considerably over this 44-year period, mean concentrations can vary substantially from year to year.

Concentrations of dissolved oxygen in the Delaware Estuary generally are greatest near Trenton and decrease in a downstream direction. In an area just downstream of the Benjamin Franklin Bridge, concentrations commonly reach minimum levels. During the report year, daily mean concentrations of dissolved oxygen at the Benjamin Franklin Bridge monitor site were lowest in mid-July, and the lowest recorded daily mean concentration was 3.6 mg/L on July 19 and 22, 2008 (table 19). Daily mean concentrations of dissolved oxygen were consistently 6.0 mg/L or greater on all days from April 1 to June 14; and October 19 to November 30, 2008. At Chester, daily mean dissolved-oxygen concentrations were lowest in late July and the lowest recorded daily mean concentration was 4.2 mg/L on July 30–31, 2008 (table 20).

Histograms of hourly dissolved-oxygen concentrations at the Benjamin Franklin Bridge and Chester monitor sites during the critical summer period from July to September 2008 are presented in figure 9. Hourly concentrations at the Benjamin Franklin Bridge were 4 mg/L or less in about 21 percent of this period. At Chester, hourly dissolved-oxygen concentrations were 4 mg/L or less during less than 1 percent of the 2008 critical summer period. Dissolved-oxygen concentrations less than 4 mg/L can have adverse, and potentially lethal, effects on fish and other aquatic organisms.

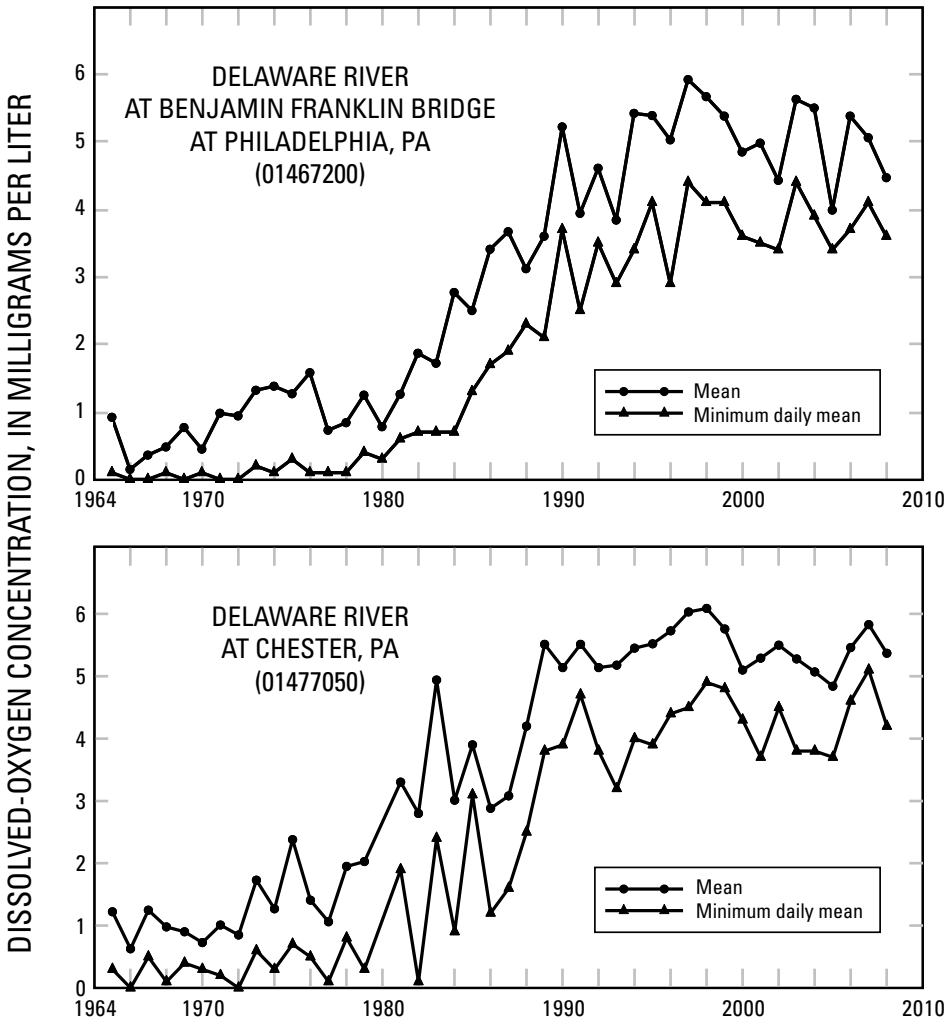


Figure 8. Mean and minimum daily mean dissolved-oxygen concentrations from July to September at two monitor sites on the Delaware Estuary, 1965–2008.

