USGS
science for a changing world

Report of the River Master of the Delaware River for the Period December 1, 2013–November 30, 2014

Open-File Report 2023–1084

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

Calendar for Report Year 2014

December 2013

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

January 2014

			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February 2014

						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

March 2014

						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April 2014

		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May 2014

				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June 2014

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July 2014

		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August 2014

					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September 2014

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 2014

			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November 2014

						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Report of the River Master of the Delaware River for the Period December 1, 2013–November 30, 2014

By Kendra L. Russell, William J. Andrews, Vincent J. DiFrenna, J. Michael Norris, and Robert R. Mason, Jr.

Open-File Report 2023–1084

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

U.S. Geological Survey, Reston, Virginia: 2024

Suggested citation:
Russell, K.L., Andrews, W.J., DiFrenna, V.J., Norris, J.M., and Mason, R.R., Jr., 2024, Report of the River Master of the Delaware River for the period December 1, 2013–November 30, 2014: U.S. Geological Survey Open-File Report 2023–1084, 98 p., https://doi.org/10.3133/ofr20231084.

ISSN 0196-1497 (print)
ISSN 2331-1258 (online)

ISBN 978-1-4113-4543-0

Acknowledgments

The Office of the Delaware River Master's (ODRM) daily operation records were prepared from hydrologic data collected daily. Data for these records were collected and computed by the ODRM or provided by the following agencies and utilities. Data for streamflow of the Delaware River at Montague, New Jersey, and other locations and tributaries in this report were provided by the U.S. Geological Survey (USGS); for the Pepacton, Cannonsville, and Neversink Reservoirs by the New York City Department of Environmental Protection (NYCDEP); for Lake Wallenpaupack by the PPL Corporation; and for Rio Reservoir by Eagle Creek Renewable Energy, LLC. Quantitative precipitation forecasts and some precipitation data were provided by the National Weather Service offices, the NYCDEP, and the ODRM. Marie Owens and Margaret Philips of the USGS assisted with and contributed to this report by collecting, organizing, and reviewing data.

Contents

Figures

Tables

Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
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)
billion gallons (Ggal)	3.785	cubic hectometers (hm^3)
cubic foot per second for a day ([ft^3/s]-d)	2,447	cubic meter per second for a day ([m^3/s]-d)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
	Flow rate	
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m^3/s)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as

$$°F = (1.8 \times °C) + 32.$$

Datums

Vertical coordinate information is referenced to the Bureau of Water Supply datum, which was established by the New York City Department of Environmental Protection, Bureau of Water Supply.

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

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

Supplemental Information

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25 °C).

Concentrations of chemical constituents in water are given in milligrams per liter (mg/L).

River Master Letter of Transmittal and Special Report

Office of the Delaware River Master
U.S. Geological Survey
415 National Center
Reston, VA 20192

January 3, 2024

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

The Honorable
John Carney
Governor of Delaware

The Honorable
Phil Murphy
Governor of New Jersey

The Honorable
Kathy Hochul
Governor of New York

The Honorable
Josh Shapiro
Governor of Pennsylvania

The Honorable
Eric Adams
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.

To the Chief Justice of the United States:

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 hereby transmit the 61st Annual Report of the River Master of the Delaware River for the 12-month period from December 1, 2013, to November 30, 2014. In this report, this period is referred to as the River Master "report year."

During the 2014 report year, monthly precipitation in the upper Delaware River Basin ranged from 33 percent of the long-term average in September 2014 to 137 percent of the long-term average in October 2014. Precipitation from December to May, when reservoirs typically refill, was 20.16 inches. Precipitation was below normal in January, March, April, August, September, and November, and above normal in the other 6 months.

When the report year began on December 1, 2013, combined useable storage in the New York City reservoirs in the upper Delaware River Basin was 200.133 billion gallons or 73.9 percent of combined storage capacity. The combined usable storage was 154.547 billion gallons at the end of the report year on November 30, 2014. During the report year, operations in the basin were conducted as stipulated by the Decree and the Flexible Flow Management Program (FFMP).

On January 23, 2014, the Delaware River Master Advisory Committee (Advisory Committee) met at the Delaware River Basin Commission (DRBC) offices in West Trenton, New Jersey, to discuss the status and structure of the next FFMP agreement. During the report year, the following individuals served as members of the Advisory Committee:

Decree Party affiliation	Committee member
Delaware	David Wunsch
New Jersey	Michele Siekerka
New York	Mark Klotz
New York City	Paul Rush
Pennsylvania	Kelly Heffner

During the report year, the River Master and staff participated in many 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 the DRBC's Regulated Flow Advisory Committee. In addition to management of reservoir releases and streamflow in the upper Delaware River Basin, an issue of particular interest to the River Master was the impending expiration of the current FFMP on June 1, 2014.

River Master operations were executed through the U.S. Geological Survey (USGS) Office of the Delaware River Master (ODRM) at Milford, Pennsylvania. Marie Hynes, Deputy Delaware River Master, remained in charge of the office, assisted by hydrologists Arthur Lilienthal and Gary N. Paulachok.

During the report year, the ODRM 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, the daily segregation of flow of the Delaware River at the USGS streamgage at Montague, New Jersey (USGS site number 01438500), and diversions by the State of New Jersey. The reports were distributed to members of the Advisory Committee and other parties interested in Delaware River operations. A monthly summary of hydrologic conditions was also provided to Advisory

Committee members. The weekly and monthly hydrologic reports are available through the ODRM website (https://webapps.usgs.gov/odrm/data/data.html).

This report documents Delaware River operations during the report year. During the year, New York City diverted 198.447 billion gallons from the Delaware River Basin and released 170.037 billion gallons from Pepacton, Cannonsville, and Neversink Reservoirs to the Delaware River for conservation purposes. A total of 33.159 billion gallons was spilled from the Pepacton, Cannonsville, and Neversink Reservoirs. The River Master directed releases from these reservoirs to the Delaware River that totaled 51.889 billion gallons. This report also describes water quality at various monitoring sites on the Delaware River estuary and includes basic data on the chemical properties and physical characteristics of the water and presents summary statistics.

Throughout the year, diversions to New York City's water-supply system and releases designed to maintain the flow of the Delaware River at Montague were made as directed by the ODRM. Diversions by New York City from its reservoirs in the Delaware River Basin did not exceed the limit stipulated by the Decree. Diversions by the State of New Jersey were also 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 Eagle Creek Renewable Energy, LLC, in informing the ODRM of plans for power generation and furnishing data on reservoir releases and elevations are greatly appreciated.

Sincerely yours,

/Signed/

Kendra Russell, P. E.

Delaware River Master

Abbreviations

CSO	Conditional Storage Objective
CSSO	Conditional Seasonal Storage Objective
Del.	Delaware
DRBC	Delaware River Basin Commission
FFMP	Flexible Flow Management Program
ft	foot
ft^3/s	cubic foot per second
(ft^3/s)-d	cubic foot per second for a day
IERQ	Interim Excess Release Quantity
in.	inch
Mgal	million gallons
mg/L	milligram per liter
mi	mile
mi^2	square mile
N.J.	New Jersey
N.Y.	New York
NYCDEP	New York City Department of Environmental Protection
NWIS	National Water Information System [database]
ODRM	Office of the Delaware River Master
OST	Operational Support Tool
Pa.	Pennsylvania
USGS	U.S. Geological Survey
µS/cm at 25 °C	microsiemens per centimeter at 25 degrees Celsius

Report of the River Master of the Delaware River for the Period December 1, 2013–November 30, 2014

By Kendra L. Russell, William J. Andrews, Vincent J. DiFrenna, J. Michael Norris, and Robert R. Mason, Jr.

Executive Summary

A Decree of the Supreme Court of the United States, entered June 7, 1954 (*New Jersey* v. *New York*, 347 U.S. 995), established the position of Delaware River Master within the U.S. Geological Survey. In addition, the Decree authorizes the diversion of water from the Delaware River Basin and requires compensating releases from specific 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 provide reports to the Court, not less frequently than annually. This report is the 61st annual report of the River Master of the Delaware River. The report covers the 2014 River Master report year, which is the period from December 1, 2013, to November 30, 2014.

During the report year, precipitation in the upper Delaware River Basin was 42.40 inches or 95 percent of the long-term average. On December 1, 2013, combined useable storage in New York's Pepacton, Cannonsville, and Neversink Reservoirs in the upper Delaware River Basin was 200.133 billion gallons or 73.9 percent of the combined capacity of 270.8 billion gallons. The reservoirs were at about 99.7 percent of usable capacity on May 31, 2014. Combined storage in the Pepacton, Cannonsville, and Neversink Reservoirs decreased below 80 percent of combined capacity in late August. The lowest combined storage was 151.730 billion gallons or 56 percent of combined capacity on November 24, 2014. Delaware River Master operations during the year were conducted as stipulated by the Decree and the Flexible Flow Management Program.

Diversions from the Delaware River Basin by New York City and the State of New Jersey fully complied 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 94 days during the report year. Interim Excess Release Quantity and conservation releases, designed to relieve thermal stress and protect the fishery and aquatic habitat in the tailwaters of the reservoirs, were also made during the report year.

Water quality in the Delaware River estuary between streamgages at Trenton, New Jersey, and Reedy Island Jetty, Delaware, was monitored at several locations. Data on water temperature, specific conductance, dissolved oxygen, and pH were collected continuously by electronic instruments at four locations.