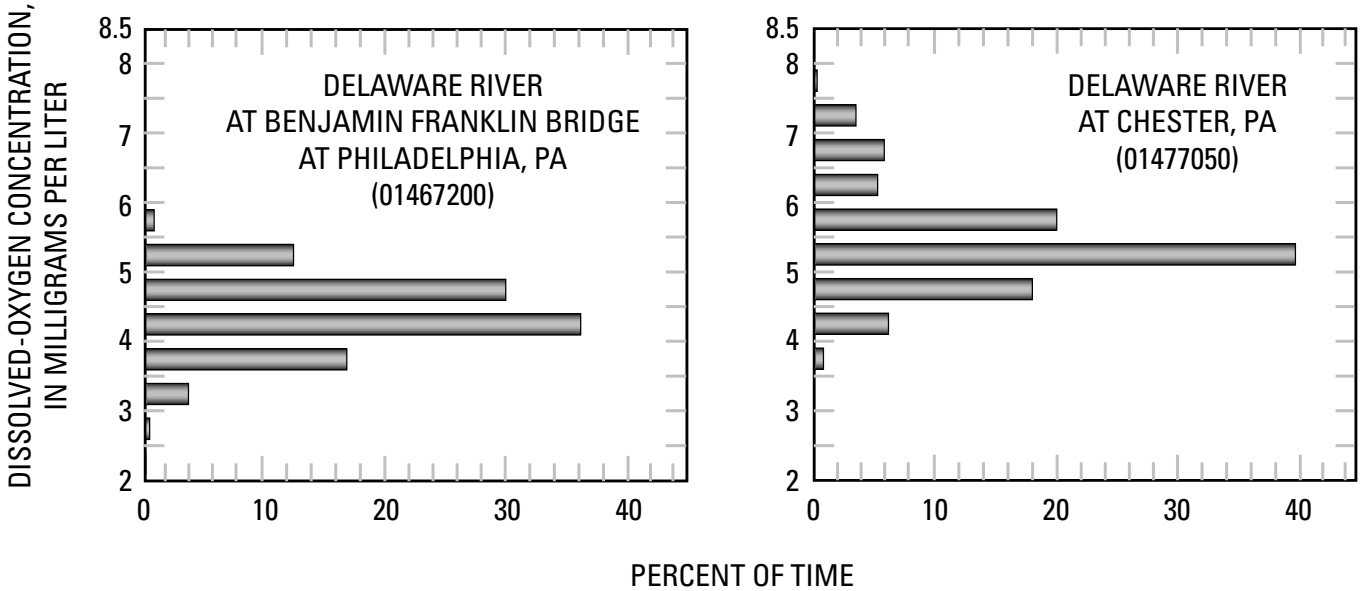


Figure 9. Distribution of hourly dissolved-oxygen concentrations at two monitor sites on the Delaware Estuary, July to September 2008.

Hydrogen-Ion Activity (pH)

The pH of a solution is a measure of the effective concentration (activity) of dissolved hydrogen ions. Solutions having pH less than 7 are characterized as acidic, whereas solutions with 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, including effluent 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 seasonally at the Benjamin Franklin Bridge and Chester monitor sites, and continuously at the Reedy Island Jetty site. During these periods, the ranges of daily median pH measured at these stations are as follows: Benjamin Franklin Bridge, 7.0 to 7.6; Chester, 7.1 to 7.6; and Reedy Island Jetty, 7.1 to 7.9. Generally, the pH of water in the Delaware Estuary is lowest near Trenton, New Jersey, and increases (that is, water becomes more alkaline) in a downstream direction. The pH of water in the Delaware Estuary between the Benjamin Franklin Bridge and Reedy Island Jetty is not a limiting factor for aquatic health or other beneficial uses of the water.

Table 16. Daily mean discharge, Delaware River at Trenton, New Jersey (station number 01463500), for report year ending November 30, 2008. (U.S. Geological Survey published record)

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

DAY	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	18,300	28,100	12,800	19,100	18,900	12,000	7,170	4,120	5,830	3,550	7,330	15,700
2	16,000	26,300	21,300	17,800	23,600	10,700	6,730	4,000	5,250	3,530	6,660	13,200
3	15,100	23,600	18,500	16,300	27,800	9,670	6,290	4,360	5,570	3,220	6,010	12,100
4	15,200	19,900	16,800	16,300	27,600	9,480	7,250	4,350	5,360	3,130	5,430	11,800
5	15,400	17,800	15,700	41,200	27,100	9,720	8,720	4,410	4,690	3,090	5,000	12,100
6	14,100	17,200	16,300	93,200	30,500	10,000	7,630	4,310	4,590	3,610	4,720	11,400
7	12,700	17,400	25,100	81,000	28,700	9,890	6,990	4,360	4,810	6,620	4,380	11,200
8	11,500	17,700	48,600	73,800	25,800	9,250	6,530	4,450	4,710	5,540	4,260	10,500
9	10,600	20,300	37,800	93,200	23,600	9,470	5,850	3,910	4,610	4,400	4,080	9,990
10	11,400	25,200	30,900	100,000	21,500	11,900	5,370	3,980	4,370	4,550	3,850	8,980
11	11,800	31,600	26,600	72,800	19,700	12,100	6,080	3,810	4,350	5,330	3,820	8,330
12	12,000	30,700	21,700	55,700	19,600	11,200	6,870	3,680	4,320	5,160	3,810	7,880
13	12,700	35,200	36,400	45,300	19,200	10,800	6,050	3,510	4,560	5,290	4,510	7,470
14	18,000	28,800	58,700	37,400	17,900	9,400	5,780	3,780	4,900	5,120	4,490	7,470
15	17,600	25,100	50,300	32,800	16,700	8,490	5,820	4,390	4,940	4,600	3,970	8,530
16	17,100	22,300	39,500	32,500	16,400	8,770	5,660	4,790	4,730	4,040	3,770	12,700
17	16,200	19,900	32,400	31,700	15,000	12,300	5,190	5,340	4,650	3,600	3,610	12,200
18	13,900	19,500	35,500	29,100	14,000	14,000	5,450	4,820	4,690	3,600	3,600	12,600
19	13,400	18,800	55,000	27,500	13,000	15,200	5,590	4,300	4,340	3,410	3,430	12,300
20	12,700	17,100	56,000	38,900	11,400	13,500	5,470	3,860	3,810	3,160	3,390	11,000
21	13,000	15,300	44,500	55,200	9,960	14,800	5,400	4,480	3,680	3,060	3,480	9,950
22	13,200	13,500	36,900	48,000	9,220	13,300	5,250	4,060	3,590	3,030	3,410	9,270
23	13,300	12,900	32,300	38,000	8,920	12,000	5,170	4,020	3,600	3,040	3,430	8,620
24	28,800	13,200	27,100	32,100	8,750	10,900	4,970	6,160	3,460	3,250	3,440	7,470
25	41,700	12,600	24,700	27,900	8,980	10,000	5,280	18,300	3,380	3,220	3,520	7,530
26	33,500	11,800	22,700	24,400	8,990	8,600	5,050	20,800	3,400	3,400	6,190	9,090
27	30,100	11,500	26,800	22,200	8,540	7,800	4,980	14,200	3,340	4,090	12,800	9,490
28	27,000	11,100	25,200	20,800	8,270	7,600	4,690	10,500	3,270	5,050	20,500	9,370
29	27,600	10,700	21,500	20,400	12,200	7,720	4,470	8,580	3,230	11,700	28,100	8,130
30	27,400	10,800		22,000	13,300	7,160	4,310	8,610	3,340	9,060	25,400	7,930
31	30,600	11,000		19,600		6,730		7,230	3,330		19,200	
Total	571,900	596,900	917,600	1,286,200	515,130	324,450	176,060	191,470	132,700	133,450	219,590	304,300
Mean	18,448	19,255	31,641	41,490	17,171	10,466	5,869	6,176	4,281	4,448	7,084	10,143