Introduction

An amended Decree of the Supreme Court of the United States, entered June 7, 1954 (*New Jersey* v. *New York*, 347 U.S. 995), which superseded a 1931 Decree, authorizes the diversion of water from the Delaware River Basin and provides for releases of water from three New York City reservoirs—Pepacton, Cannonsville, and Neversink—to the upper Delaware River (https://webapps.usgs.gov/odrm/about/decree). The Decree stipulates that these diversions and releases be made under the supervision and direction of the Office of the Delaware River Master (ODRM). The Decree also stipulates that reports on Delaware River operations be made to the Court no less frequently than annually. The reports can be accessed at https://webapps.usgs.gov/odrm/publications/publications.

This report documents operations from December 1, 2013, to November 30, 2014, or the 2014 River Master report year, hereafter referred to as the "report year." This report also presents information on water quality in the Delaware River estuary during the report year.

Since 2007, the Decree Parties (Delaware, New Jersey, New York, New York City, and Pennsylvania) have unanimously approved a series of Flexible Flow Management Program (FFMP) agreements (available at https://webapps.usgs.gov/odrm/ffmp/flexible-flow-management-program) to manage the shared waters of the Delaware River Basin. On December 10, 2008, the Decree Parties signed an FFMP to guide the operations of the ODRM (Russell and others, 2019). The Agreement was in effect until May 31, 2011.

A 1-year FFMP Agreement that became effective on June 1, 2014 (appendix 1; also available at https://webapps.usgs.gov/odrm/documents/ffmp/FFMP_2014_Agreement.pdf), is an extension of the June 1, 2011, Agreement (DiFrenna and others, 2020) and incorporates the changes of the 2012 and 2013 Agreements. The June 1, 2011, Agreement changed the term Conditional Storage Objective (CSO) to Conditional Seasonal Storage Objective (CSSO).

Some hydrologic data presented in this report are streamflow and water quality records for U.S. Geological Survey (USGS) data-collection sites. The USGS collected and computed these records 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 USGS streamgages in the Delaware River Basin, are shown in figure 1.

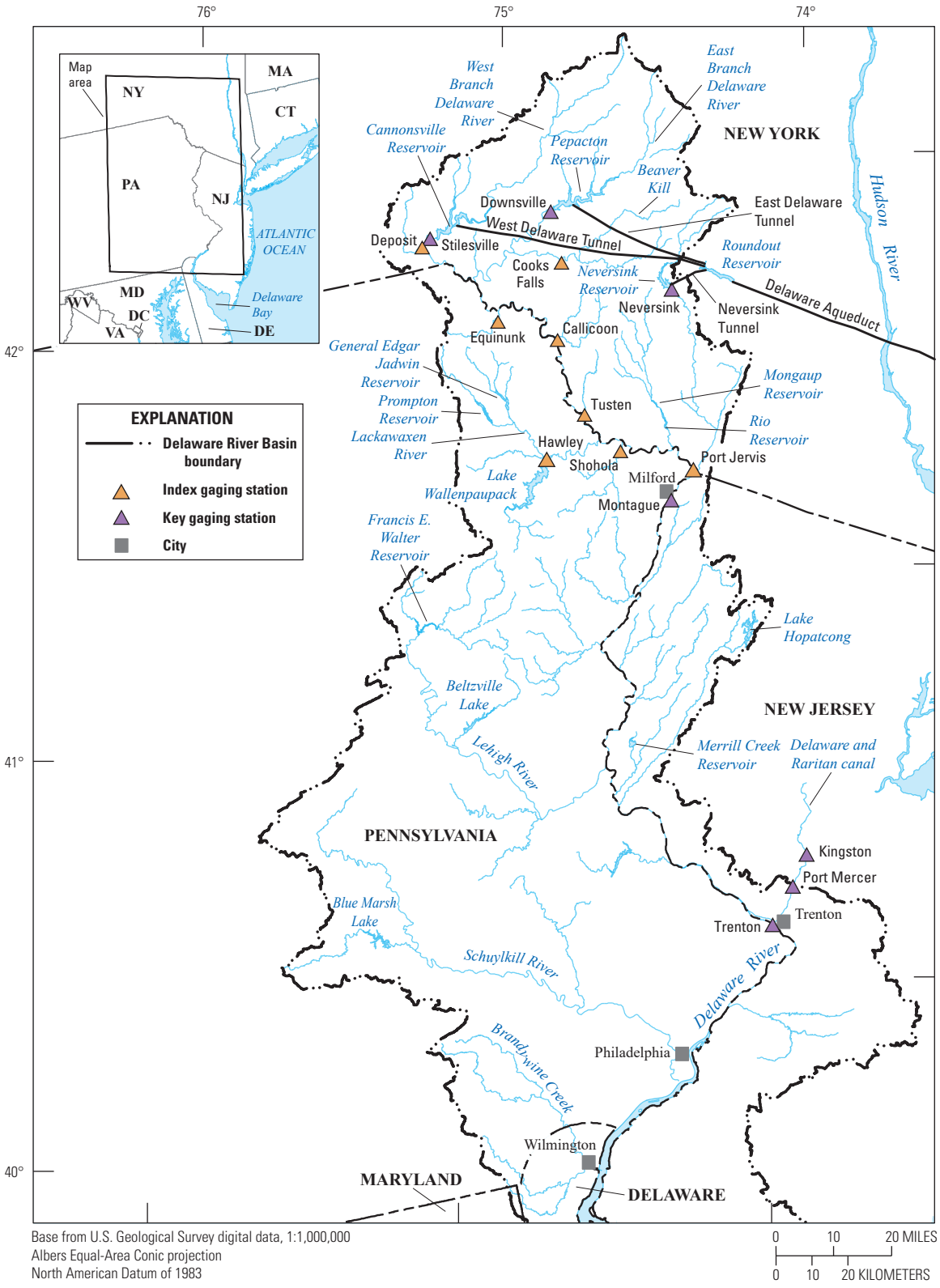


Figure 1. Map showing the Delaware River Basin upstream from Wilmington, Delaware. The Delaware River Basin boundary is shown along with key and index gaging stations; refer to the "Glossary" section for definitions.

Method to Determine Directed Releases From New York City Reservoirs

The data and computations of the streamflow components form the operational record used by the ODRM to carry out specific responsibilities related to the "Montague flow objective" (appendix 1). The operational record has two parts: (1) segregating the streamflow components of the current daily mean discharge at the USGS streamgage at Montague, New Jersey (N.J.) (USGS site number 01438500), to compute the uncontrolled runoff and (2) forecasting the uncontrolled runoff and using forecasted information from other sources to predict the flow at the Montague site with adequate advance time to direct releases. The forecasting process is used to determine whether the ODRM directs New York City reservoirs to release water to maintain the minimum Montague flow objective at the Montague site, which is defined in table 1 of appendix 1.

Segregating Streamflow Components—Delaware River at Montague, New Jersey

The segregation of streamflow at the Montague site involves determining the components of flow, including releases from New York City reservoirs, releases from Lake Wallenpaupack in Pennsylvania and Rio Reservoir in New York for generation of hydroelectric power, and uncontrolled runoff. For the segregation of components of daily mean flow at the Montague site, the following data are used:

1. controlled releases from the Pepacton, Cannonsville, and Neversink Reservoirs of New York City;
2. controlled releases from Lake Wallenpaupack on Wallenpaupack Creek to produce hydroelectric power; and
3. controlled releases from the Rio Reservoir on the Mongaup River to produce hydroelectric power.

To determine the contributions of each of these releases, the amount of time for water to travel from the release point to the Montague site is required. The various traveltimes are used to determine the appropriate time-delayed flow contributions from the above sources. The time-adjusted controlled flows of the sources are subtracted from the total streamflow measured at the Montague site to determine the uncontrolled runoff (including reservoir spills and groundwater) from the drainage area upstream from the Montague site.

Traveltimes were computed from reservoir- and powerplant-operations data and historical streamflow records. The traveltimes are generally adequate for ODRM operations. Occasionally, however, significant exceptions are observed. For example, during a large increase in a directed release from Cannonsville Reservoir, the arrival time of the water at the Montague site can be delayed as long as 1.5 days because a substantial amount of water must first fill the channel before a steady flow arrives at the Montague site. During winter, ice formation and lower streamflow gradually increase the resistance to water flow, resulting in increased traveltimes. No adjustments were made to compensate for increased traveltimes during these periods of the report year. The following list gives the average times for the effective travel of water from the various sources of controlled supply to the Montague site. These traveltimes, in hours, were used for flow routing during the 2014 report year: Pepacton Reservoir, 60; Cannonsville Reservoir, 48; Neversink Reservoir, 33; Lake Wallenpaupack, 16; and Rio Reservoir, 8.

Forecasting Streamflow—Delaware River at Montague, New Jersey

The releases from New York City's reservoirs necessary to meet the Montague flow objective were computed based on the forecasted streamflow at the Montague site, exclusive of releases from New York City's Delaware River Basin reservoirs. The flow must be forecast 3 days in advance to account for the longest traveltime needed for the flow to reach the Montague site from the Pepacton Reservoir.

The electric utilities PPL Corporation and Eagle Creek Renewable Energy, LLC, provided daily forecasts of power generation and releases to the Delaware River from Lake Wallenpaupack and Rio Reservoir, respectively, to the ODRM. Because the hydroelectric plants were used mainly for meeting rapidly varying 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, the demand for power outside the local service area can 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 the Montague site were treated as two components: (1) current runoff and (2) forecasted runoff from precipitation.