Year total 5,369,750 (ft^3/s)-d

Mean 14,670 ft^3/s

Table 17. Daily maximum and minimum chloride concentrations estimated from values of specific conductance, Delaware River at Reedy Island Jetty, Delaware (station number 01482800), for report year ending November 30, 2008.

[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		JUNE		JULY		AUG		SEPT		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	2,700	950	1,300	220	4,700	1,400	2,500	500	1,800	330	3,500	870	3,900	1,100	5,800	2,400	5,500	2,100	6,900	4,300	7,400	4,700	6,400	3,200
2	4,100	870	1,200	310	3,900	960	2,300	420	1,300	93	3,500	1,100	3,900	1,200	5,800	2,500	5,600	2,200	7,000	4,300	6,700	4,500	7,400	3,200
3	4,100	1,000	3,600	240	2,800	740	2,700	820	1,900	180	4,500	1,200	3,900	1,200	5,800	2,700	5,300	2,200	7,600	4,500	6,900	4,400	7,000	3,200
4	2,500	680	4,400	1,400	3,400	790	3,500	930	1,400	240	4,500	1,300	4,200	1,300	5,600	2,500	5,000	2,300	7,400	4,600	6,700	4,300	6,900	3,200
5	4,500	800	4,000	1,000	3,900	770	3,200	730	1,000	220	3,800	1,200	3,500	1,100	5,600	2,600	5,200	2,300	7,200	4,800	6,600	4,100	7,700	3,100
6	4,800	1,300	4,200	1,100	3,700	920	1,900	220	1,300	270	3,800	1,300	3,400	1,100	5,600	2,700	5,600	2,500	7,500	4,800	7,200	4,100	9,100	4,200
7	5,200	1,400	4,600	1,000	2,700	840	700	81	1,600	320	3,700	1,300	3,200	1,000	5,500	2,700	6,100	2,600	6,500	3,900	7,500	4,500	8,900	4,600
8	5,000	1,500	4,100	1,200	3,200	680	350	52	1,600	330	3,900	1,300	2,800	990	4,800	2,700	5,800	2,800	6,400	3,800	7,500	4,300	8,400	4,800
9	5,100	1,400	3,300	1,000	2,000	520	100	<30	1,300	260	3,200	1,200	3,000	1,000	4,700	2,500	6,700	2,900	6,200	3,600	7,500	4,600	8,300	4,700
10	5,300	1,600	3,200	900	1,400	520	<30	<30	970	240	3,600	1,200	3,000	1,000	5,200	2,300	7,000	3,000	6,700	3,500	7,900	4,100	---	---
11	5,500	1,700	3,200	750	680	200	<30	<30	710	200	3,500	1,300	3,200	1,000	5,700	2,500	7,000	3,100	6,900	3,700	7,700	4,300	---	---
12	4,500	1,600	2,500	670	1,000	190	<30	<30	730	210	4,700	1,800	3,700	1,000	5,900	2,400	7,600	3,200	6,900	3,900	7,800	4,600	---	---
13	5,300	1,500	2,500	580	2,200	230	<30	<30	670	180	5,000	1,600	3,600	1,300	5,800	2,700	7,900	3,200	6,900	3,500	7,800	4,700	---	---
14	5,100	1,600	2,700	550	770	110	<30	<30	1,100	180	4,600	1,800	3,800	1,200	5,500	2,300	7,900	3,600	6,700	3,500	7,900	5,000	---	---
15	4,800	1,600	1,600	420	1,300	39	<30	<30	1,600	170	4,300	1,600	4,400	1,200	6,000	2,200	7,600	3,600	6,600	3,600	7,700	4,900	---	---
16	5,700	1,900	1,900	330	930	47	250	<30	2,100	220	3,600	1,700	4,400	1,400	6,000	2,400	7,600	3,800	6,300	3,600	7,900	5,000	---	---
17	3,000	990	2,900	340	1,700	54	660	<30	1,800	320	4,300	1,500	4,300	1,400	6,500	2,600	7,300	3,900	6,600	3,600	7,700	5,000	---	---
18	3,000	940	3,200	540	1,400	62	1,400	<30	2,400	360	4,300	1,400	4,800	1,600	6,200	2,700	7,200	3,900	6,600	3,800	8,100	5,200	---	---
19	4,200	930	2,700	480	680	45	1,500	54	2,700	450	4,000	1,300	5,400	1,900	6,500	2,700	6,900	3,300	7,100	4,100	8,800	5,600	---	---
20	4,300	1,100	2,200	390	100	35	1,000	42	2,300	510	3,600	1,200	5,800	1,600	6,300	2,600	6,700	3,500	6,600	4,000	9,000	5,800	---	---
21	4,800	1,100	2,800	340	48	31	270	<30	1,800	530	3,700	1,100	5,400	1,700	5,900	2,400	6,300	3,500	6,900	3,800	8,000	6,000	6,600	3,200
22	5,200	1,300	3,200	380	45	30	33	<30	1,700	460	3,600	900	5,500	2,000	5,600	2,700	7,000	4,000	7,300	4,000	8,200	5,300	6,700	3,200
23	5,200	1,600	2,700	400	76	<30	<30	<30	1,700	510	3,100	840	5,000	2,000	5,700	2,800	7,200	4,100	7,700	4,500	9,300	5,800	6,500	3,100
24	3,800	1,200	2,600	440	35	<30	<30	<30	1,900	510	3,700	810	4,800	1,900	4,800	2,700	7,200	4,100	7,900	4,700	8,500	6,000	6,900	3,200
25	2,300	750	2,800	470	56	<30	<30	<30	1,900	530	4,100	830	4,700	1,900	5,500	2,300	7,000	3,700	8,400	4,900	8,600	6,000	6,300	3,400
26	2,400	680	2,800	520	330	<30	220	<30	2,300	600	4,000	1,200	4,900	2,000	5,400	2,300	7,500	3,700	8,100	5,200	8,100	5,900	6,400	3,200
27	3,200	580	3,000	670	350	<30	<30	<30	3,000	890	3,200	890	5,200	2,200	4,800	1,900	7,400	3,900	8,100	5,000	8,100	5,600	7,000	3,100
28	1,900	470	3,800	800	910	<30	430	<30	3,000	1,100	3,900	880	5,500	2,300	5,200	1,800	7,300	4,300	7,700	5,000	7,500	4,800	6,600	3,000
29	2,200	450	3,900	1,000	1,900	33	870	<30	2,500	870	4,100	1,400	5,700	2,400	5,000	1,800	7,300	4,400	7,200	4,800	6,000	4,000	6,500	2,900
30	1,100	340	3,700	770			1,400	53	3,300	900	3,900	1,200	5,800	2,400	5,500	1,900	7,300	4,200	7,300	4,700	6,900	3,300	6,400	3,200
31	1,800	260	3,400	690			1,800	290			3,700	1,200			5,500	1,900	6,900	4,200			7,200	3,200		
Mean	4,000	1,100	3,000	640	1,600	n.d.	n.d.	n.d.	1,800	410	3,900	1,200	4,400	1,500	5,600	2,400	6,800	3,400	7,100	4,200	7,700	4,800	7,200	3,500
Max	5,700	1,900	4,600	1,400	4,700	1,400	3,500	930	3,300	1,100	5,000	1,800	5,800	2,400	6,500	2,800	7,900	4,400	8,400	5,200	9,300	6,000	9,100	4,800
Min	1,100	260	1,200	220	35	<30	<30	<30	670	93	3,100	810	2,800	990	4,700	1,800	5,000	2,100	6,200	3,500	6,000	3,200	6,300	2,900

Table 18. Daily maximum and minimum chloride concentrations, Delaware River at Chester, Pennsylvania (station number 01477050), for report year ending November 30, 2008.
(Record furnished by Kimberly Clark Chester Operations)