An estimate of uncontrolled runoff was computed by using a recession procedure. A recession curve of uncontrolled inputs was developed using the flow at the Montague streamgage and is used to forecast the uncontrolled portion of flow at the Montague site 3 days in advance. Forecasted runoff was determined from data provided by the National Weather Service office in Binghamton, New York (N.Y.), which provided quantitative forecasts of average precipitation and air temperatures for the 3,480-square-mile (mi^2) drainage basin upstream from Montague, N.J. During winter, runoff was estimated based on the 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 the Montague site, exclusive of releases from New York City's Delaware River Basin reservoirs, is computed as the sum of forecasted releases from hydroelectric power reservoirs, estimated uncontrolled runoff—including conservation releases from Rio Reservoir—and estimated runoff from predicted rainfall. Each of these inputs is adjusted for traveltime. If the computed total flow is less than the flow objective at the Montague site, the deficiency is made up by releases from New York City's reservoirs, as directed by the ODRM.

Based on the previous day's provisional data, a balancing adjustment is applied to the following day's release design. The balancing adjustment is computed as 10 percent of the difference between the cumulative directed release and the cumulative directed release required for exact forecasting and is limited to a maximum of 50 cubic feet per second (ft^3/s) magnitude. The balancing adjustment calls for more water to be released when previous directed releases (or a lack of releases) were insufficient to meet the Montague flow objective. The adjustment calls for less water to be released when previous directed releases were higher than required to meet the Montague flow objective.

When updated forecasts of precipitation or powerplant releases showed appreciable changes after a release was directed, the release required from New York City's reservoirs was recomputed based on the updated forecasts. Commonly, this procedure resulted in a reduced release requirement for New York City reservoirs that day. Only final values for releases from New York City reservoirs are presented in this report.

Hydrologic Conditions

Precipitation

Average precipitation in the Delaware River Basin above Montague, N.J., totaled 42.40 inches (in.) during the 2014 report year, which is 95 percent of the 73-year long-term average (table 1, in back of report). Monthly precipitation ranged from 33 percent of the long-term average in September 2014 to 143 percent of the long-term average in February 2014 (table 1). Precipitation data for the 2014 report year are computed from records for 10 geographically distributed stations operated by the National Weather Service, the New York City Department of Environmental Protection's (NYCDEP) Bureau of Water Supply, and the ODRM.

The seasonal period from December to May is typically when surface-water and groundwater reservoirs refill. During this period in 2013–2014, total precipitation was 20.16 in., which is about 98 percent of the 73-year long-term average. During the June to November period, total precipitation was 22.24 in., which is 92.6 percent of the 73-year long-term average.

Reservoir Storage

Table 2 summarizes the "point of maximum depletion" and other pertinent levels, and the contents of the Pepacton, Cannonsville, and Neversink Reservoirs. The NYCDEP provided this data.

Daily storage in the Pepacton, Cannonsville, and Neversink Reservoirs above the point of maximum depletion, or minimum full-operating level, is given in tables 3, 4, and 5 (all in back of report), respectively, and combined storage during the report year is shown in figure 2. Data for these records were provided daily by the NYCDEP, and summary calculations were computed by the ODRM. On December 1, 2013, combined useable storage in the three reservoirs was 200.133 billion gallons, or 73.9 percent of the combined capacity. From December to May, inflow to the New York City reservoirs typically exceeds outflow, consequently increasing storage. Combined storage increased during the report year, and the reservoirs were at about 99.7 percent of usable capacity on May 31, 2014. Combined storage remained high (above 80 percent of combined capacity) until September 2014. The lowest combined storage was 151.730 billion gallons (56 percent) on November 24, 2014 (fig. 2).

The three reservoirs spilled a total of 33.159 billion gallons during the year when reservoirs reached maximum capacity. Pepacton Reservoir spilled during the following periods: April 15–23, 2014; May 3–28, 2014; and June 25–July 7, 2014. Cannonsville Reservoir spilled during the following periods: April 15–24, 2014, and May 6–29, 2014. Neversink Reservoir spilled during the following periods: January 13–15, 2014, and July 14–22, 2014. Combined storage reached a maximum for the report year on May 18, 2014, at 277.028 billion gallons. At the end of the report year, the combined storage was 154.547 billion gallons, or 57 percent of the combined capacity, on November 30, 2014.

Table 2. Elevation and capacities of structures of the Pepacton, Cannonsville, and Neversink Reservoirs.

[ft, foot; Mgal, million gallons; NA, not available; —, not applicable]

Level	Pepacton Reservoir		Cannonsville Reservoir		Neversink Reservoir	
	Elevation (ft)	Volume (Mgal)	Elevation (ft)	Volume (Mgal)	Elevation (ft)	Volume (Mgal)
Full pool or spillway crest	1,280	—	1,150	—	1,440	—
Point of maximum depletion	1,152	[1]140,190	1,040	[1]95,706	1,319	[1]34,941
Sill of diversion tunnel	1,143	[2]3,511	[3]1,035	[2]1,020	1,314	[2]525
Sill of river outlet tunnel	1,126.50	[4]4,200	1,020.5	[4]1,564	1,314	NA
Dead storage	—	1,800	—	328	—	1,680

[1]The quantity stored between full pool or spillway crest and the point of maximum depletion.

[2]The quantity stored between the point of maximum depletion and the sill of the diversion tunnel.

[3]The elevation of the mouth of the inlet channel of the diversion works.

[4]The quantity stored between the sill of the diversion tunnel and the sill of the river outlet tunnel.

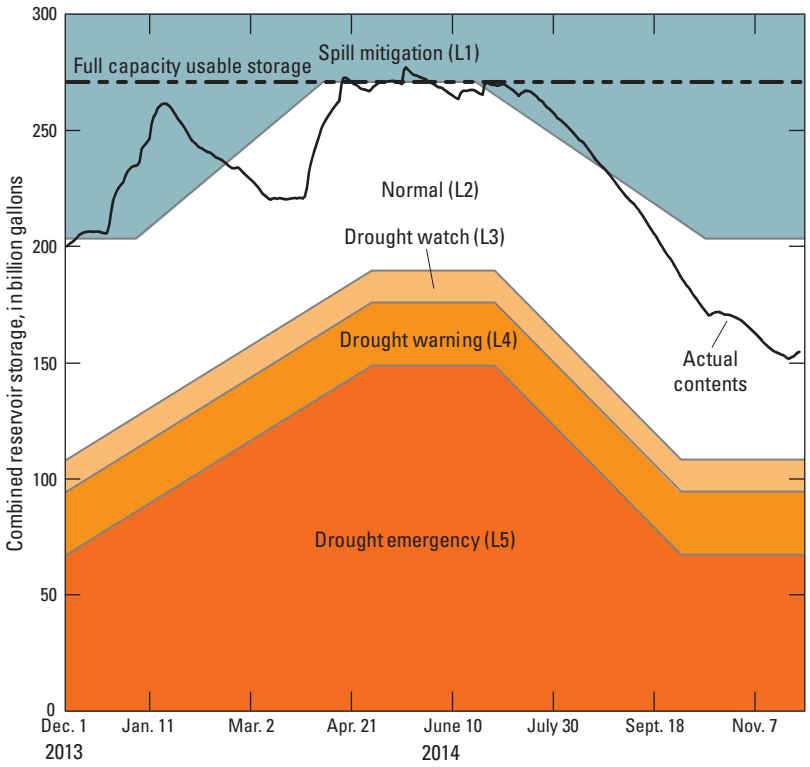


Figure 2. Graph showing rule curves and actual contents for New York City reservoirs in the Delaware River Basin, from December 1, 2013, to November 30, 2014. Full capacity usable storage line and the five conservation release rate zones (L1–5) are shown. The conservation release rate zones are defined in the "conservation release" definition in the "Glossary" section.

Operations

Operations for December 1, 2013, through November 30, 2014, were conducted as described by the FFMP (revised, effective June 1, 2013, and June 1, 2014). The allowable diversion to New York City was 800 million gallons per day (Mgal/d) throughout the year. The Montague flow objective was 1,750 ft^3/s. The allowable diversion to New Jersey was 100 Mgal/d. Conservation releases from New York City reservoirs were made at the rates shown in tables 4a–g of the June 1, 2013, FFMP (DiFrenna and others, 2022) and the June 1, 2014, FFMP (appendix 1), including tables 4f and 4g in December, tables 4e–g in January, tables 4f and 4g in February through March, tables 4d–g in April, tables 4f and 4g in May through October, and table 4g in November 2014 (see "Archived OST Summary Data" from New York City's Operational Support Tool [OST] at https://webapps.usgs.gov/odrm/data/data.html).

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 rolling average 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 (appendix 1).

Records of daily diversions through New York City's East Delaware, West Delaware, and Neversink Tunnels (fig. 1) were provided to the ODRM by the NYCDEP. These records were obtained from New York City's calibrated instruments, which are connected to Venturi meters installed in the tunnel conduits. The measured flows were transmitted electronically on a 15-second interval to New York City computers, and 5-minute interval 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 each day to the ODRM. Each week, the computed diversion values were checked against the flow meter totalizer readings by the NYCDEP and corrected when necessary.

Daily diversions during the report year from the Pepacton, Cannonsville, and Neversink Reservoirs to the New York City water-supply system (Rondout Reservoir, N.Y.) are given in table 6 (in back of report). A running account of the average rates of combined diversions from the three reservoirs from June 1, 2013, computed as stipulated by the Decree, is also shown in table 6. A total of 198.447 billion gallons of water was diverted to the New York City water-supply system during the report year with an average of 544 Mgal/d, which is below the maximum diversion rate. The maximum daily diversion from a single reservoir was 515 million gallons (Mgal) on November 1, 2014, from Pepacton Reservoir. The maximum daily combined diversion from all three reservoirs was 965 Mgal on March 13, 2014. Diversions by New York City did not exceed the limits stipulated by the Decree and the FFMP. Data on water consumption by New York City for each calendar year since 1950, from all sources of supply, are presented in table 7 (in back of report).

The East Delaware Tunnel is used to divert water from Pepacton Reservoir to Rondout Reservoir. The hydroelectric powerplant 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 showed that the (assumed constant) rate of leakage is about 12.4 ft^3/s (8.0 Mgal/d). Because the powerplant was not in operation for the equivalent of 39 days during the 2014 report year, the estimated quantity of unmeasured leakage (diverted but not recorded) was about 0.3 billion gallons.

The West Delaware Tunnel is used to divert water from Cannonsville Reservoir to Rondout Reservoir. When the valves were closed, inspections of the channel below the outlet revealed negligible leakage. A hydroelectric powerplant uses water diverted through the West Delaware Tunnel, but the powerplant only operates 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 by the Venturi meters. One current-meter measurement made in 1999 showed a leakage rate of 16.2 ft^3/s (10.5 Mgal/d). The leakage is included in the recorded flow when the powerplant is operating. No leakage occurs when the main valve on the tunnel is closed. During the 2014 report year, the powerplant operated part of the day on most days and was not operated for the equivalent of 203 days. About 2.1 billion gallons of water was diverted but not recorded, according to the leakage rate noted above and in records of powerplant operation.

Diversions by New Jersey

The Decree authorizes the State of 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. Under the FFMP, New Jersey diversions shall not exceed 100 Mgal/d as a monthly average, and the daily mean diversion shall not exceed 120 Mgal/d. When the lower part of the Delaware River Basin is in a drought warning period, diversions shall not exceed 85 Mgal/d as a running average.

The USGS streamgage on the Delaware and Raritan Canal at Port Mercer, N.J. (USGS site number 01460440; fig. 1), is the official control point for measuring these diversions by New Jersey. Based on data collected by the USGS at this site, the maximum monthly mean diversion was 99.1 Mgal/d during February 2014 (table 8, in back of report). The maximum daily mean diversion was 109 Mgal/d on February 17 and 18, 2014 (table 8). Diversions by New Jersey did not exceed the limits stipulated by the FFMP.

Montague Flow Objective

The components of forecasted flow at the Montague site during low flow (forecasted releases from power reservoirs, estimated uncontrolled runoff including conservation releases from Rio Reservoir, and forecasted increases in runoff from precipitation) and the sums of flows exclusive of releases from New York City's reservoirs are given in table 9 (in back of report). If the computed sum of the components is less than the Montague flow objective, then the deficiency is made up by releases from New York City's reservoirs, as directed by the ODRM. Table 10 (in back of report) presents the ODRM daily operations record of reservoir releases and segregation of the various components contributing to the flow of the Delaware River, as measured at the Montague site.

Based on provisional data and exclusive of water released from the New York City reservoirs, the forecasted flow of the Delaware River at the Montague site was greater than the flow objective on all days from December 1, 2013, to August 4, 2014. Releases of 51.889 billion gallons were ordered over 94 days for August through November. The observed daily mean discharge at the Montague site was greater than the applicable flow objective (1,750 ft^3/s) on all but 19 days during this period (table 11, in back of report).

The forecasted flow at the Montague site, exclusive of water released from the New York City reservoirs, was less than the flow objective on 94 days between August 8, 2014, and November 27, 2014, and directed releases were required (table 9). On 19 days between August 18, 2014, and November 26, 2014, the observed flow was less than or equal to the flow objective (table 10). However, 13 observed flows were within 10 percent of the flow objective. On October 6, 2014, the observed flow was 1,430 ft^3/s, which is 82 percent of the flow objective (table 11).

The components of the total observed flow at the Montague site for August through November 2014 are shown in figure 3. The flow is segregated into the portion derived from the New York City reservoirs, the portion contributed by the power reservoirs, and the uncontrolled runoff from the drainage area below the reservoirs. As described above, the uncontrolled runoff was computed as the residual of observed flow minus releases and was subject to errors in the observations, transit times, and routings of the various flow components. The conservation release from the Rio Reservoir is included in the uncontrolled runoff component. The effect of these uncertainties is incorporated into the computation of uncontrolled runoff.

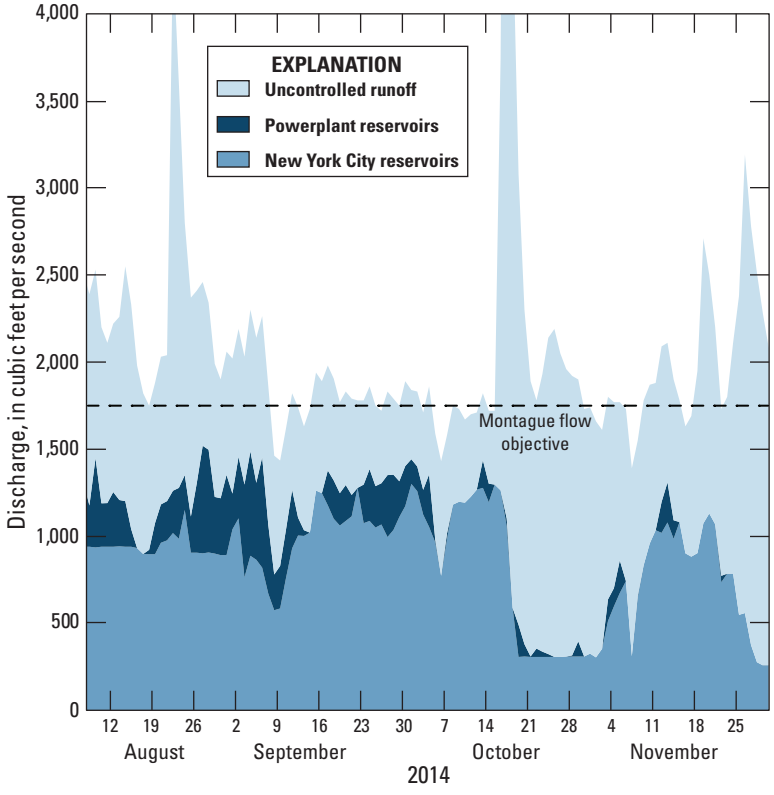


Figure 3. Graph showing components of flow, Delaware River at Montague, New Jersey, from August 8 to November 30, 2014.

Excess Release Quantity and Interim Excess Release Quantity

Per section 4c of the 2014 FFMP (appendix 1), the Excess Release Quantity is used in support of the Interim Excess Release Quantity (IERQ). The IERQ is 10.0 billion gallons (15,468 cubic feet per second for a day [(ft^3/s)-d]). In 2014, 3.91 billion gallons (6,045 [ft^3/s]-d) of the IERQ was incorporated into the release tables to enhance base releases from the New York City Delaware River Basin reservoirs. The IERQ balance of 6.09 billion gallons (9,423 [ft^3/s]-d) is reserved and may be used for additional releases to meet the Trenton flow objective or to establish an Extraordinary Needs Bank as described in section 4d of the 2014 FFMP (appendix 1). Per section 4c of the 2014 FFMP, upon request by the "Lower Basin States" or the Delaware River Basin Commission (DRBC), New York City is required to release water in sufficient quantities from the remaining IERQ balance to maintain a flow in the Delaware River at Trenton, N.J. (USGS site number 01463500), of 3,000 ft^3/s during basinwide normal conditions from June 15 to March 15 (known as the seasonal period). The maximum amount of water required to be released from the remaining IERQ in any seasonal period is 70 billion gallons. New York City is required to make releases from the IERQ until May 31, 2015, or until the aggregate quantity of the IERQ is exhausted, whichever occurs first.

As described in section 4d of the 2014 FFMP (appendix 1), the Decree Parties, the DRBC, and the ODRM may at any time review extraordinary water needs to support such research, aquatic life, or other water-use activity as may be approved by the DRBC. Upon unanimous agreement, the Decree Parties may bank all or a portion of the IERQ remaining in an IERQ Extraordinary Needs Bank to provide for such extraordinary water needs. Banked quantities are deducted from the IERQ, and any unused Extraordinary Needs Bank water is returned to the IERQ. In 2014, 3.129 billion gallons of IERQ water was released from September through November to maintain flows at Trenton, N.J.

Tailwaters Habitat Protection and Discharge Mitigation Program

The FFMP established a Tailwaters Habitat Protection and Discharge Mitigation Program, which consists of (1) conservation releases designed for protection of the ecology in the tailwaters below the New York City reservoirs and (2) discharge mitigation releases designed to help mitigate the effects of water spilling from the full Delaware River Basin reservoirs. Controlled releases were made from the New York City Delaware River Basin reservoirs in accordance with the FFMP. From December 1, 2013, to November 30, 2014, 170.037 billion gallons was released from the New York City Delaware River Basin reservoirs in accordance with the Tailwaters Habitat Protection and Discharge Mitigation Program.

Comparison of Delaware River Master Operations Data With Other Records

The ODRM operations are conducted on a daily basis and, by necessity, use preliminary streamflow data. This section compares the records used in ODRM operations with the final data published for selected USGS streamgages. Release data were reported in million gallons per day and converted to cubic feet per second for comparisons.

Analysis of Forecasts

Based on anticipated contributions from the components described previously but excluding releases from New York City reservoirs, forecasted streamflow at the Montague site differed from the observed flow on most days. Occasionally, variations in the components were partially compensating, and observed flows compared favorably with forecasted flows.

The forecasted flow of the Delaware River at the Montague site, exclusive of releases from the New York City reservoirs, was less than the Montague flow objective on most days for August 5 through October 15, 2014, and for October 28 through November 27, 2014, as indicated by directed releases on 94 days during the report year. Table 12 computes forecasted and actual hydroelectric power releases and uncontrolled runoff from August 1 to November 30, 2014.