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

DAY	DEC		JAN		FEB		MAR		APR		MAY		JUNE		JULY		AUG		SEPT		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	49	42	46	39	44	38	130	50	46	27	46	33	46	39	84	63	70	61	252	234	184	156	295	74
2	49	36	39	33	75	44	142	46	46	33	39	33	46	39	84	67	70	61	272	170	170	109	93	65
3	49	31	39	33	59	51	46	41	142	33	39	33	88	39	78	54	78	70	524	170	184	110	89	65
4	36	36	39	39	44	31	118	46	33	27	39	33	46	36	61	54	78	70	608	272	184	119	63	56
5	36	31	39	33	51	31	130	46	33	27	46	39	63	49	61	51	70	54	564	184	234	216	63	56
6	36	31	97	33	44	31	54	46	33	27	46	39	56	46	70	54	88	70	487	170	234	143	63	56
7	42	36	39	33	150	31	46	39	39	33	39	33	56	48	78	54	88	70	272	184	184	156	63	56
8	49	36	182	33	44	44	46	33	39	33	39	33	56	56	88	70	107	78	252	184	170	131	71	56
9	56	42	46	33	44	38	39	33	46	33	39	33	56	56	88	70	88	78	234	200	143	119	71	49
10	42	36	39	33	44	38	46	39	46	33	39	39	56	49	78	61	100	88	184	131	170	131	63	42
11	166	49	39	39	44	38	54	33	37	33	39	33	56	49	88	61	118	61	234	143	156	131	184	42
12	63	56	39	33	44	38	118	33	37	33	46	33	56	49	97	78	78	61	234	131	131	119	63	49
13	49	44	39	33	84	59	118	27	33	33	46	33	56	49	88	78	88	78	184	156	234	184	56	49
14	51	38	38	28	84	51	27	23	33	33	46	39	56	49	88	70	70	61	216	119	200	156	63	49
15	51	44	193	38	59	51	27	23	39	33	54	39	56	49	78	70	88	70	216	120	234	170	143	42
16	51	44	44	38	51	51	27	27	33	27	46	46	56	49	78	61	88	70	200	143	272	184	49	49
17	59	44	190	38	51	51	37	33	33	27	46	39	56	49	97	78	88	70	216	141	216	184	66	49
18	164	51	44	31	51	51	33	27	33	27	46	39	56	56	88	78	88	78	234	156	564	234	65	49
19	51	38	190	38	59	51	33	27	46	27	88	46	56	56	88	78	154	78	252	131	564	421	162	53
20	51	51	38	31	51	49	33	27	39	33	46	46	56	49	88	78	154	80	391	143	650	215	65	57
21	59	51	38	38	44	38	47	39	37	33	46	46	56	49	118	88	142	118	364	170	605	525	65	49
22	51	51	38	38	51	44	70	37	33	33	46	46	56	49	118	97	213	118	292	216	525	424	49	42
23	51	51	44	38	51	41	70	33	33	33	54	46	56	49	130	80	192	142	286	216	456	395	49	49
24	51	51	41	38	138	51	46	33	33	33	56	39	89	56	100	88	230	154	281	234	395	342	57	49
25	59	51	44	38	144	51	33	27	39	27	46	39	56	49	88	78	213	142	268	227	563	342	166	49
26	51	51	114	30	51	51	33	27	---	---	46	39	56	49	88	78	200	143	487	216	605	295	57	49
27	51	44	138	31	59	44	33	27	---	---	46	39	63	52	88	78	234	109	364	234	456	318	57	49
28	59	44	44	38	51	44	118	33	---	---	54	39	63	56	88	70	143	119	315	230	318	152	65	57
29	46	38	46	38	54	42	138	27	---	---	54	46	80	56	118	70	216	143	315	230	215	114	65	57
30	46	46	44	38			39	27	33	33	46	46	80	63	88	61	216	184	242	156	139	93	65	49
31	54	39	44	44			33	27			46	39			97	61	234	200			114	74		
Mean	57	43	68	35	63	44	63	33	41	31	47	39	60	50	89	70	132	96	308	180	306	209	85	52
Max	166	56	193	44	150	59	142	50	142	33	88	46	89	63	130	97	234	200	608	272	650	525	295	74
Min	36	31	38	28	44	31	27	23	33	27	39	33	46	36	61	51	70	54	184	119	114	74	49	42

Table 19. Daily mean dissolved oxygen concentration, Delaware River at Benjamin Franklin Bridge at Philadelphia, Pennsylvania (station number 01467200), April 1 to November 30, 2008.
(U.S. Geological Survey published record)

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

DAY	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	11.9	7.7	7.2	4.2	4.5	4.7	5.4	9.3
2	12.0	7.5	7.1	4.3	4.6	4.6	5.4	9.2
3	11.9	7.4	7.4	4.6	4.4	4.5	5.7	9.2
4	11.8	7.3	6.9	4.8	4.7	4.5	6.0	9.2
5	11.6	7.2	6.6	4.4	4.8	4.6	6.0	9.5
6	11.6	7.1	7.0	4.2	4.7	4.5	5.9	9.5
7	11.5	7.2	7.4	3.9	4.7	4.5	5.9	9.6
8	11.4	7.2	7.5	3.7	4.8	4.3	5.9	9.5
9	11.4	7.1	7.8	3.8	4.8	---	6.0	9.6
10	11.3	6.8	7.9	3.8	4.6	4.2	6.1	9.6
11	11.2	6.9	7.7	4.0	4.4	4.2	6.0	9.7
12	11.1	7.4	7.4	4.1	4.2	4.3	6.0	9.5
13	11.0	7.2	6.9	4.5	4.3	4.1	5.9	9.5
14	10.7	7.3	6.3	4.3	4.3	4.0	5.9	9.1
15	10.4	7.3	5.5	4.2	4.4	4.2	5.8	9.0
16	10.2	7.1	5.1	4.3	4.3	4.3	5.7	8.8
17	10.0	7.0	4.7	3.9	4.4	4.4	5.8	9.0
18	9.9	7.0	4.2	3.7	4.5	4.4	5.9	9.0
19	10.0	7.1	4.1	3.6	4.5	4.6	6.1	9.0
20	10.0	7.3	4.0	3.8	4.7	4.8	6.0	9.2
21	10.1	7.0	3.9	3.7	4.7	4.8	6.1	9.3
22	9.9	7.1	3.8	3.6	4.8	4.8	6.6	9.6
23	9.7	7.2	3.7	---	5.0	4.8	6.9	9.7
24	9.5	7.3	3.7	---	4.9	5.0	6.9	9.8
25	9.4	7.6	3.8	---	4.7	5.3	7.1	9.9
26	9.1	7.7	4.0	4.1	4.8	5.5	6.9	10.0
27	8.8	7.5	3.8	4.2	4.9	5.5	6.9	10.2
28	8.5	7.4	3.9	4.1	4.9	5.5	7.3	10.4
29	8.0	7.4	4.1	4.1	4.7	5.3	8.2	10.6
30	7.7	7.5	4.2	4.2	4.6	5.4	8.9	10.7
31		7.3		4.3	4.6		9.1	
Mean	10.4	7.3	5.6	4.1	4.6	4.7	6.4	9.5
Max	12.0	7.7	7.9	4.8	5.0	5.5	9.1	10.7
Min	7.7	6.8	3.7	3.6	4.2	4.0	5.4	8.8