For August 1 through November 30, 2014, as shown in table 12, actual releases from Lake Wallenpaupack and Rio Reservoir averaged 0.6 and 111 percent more than the forecasted releases, respectively. Powerplant forecasted volumes are calculated from columns 1 and 2 in table 9; powerplant actual releases are calculated from columns 5 and 6 in table 10. The observed runoff (column 10 in table 10) from the uncontrolled area was about 6.0 percent more than the forecasted runoff (columns 3 + 4 in table 9).

Table 12. Cumulative forecasted and actual release volume from Lake Wallenpaupack and Rio Reservoir, and uncontrolled runoff from July 1 to November 1, 2014.

[(ft^3/s)-d, cubic foot per second for a day]

Releases and runoff	Forecasted volume ([ft^3/s]-d)	Actual volume ([ft^3/s]-d)
Lake Wallenpaupack	12,324	12,401
Rio Reservoir	2,977	6,276
Runoff from uncontrolled area	128,261	136,001

On any given day, forecasted and actual releases from Lake Wallenpaupack and Rio Reservoir can differ considerably. The differences between actual and forecasted daily releases from August 1 to November 30, 2014, are as follows: daily releases at Lake Wallenpaupack varied between 206 (ft^3/s)-d less than forecasted releases and 442 (ft^3/s)-d greater than forecasted releases, and daily releases at Rio Reservoir differed by 301 (ft^3/s)-d less than forecasted releases to 266 (ft^3/s)-d greater than forecasted releases. Based on gaged streamflow at the Montague site, total directed releases from New York City reservoirs during the report year (column 9 in table 9) were about 6.6 percent more than required for exact forecasting (column 11 in table 9).

A hydrograph comparison of forecasted and computed runoff from the uncontrolled area (fig. 4) indicated that the forecasts were suitable for designing releases from New York City Delaware River Basin reservoirs. Numerical adjustments to the designs were made when needed to compensate for forecast errors. However, because of travel times, the effects of the adjustments on flows at the Montague site were not evident until several days after the design date.

Releases From New York City Reservoirs

The ODRM operations data on controlled releases from Pepacton, Cannonsville, and Neversink Reservoirs to the Delaware River were provided by the NYCDEP to the ODRM. These data were collected from calibrated instruments connected to Venturi meters installed in the outlet conduits of the reservoirs.

The USGS streamgaging site on the East Branch Delaware River at Downsville, N.Y. (site number 01417000), is 0.5 miles (mi) downstream from Downsville Dam (fig. 1). Discharge measured at this site includes releases from Pepacton Reservoir, a small amount of seepage, and any runoff that enters the channel between the dam and the streamgage. The drainage area is 371 mi^2 at the dam and 372 mi^2 at the streamgage. The streamgage records are rated "good," which means that about 95 percent of the measured daily mean discharges are within 10 percent of the actual discharge.

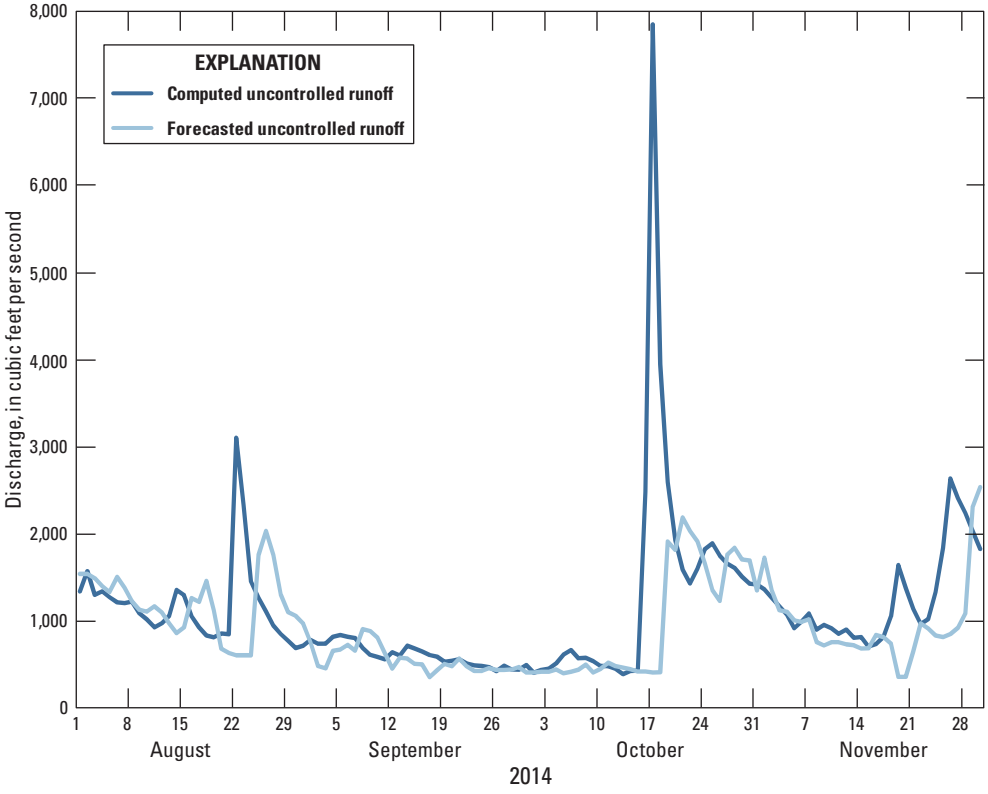


Figure 4. Hydrographs of computed and forecasted uncontrolled runoff components, Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01460440), from August 1 to November 30, 2014. Discharge is shown in cubic feet per second.

Figure 5*A* shows the measured flow from Pepacton Reservoir, including spillway, conservation, and directed releases, as reported by the NYCDEP, compared with the records for the USGS streamgage on the East Branch Delaware River at Downsville, N.Y. (table 13, in back of report; USGS, 2019a) from December 1, 2013, to November 30, 2014. The mean difference is 5.3 percent; 95 percent of the daily differences between the streamgage readings and New York City records are within 24 percent. Greater differences rarely occur and can be due to rainfall. Instruments connected to the Venturi meters were recalibrated periodically by the NYCDEP to improve the accuracy of the recorded flow data.

The USGS streamgaging site on the West Branch Delaware River at Stilesville, N.Y. (USGS site number 01425000; fig. 1), is 1.4 mi downstream from Cannonsville Dam. Discharge measured at this site includes releases from Cannonsville Reservoir and runoff from 2 mi^2 of drainage area between the dam and the streamgage. The drainage area is 454 mi^2 at the dam and 456 mi^2 at the streamgage. The streamgage records are rated "fair," which means that about 95 percent of the daily mean discharges are within 15 percent of the actual discharge. The records include runoff from the area between the dam and the streamgage and seepage near the base of the dam.

Figure 5*B* shows the releases from Cannonsville Reservoir (including spillway, conservation, and directed releases), reported by New York City, compared with records for the USGS streamgage on the West Branch Delaware River at Stilesville, N.Y. (table 14, in back of report; USGS, 2019b), from December 1, 2013, to November 30, 2014. The mean difference is 6.5 percent, and 95 percent of the daily differences between the streamgage readings and New York City records are within 17 percent. The most significant differences between the measured flows are primarily at lower flow rates.

The USGS streamgaging site on the Neversink River at Neversink, N.Y. (site number 01436000), is 1,650 ft downstream from the Neversink Dam (fig. 1). Discharge measured at this streamgage includes releases from Neversink Reservoir and, during storms, a small amount of runoff that originates between the dam and the streamgage. The drainage area is 92.5 mi^2 at the dam and 92.6 mi^2 at the streamgage. The streamgage records are rated "good," which means that about 95 percent of the measured daily mean discharges are within 10 percent of the actual discharge.

Figure 5*C* shows releases from Neversink Reservoir, including spillway, conservation, and directed releases, reported by New York City, compared with the records for the USGS streamgage on the Neversink River at Neversink, N.Y. (table 15, in back of report; USGS, 2019c), from December 1, 2013, to November 30, 2014. The mean difference between the released flow and measured flow is 6.5 percent, and 95 percent of the daily differences between the streamgage readings and New York City records are within 21.0 percent.

Delaware River at Montague, New Jersey

The ODRM's operations record for the Delaware River at Montague, N.J. (USGS site number 01438500) (table 10), showed 0.6 percent less discharge for the report year than the published USGS record for the streamgage (table 11). Daily values for the two records agreed closely, except during ice-affected periods and the summer vegetation growth season.

Conformance of Operations Under the Amended Decree of the Supreme Court of the United States Entered June 7, 1954

From December 1, 2013, to November 30, 2014, operations of the ODRM were conducted as stipulated by the Decree and the FFMP. Diversions from the Delaware River Basin to the New York City water-supply system did not exceed those authorized by the Decree and the FFMP. New York City released water from its reservoirs at rates directed by the ODRM to meet the applicable flow objective at the Montague site. During the report year, New York City complied fully with all directives and requests of the ODRM. Diversions from the Delaware River Basin by New Jersey were within the limits stipulated by the Decree. New Jersey complied fully with all directives and requests of the ODRM. The IERQ was used in accordance with the FFMP and agreements completed throughout the report year.

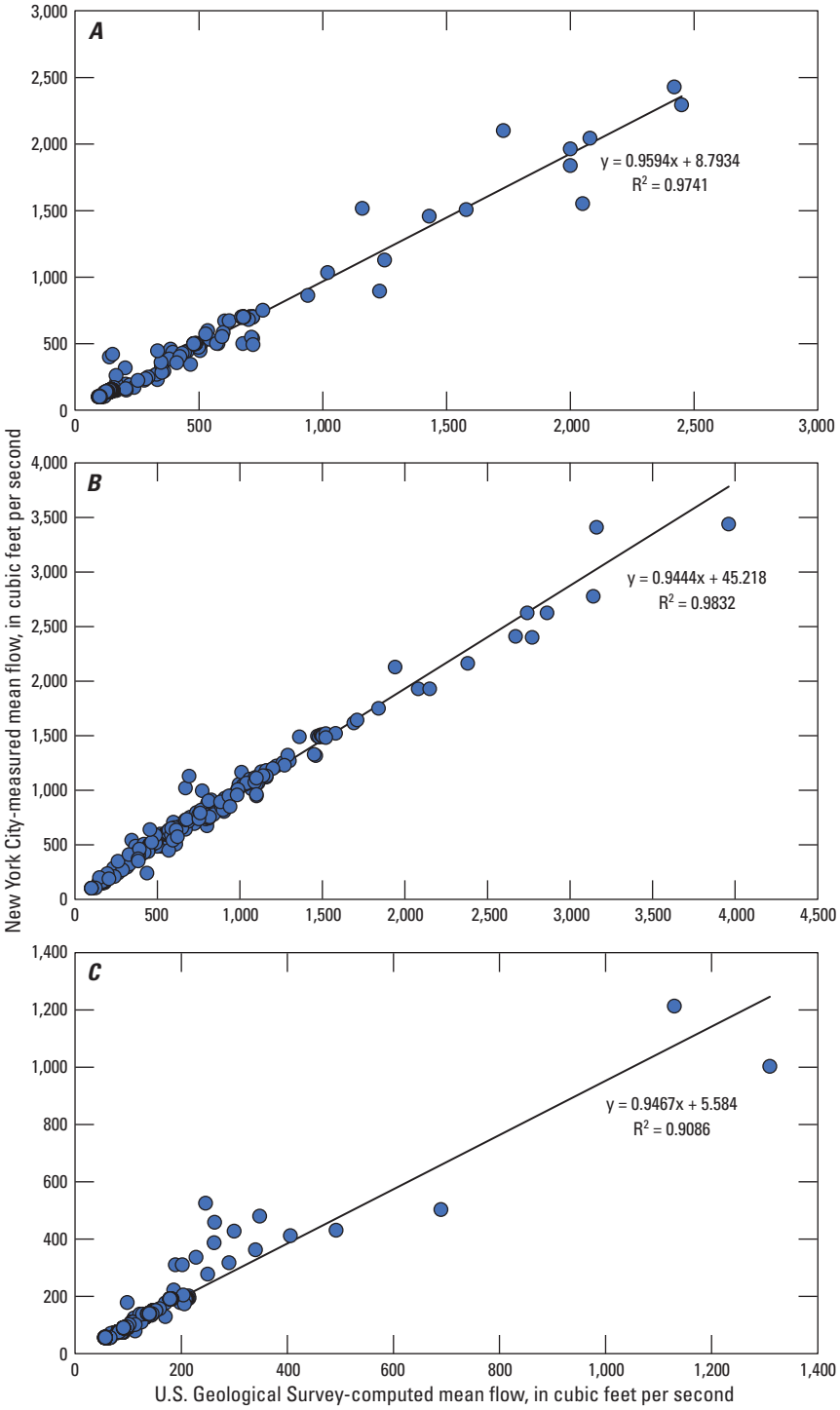


Figure 5. Graphs showing New York City-measured mean flow compared with computed mean flow records of U.S. Geological Survey (USGS) streamgaging sites, with both sets of flow data shown in cubic feet per second, downstream from their respective reservoirs: (*A*) site number 01417000, East Branch Delaware River at Downsville, New York (N.Y.), downstream from Pepacton Reservoir (data from USGS, 2019a); (*B*) site number 01425000, West Branch Delaware River at Stilesville N.Y., downstream from Cannonsville Reservoir (data from USGS, 2019b); and (*C*) site number 01436000, Neversink River at Neversink, N.Y., downstream from Neversink Reservoir (data from USGS, 2019c), for December 1, 2013–November 30, 2014.

Quality of Water in the Delaware River Estuary

This section describes water-quality monitoring programs for the Delaware River estuary during the 2014 report year. Selected data are presented, and water-quality conditions are summarized.

Water-Quality Monitoring Programs

U.S. Geological Survey Continuous Water-Quality Monitoring Program

As part of a long-term program, in cooperation with the DRBC, the USGS operates continuous water-quality monitoring stations at four locations in the Delaware River estuary between the streamgages at Trenton, N.J., and Reedy Island Jetty, Delaware (Del.) (fig. 6).

Continuous water temperature, specific conductance, dissolved oxygen, and pH data were collected at four sites: the Delaware River at Trenton, N.J. (USGS site number 01463500); the Delaware River at Benjamin Franklin Bridge at Philadelphia, Pennsylvania (Pa.) (USGS site number 01467200); the Delaware River at Chester, Pa. (USGS site number 01477050); and the Delaware River at Reedy Island Jetty, Del. (USGS site number 01482800). Continuous turbidity data were also collected at the Trenton and Reedy Island Jetty sites.

The DRBC and others use these data to assess water-quality conditions and track "salt front" movement in the Delaware River estuary. Continuous monitor data are processed and stored in the USGS National Water Information System database (NWIS) (USGS, 2019g) and are available at https://waterdata.usgs.gov/nwis. Selected monitoring data from the 2014 report year are included in this report section.

For this report, station number 01467200 is referred to as "Delaware River at Benjamin Franklin Bridge at Philadelphia, PA" because that was the gage name during the report period from December 1, 2013, to November 30, 2014. The gage was moved 150 feet upstream and renamed "Delaware River at Penns Landing, Philadelphia, PA" in January 2020. The updated name is used in the "References Cited" section to refer to the data as listed on NWIS web at the time of publication.

Delaware River Estuary Boat Run Monitoring Program

Each year, the DBRC contracts with the Delaware Department of Natural Resources and Environmental Control to collect water samples at 22 sites on the Delaware River estuary (fig. 6, sites A–N, P–W) (DRBC, 2021). Samples are collected monthly from April to October. The goals of this program are to provide accurate, precise, and defensible estimates of the surface-water quality of the Delaware River estuary and allow for the assessment of compliance with water-quality standards. Sample analysis includes routine and bacterial parameters, nutrients, heavy metals, chlorophyll-*a*, dissolved silica, and volatile organics. Water-quality data for these DBRC sampling sites are not presented in this report but are accessible from the DRBC Delaware Estuary Water Quality (Boat Run) Explorer (https://johnyagecic.shinyapps.io/BoatRunExplorer/).

Water Quality During the 2014 Report Year

Streamflow

Streamflow has a major effect on water quality in the Delaware River estuary. Large 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 support higher concentrations of dissolved oxygen. Under certain conditions, however, high streamflows can transport large quantities of nutrients to the estuary, which can result in excessive algae levels.

Streamflow from the Delaware River Basin upstream from the Trenton, N.J., site is the primary source of freshwater inflow to the Delaware River estuary. During the report year, monthly mean streamflow measured at the Delaware River at Trenton, N.J., streamgage (USGS site number 01463500) was highest during May 2014 (24,568 ft^3/s; table 16 [in back of report]) and lowest during September 2014 (3,295 ft^3/s; table 16). Long-term monthly mean streamflow was computed for October 1912 through November 2013 (USGS, 2019f). Monthly mean streamflows were less than the long-term mean monthly streamflows in December 2013, February and March 2014, and from August through November 2014. The greatest percentage of flow deficiency was in November 2014, when the monthly mean streamflow was 35 percent of the long-term mean monthly flow. The highest daily mean streamflow during the report year was 74,900 ft^3/s on May 1, 2014, and the lowest daily mean streamflow was 2,610 ft^3/s on October 8, 2014 (table 16).

Water Temperature

Water temperature influences water quality by affecting the various physical, chemical, and biological properties of water (USGS, 2020c). Increases in water temperature usually 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 River estuary are climatic, various kinds of water use, especially powerplant cooling, can have substantial effects.