Table 20. Daily mean dissolved oxygen concentration, Delaware River at Chester, Pennsylvania (station number 01477050), April 1 to November 30, 2008.
(U.S. Geological Survey published record)

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

DAY	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
1	10.6	8.0	8.9	5.0	4.5	5.3	6.2	8.4
2	10.6	8.2	9.2	5.1	4.7	5.4	6.2	8.4
3	10.5	8.1	9.4	5.5	4.7	5.5	6.5	8.5
4	10.3	8.1	8.7	5.5	5.0	5.4	6.6	8.4
5	10.3	8.1	8.1	5.2	5.2	5.4	6.5	8.4
6	10.3	7.8	7.9	5.1	5.2	5.5	6.5	8.6
7	10.3	7.8	7.8	5.0	5.3	5.3	6.7	8.6
8	10.3	7.6	7.8	5.1	5.3	5.0	6.8	8.4
9	10.2	7.3	7.6	5.4	5.4	5.0	7.0	8.2
10	10.0	7.0	7.4	5.5	5.5	5.0	6.8	8.4
11	10.0	6.9	6.9	5.5	5.6	5.2	6.7	8.6
12	9.9	7.8	6.4	5.5	5.5	5.2	6.6	8.5
13	9.9	7.8	5.9	5.7	5.4	5.1	6.5	8.4
14	10.0	7.3	5.5	5.7	5.3	4.9	6.5	8.3
15	10.0	7.0	5.1	5.5	5.2	5.2	6.4	8.2
16	10.0	6.8	4.9	5.4	5.0	5.2	6.4	8.4
17	9.9	6.7	5.1	5.2	5.2	5.3	6.5	8.7
18	9.7	6.7	5.2	5.1	5.4	5.3	6.8	8.7
19	9.6	6.7	5.0	5.2	5.4	5.7	7.2	8.8
20	9.3	6.6	4.8	5.2	5.5	6.0	7.4	8.8
21	9.2	6.6	4.7	5.3	5.5	5.9	7.5	8.8
22	9.1	6.6	4.7	5.2	5.4	5.9	7.8	9.0
23	8.8	6.7	4.7	5.2	5.4	6.2	8.1	9.2
24	8.6	6.8	4.7	5.1	5.4	6.4	8.3	9.3
25	8.4	7.0	4.8	4.8	5.3	6.8	8.3	9.5
26	---	7.4	4.7	4.6	5.4	7.1	8.3	9.7
27	---	7.5	4.6	4.6	5.5	7.1	8.2	9.7
28	---	7.9	4.6	4.5	5.7	6.9	8.1	9.7
29	---	8.4	4.8	4.3	5.7	6.5	8.4	9.6
30	---	8.8	4.9	4.2	5.4	6.3	8.5	9.6
31		8.9		4.2	5.3		8.4	
Mean	9.8	7.4	6.2	5.1	5.3	5.7	7.2	8.8
Max	10.6	8.9	9.4	5.7	5.7	7.1	8.5	9.7
Min	8.4	6.6	4.6	4.2	4.5	4.9	6.2	8.2

Appendix A

AGREEMENT

Temporary Increase in Controlled Releases from New York City Reservoirs

The Parties to the U.S. Supreme Court Decree of 1954 agreed via telephone on February 15, 2008, to a request by the New York City Department of Environmental Protection for a temporary increase in the controlled releases from Pepacton, Cannonsville, and Neversink Reservoirs. The purpose of the increased releases was to facilitate the discharge of excess water from these reservoirs while a corrective maintenance inspection of a portion of the Delaware Aqueduct is conducted. During the inspection period, releases from these reservoirs were increased approximately 20 percent above their applicable L1-a levels. The inspection process began on February 16, 2008 and was expected to be completed within 25 days thereafter.

While New Jersey agrees that the purpose of the shut down of diversions from Rondout Reservoir was to conduct a corrective maintenance inspection of the Rondout Tunnel, it views the resultant need to make larger releases from the Delaware Reservoirs as an emergency situation to lessen spill, surcharging and flood potential due to the unfortunate timing of the shut down.

State of Delaware	Date	State of Delaware	Date
State of New Jersey	Date	State of New York	Date
Commonwealth of Pennsylvania	Date	City of New York	Date

Appendix B

AGREEMENT

Temporary Wet Spring Release Schedule Adjustment for April 2008

The Decree Parties hereby agree that during the period from April 15, 2008 to April 30, 2008, whenever total combined reservoir storage in the New York City Delaware Basin reservoirs is in the L1 zone on the Combined Storage Curve, (Flexible Flow Management Program (FFMP) Figure 1), discharge mitigation releases shall be made from the Delaware Basin reservoirs in accordance with the following:

1. If storage at any individual Delaware Basin reservoir is between 97 percent and 100 percent on the Individual Storage Curve (FFMP Figure 2), then discharge mitigation releases will be made at that reservoir at the December 1 to March 31 L1-b rate (FFMP Table 3 @ 35 MGD).
2. If on June 1, 2008, the total combined storage in the New York City Delaware Basin reservoirs is less than 100 percent, and an analysis shows that drawdown began before June 1st as a result of this release schedule adjustment, then an equivalent compensating reduction to the Interim Excess Release Quantity (IERQ) shall be made as follows:
   a. If on May 1, 2008, total combined reservoir storage equals or exceeds 100 percent, then compensation shall be computed as zero.
   b. If on May 1, 2008 and on June 1, 2008, total combined reservoir storage is less than 100 percent, then compensation shall be computed as the least of:
      i. The difference between 100 percent total combined reservoir storage and actual storage on May 1, or
      ii. The difference between 100 percent total combined reservoir storage and actual storage on June 1, or
      iii. The total quantity of releases attributable solely to the temporary wet spring release schedule adjustment.
   c. If at any time subsequent to June 1, 2008 and prior to March 15, 2009, total combined reservoir storage equals or exceeds 100 percent, then the IERQ available at that time shall be increased by the quantity of compensation as determined in accordance with paragraphs a. and b., above.
3. The Decree Parties will reassess continuation of this temporary release schedule adjustment on a Principal's conference call or a meeting on or about April 21, 2008, or if storage drops below the L1 zone on the Combined Storage Curve (FFMP Figure 1), whichever is sooner.
4. This agreement takes effect on April 15, 2008 and will continue unless it is modified by unanimous agreement of the Decree Parties or terminated by any one or more of these Parties, but in any case it will be terminated automatically on April 30, 2008.

State of Delaware	Date	State of Delaware	Date
State of New Jersey	Date	State of New York	Date
Commonwealth of Pennsylvania	Date	City of New York	Date

Appendix C

AGREEMENT

Creation of an Interim Excess Release Quantity
Extraordinary Needs Bank
For An Emergency Thermal Releases Program
For Fishery Protection

Unseasonably high air temperatures in the upper Delaware River Basin in early June 2008 resulted in unusually rapid and large increases in water temperature in the Delaware River downstream of the confluence of the East and West Branches. In response to those extraordinary thermal stress conditions, on June 9, 2008, the Decree Parties agreed to provide emergency thermal releases from Cannonsville Reservoir during June 9–11, 2008. The Interim Excess Release Quantity (IERQ) provided the water required for this temporary program.

In order to respond on a timely basis to potential future extraordinary thermal stress conditions, the Decree Parties hereby authorize a temporary program of emergency releases from Cannonsville Reservoir to provide additional thermal protection downstream to just below Hancock, New York.

The Decree Parties hereby agree:

(1) For the period July 11 to September 15, 2008, an IERQ Extraordinary Needs Bank (Bank) of 1,340 cfs-days is hereby created from the 2008–2009 IERQ;

(2) The NYSDEC is authorized to make emergency thermal releases from Cannonsville Reservoir during the same period, on any day when the three-day average of daily maximum air temperatures for the Hancock vicinity, computed on the basis of the actual daily maximum air temperature for the current day and forecasts for the following two days, exceeds 90 degrees F and the three-day average of daily minimum air temperatures, computed on the basis of the actual daily minimum air temperature for the current day and forecasts for the following two day, exceeds 65 degrees F. The air temperature forecasts will be provided by the National Weather Service;

(3) The Montague flow objective shall be reduced from 1,850 cfs to 1,830 cfs during the same period; and

(4) Any water remaining in the Bank after September 15, 2008 shall be returned to the IERQ.

State of Delaware Date	State of Delaware Date
State of New Jersey Date	State of New York Date
Commonwealth of Pennsylvania Date	City of New York Date

Appendix D

Temporary Releases Program
For 2008 Rondout West Branch Tunnel Shutdown

In order to perform necessary dive work on Shaft 6, the Rondout to West Branch Tunnel (RWBT) is tentatively scheduled to be shutdown in the fall of 2008. The RWBT will be shutdown for the minimum period of time required to perform this critical work. In accordance with Section 17 of the Flexible Flow Management Program, the New York City Department of Environmental Protection is herein authorized to implement a temporary release program for the duration of this work as described below.

Shutdown releases may be made in accordance with Figures 1 and 2, based upon the combined and individual usable storage in the New York City Delaware System Reservoirs. In Figure 1, the "L1 Shutdown" curve is lower than L1 by 23.8 billion gallons which is equal to the average total RWBT diversion quantity for the estimated shutdown period. In Figure 2 "L1-a Shutdown", "L1-b Shutdown" and "L1-c Shutdown" have also been lowered a proportional amount.