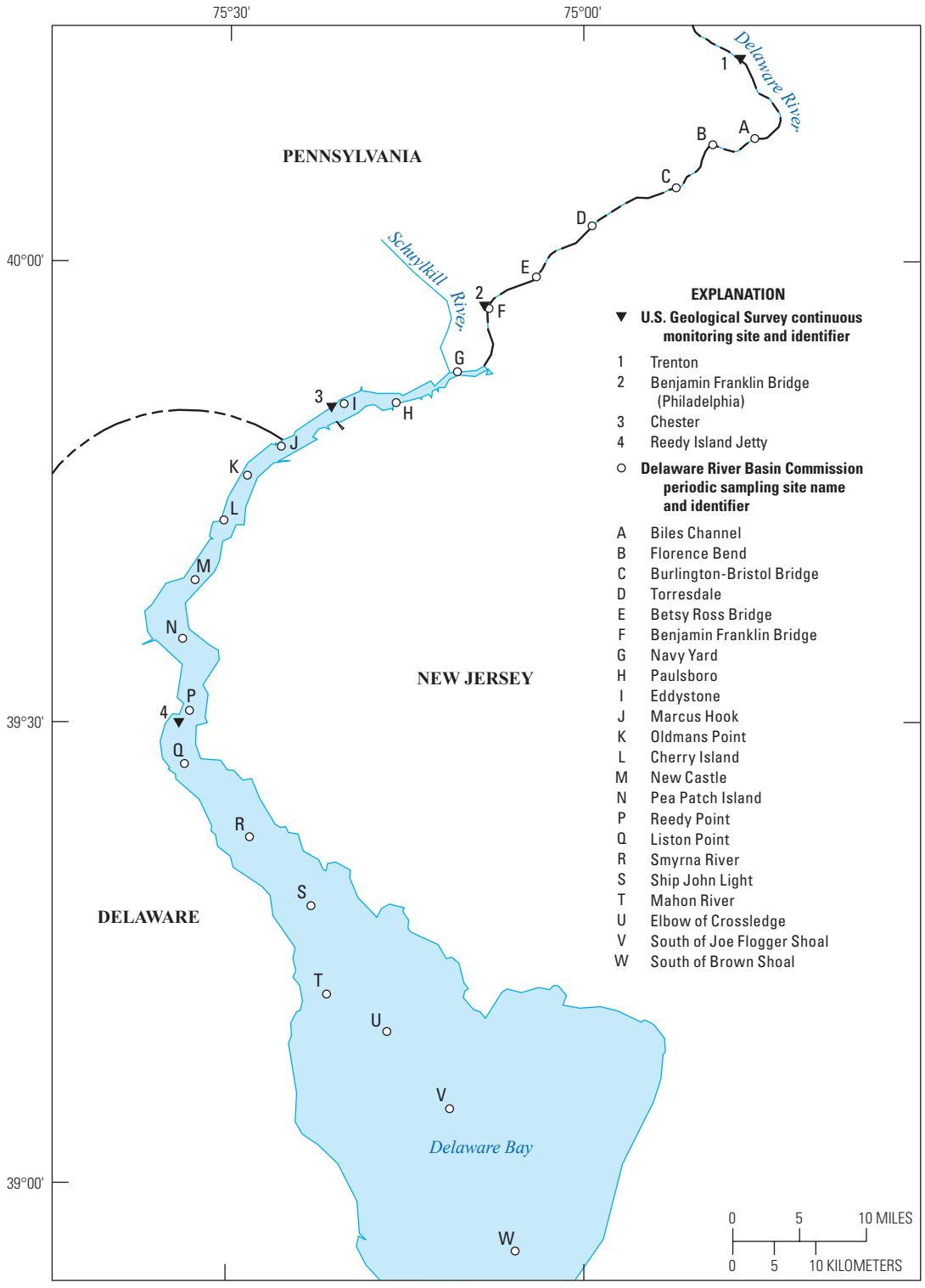


Figure 6. Map showing location of Delaware River Basin Commission (DRBC) water-quality monitoring sites on the Delaware River estuary. Modified from DRBC (2021). U.S. Geological Survey streamgaging sites (1–4) and DRBC sampling sites (A–N, P–W) are listed.

Water temperature data for the Benjamin Franklin Bridge site were collected almost continuously from April to November 2014. The procedures used to create figure 7 of this report were started for the 2011 report (DiFrenna and others, 2020). The available long-term mean daily temperature data were retrieved from the NWIS database for April through November; the mean value was computed for each month. Long-term mean water temperatures were computed using data for 1964–2014 (fig. 7). In September and October 2014, the monthly mean temperatures were greater than the long-term mean monthly temperatures (fig. 7). Monthly mean temperatures were less than the respective long-term mean temperatures in April–August and in November 2014 (fig. 7). The maximum daily mean water temperature of 26.4 degrees Celsius was recorded on July 16, 2014 (USGS, 2020d).

Specific Conductance and Chloride

Specific conductance is a measure of the capacity of water to conduct electrical current and is a function of the types and quantities of dissolved substances in water (U.S. Environmental Protection Agency, 2016). As concentrations of dissolved ions increase, the specific conductance of the water also increases. Specific conductance measurements are effective indicators of dissolved solids content and total ion concentrations, including chloride. Seawater and some artificial 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 a concern for water supplies obtained from the Delaware River estuary (Kauffman and others, 2009). 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.

The Reedy Island Jetty site measured specific conductance, not chloride concentrations. Chloride concentrations at the Chester site (table 17, in back of report; USGS, 2020f) were measured by Kimberly-Clark Chester Operations. The DRBC provided those data; they are not derived from specific conductance data.

The greatest daily maximum specific conductance at the Reedy Island Jetty site was 24,600 microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25 °C) on November 17, 2014 (table 18, in back of report). The daily maximum specific conductance during the report year exceeded 3,780 µS/cm at 25 °C on approximately 96 percent of the 362 days measured during the 2014 report year. The lowest daily minimum specific conductance was 264 µS/cm at 25 °C on May 1 and 2, 2014. The daily minimum specific conductance exceeded 3,780 µS/cm at 25 °C on 57 percent of the 362 days with measured specific conductance values in the 2014 report year.

The greatest daily maximum chloride concentration at the Chester site was 490 mg/L on October 12 and 13, 2014 (table 17). During the report year, daily maximum concentrations exceeded 50 mg/L on about 76 percent of the days. The lowest daily minimum chloride concentration was 35 mg/L on April 23, 2014. Daily minimum concentrations exceeded 50 mg/L on about 59 percent of the days. Chloride concentrations were relatively high from December 1, 2013, to mid-January 2014, from early February to mid-March 2014, in early April 2014, and from mid-August through November 30, 2014 (table 17), when daily minimum concentrations exceeded 50 mg/L on most days.

Dissolved Oxygen

Dissolved oxygen in water is necessary for the respiratory processes of aquatic organisms and chemical reactions in aquatic environments (USGS, 2020a). Fish and many other clean-water species consistently require relatively high dissolved-oxygen concentrations. The primary source of dissolved oxygen in the Delaware River estuary is diffusion from the atmosphere and, to a lesser extent, the 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.

The USGS has measured dissolved oxygen concentrations at several sites on the Delaware River estuary since 1961. Two of these sites, the Benjamin Franklin Bridge site and the Chester site, have nearly continuous records and are in the reach of the estuary most affected by effluent discharges, which can lead to reduced dissolved oxygen concentrations because of increasing biological oxygen demand by aerobic bacteria in water. For these sites, the daily mean and minimum daily mean dissolved-oxygen concentrations for the 3-month period of July–September, during the 1965–2014 report years, are shown in figure 8.

Although dissolved-oxygen concentrations increased considerably over these 50 years, yearly mean concentrations can vary substantially. Due to technological changes and other factors, the process used to calculate mean dissolved-oxygen concentrations and those data values have changed slightly over time. The procedures used to create figure 8 in this report have been used since the 2009–10 Delaware River Master report (Russell and others, 2019). The available mean and minimum daily dissolved-oxygen concentration data were downloaded from the NWIS database for July, August, and September. The average mean and average minimum dissolved-oxygen concentrations of the daily values were computed over those 3 months for each report year.

Dissolved oxygen concentrations in the Delaware River estuary are generally greatest near the Trenton site and decrease in a downstream direction. Concentrations commonly reach minimum levels in an area just downstream from the Benjamin Franklin Bridge. During the report year, the lowest recorded daily mean concentration was 5.1 mg/L on August 15, 17, 18, 20, 21, 24, 25, and September 5 and 8, 2014 (table 19, in back of report; USGS, 2020d). Daily mean dissolved oxygen concentrations were consistently 6.0 mg/L or greater from April 1 to July 14, 2014, and October 5 to November 30, 2014. At the Chester site, the lowest recorded daily mean dissolved-oxygen concentration was 4.9 mg/L on September 2, 4, 6, and 7, 2014 (table 20, in back of report; USGS, 2020e).

Histograms of half-hourly dissolved-oxygen concentrations during the critical summer period (July 1–September 30, 2014) at the Benjamin Franklin Bridge and Chester sites are presented in figure 9. During the 2014 critical summer period, half-hourly dissolved-oxygen concentrations were 4.0 mg/L or less for 0 days (0 percent of the time) at the Benjamin Franklin Bridge site and a combined total of 1.1 days (1.2 percent of the time) at the Chester site (USGS, 2020d, e).

Hydrogen-Ion Activity (pH)

The pH of a solution is a measure of the effective concentration (activity) of dissolved hydrogen ions. Solutions with a pH less than 7 are acidic, whereas solutions with a pH greater than 7 are 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 are 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, considerably affect pH. The pH of water determines the solubility (the amount that can be dissolved in the water) and biological availability (the amount that can be used by aquatic life) of chemical constituents such as nutrients (phosphorus, nitrogen, and carbon) and heavy metals (for example, lead, copper, and cadmium; USGS, 2020b).

During the report year, pH was measured seasonally (April–November) at the Benjamin Franklin Bridge and Chester sites and continuously at the Reedy Island Jetty site. During these periods, the ranges of daily median pH measured at these sites are as follows: Benjamin Franklin Bridge, 6.8–7.6; Chester, 6.9–7.4; and Reedy Island Jetty, 7.2–7.8 (USGS, 2020d, e, f). Generally, the pH of water in the Delaware River estuary is lowest near Trenton, N.J., and increases (the water becomes more alkaline) in the downstream direction. The pH of water in the Delaware River estuary between the Benjamin Franklin Bridge and Reedy Island Jetty was not a limiting factor for aquatic health or other beneficial water-uses during the report year.