Figure 1
NYC Delaware System Usable Combined Storage

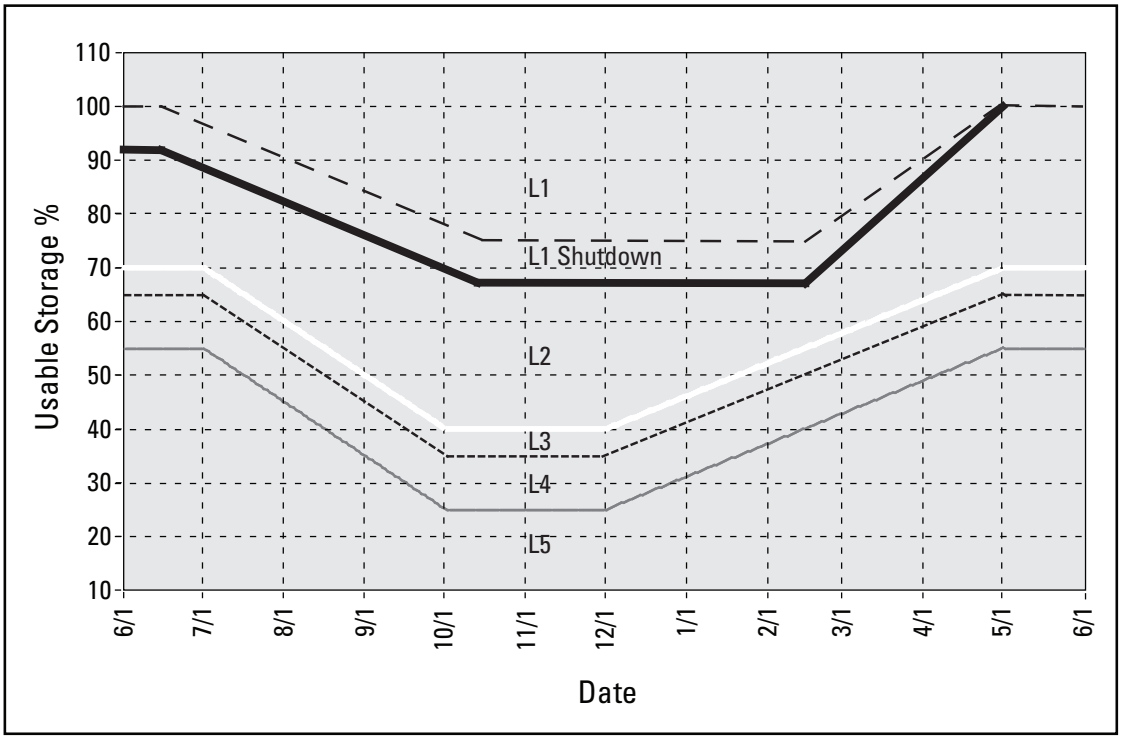
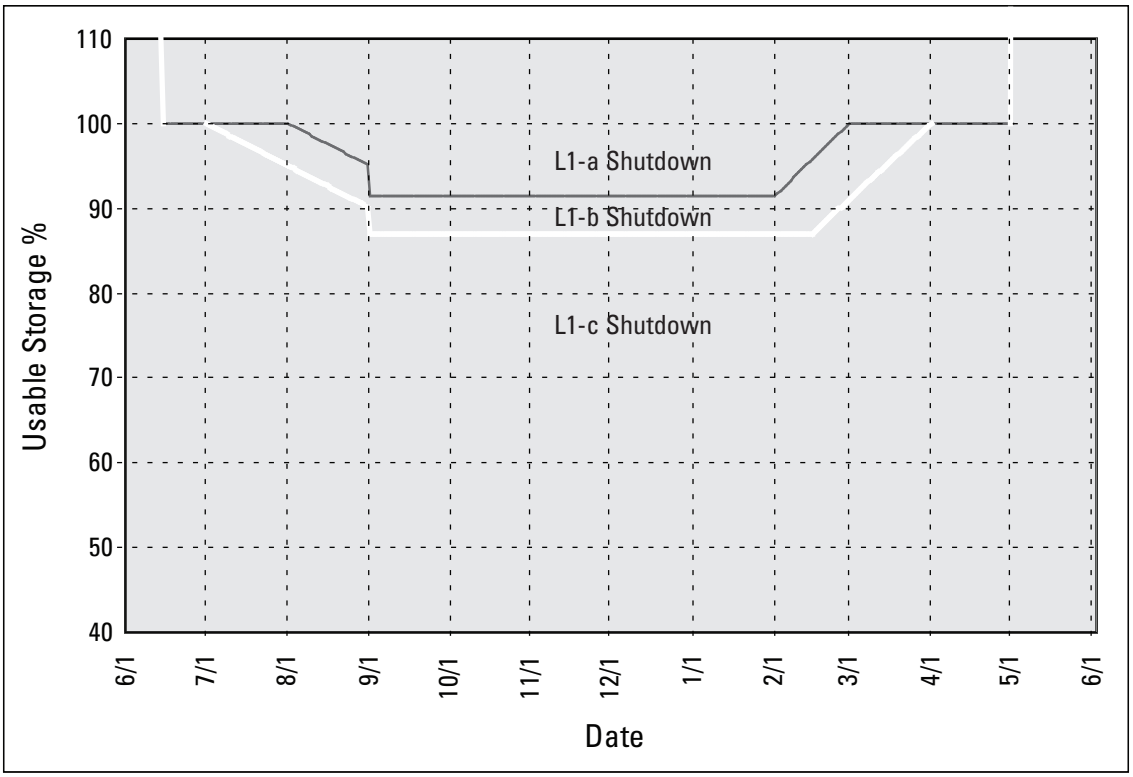


Figure 2
NYC Delaware System Usable Individual Storage



These shutdown release curves allow for greater compensating releases to be made earlier. Releases may be made as follows:

- If combined storage, in Figure 1, is in the L2 zone—releases are made according to the FFMP L2 rates
- If combined storage, in Figure 1, is in the "L1 Shutdown" zone—releases are made based on the individual "L1-a, -b or -c Shutdown" storage zones in Figure 2 according to FFMP L1-a, -b or -c rates
- If combined storage, in Figure 1, is in the L1 zone—enhanced release rates above FFMP L1, may be considered individually for each reservoir

Authorization under this temporary releases program shall become effective October 1, 2008 and shall continue until May 1, 2009 unless by unanimous agreement prior to that date the Parties approve a modification, suspension or earlier termination, as hydrologic conditions may dictate.

State of Delaware	Date	State of Delaware	Date
State of New Jersey	Date	State of New York	Date
Commonwealth of Pennsylvania	Date	City of New York	Date