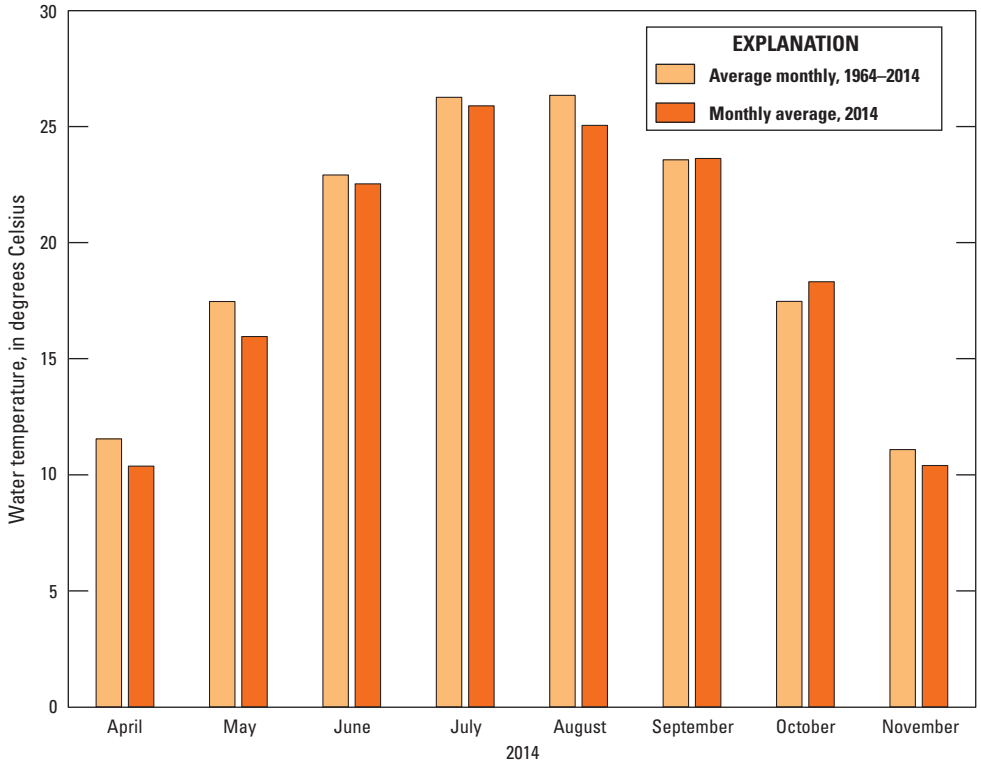


Figure 7. Bar chart showing monthly mean water temperatures in 2014 and long-term mean monthly water temperatures from 1964 to 2014, for April–November in the Delaware River estuary at Benjamin Franklin Bridge, Philadelphia, Pennsylvania. Water temperatures are given in degrees Celsius.

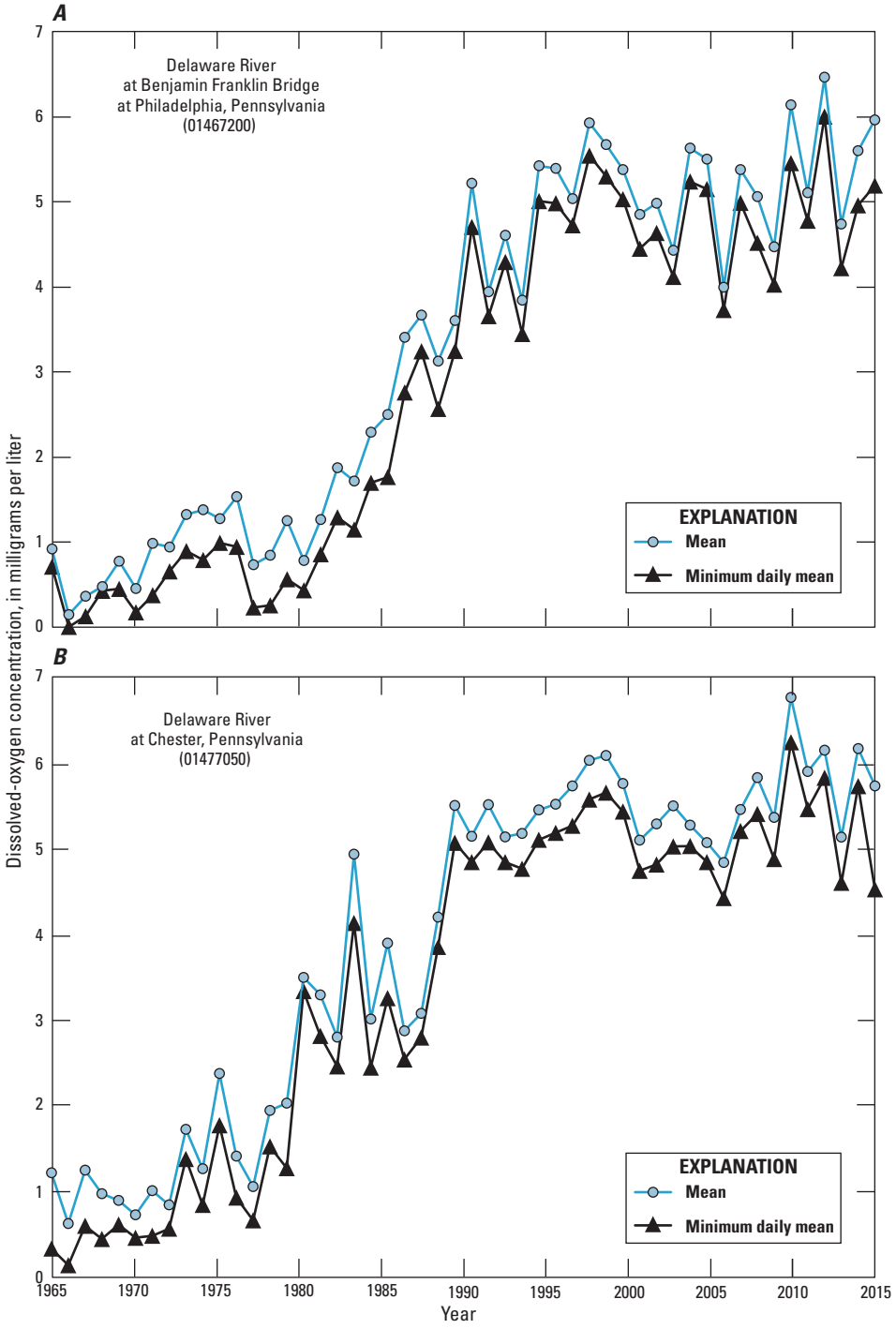


Figure 8. Graphs showing the daily mean and minimum daily mean dissolved-oxygen concentrations (in milligrams per liter) averaged from the months of July–September, annually, at two sites on the Delaware River estuary, 1965–2014, at (*A*), Delaware River at Benjamin Franklin Bridge at Philadelphia, Pennsylvania (Pa.) (U.S. Geological Survey [USGS] site number 01467200) and (*B*), Delaware River at Chester, Pa. (USGS site number 01477050).

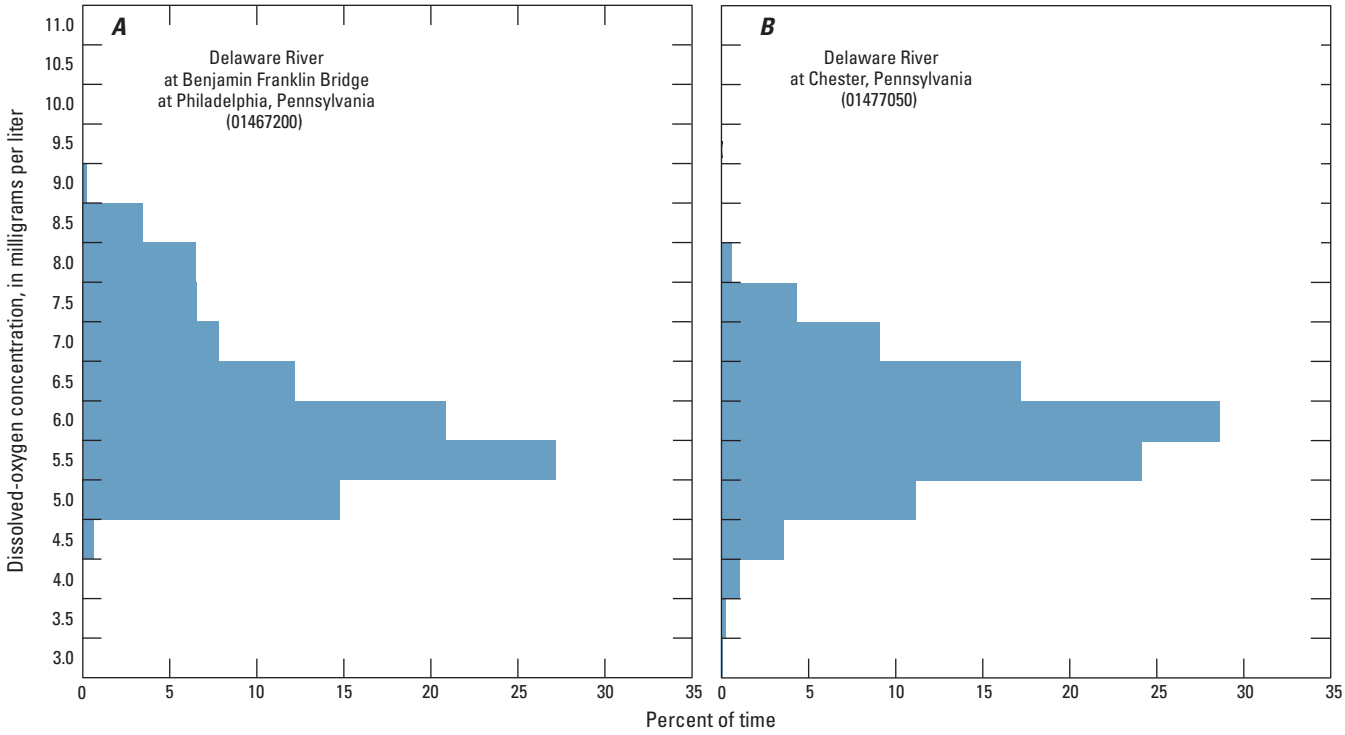


Figure 9. Graphs showing percent distribution of quarter-hourly dissolved-oxygen concentrations (in milligrams per liter) at two sites on the Delaware River estuary, from July to September 2014 for (*A*), Delaware River at Benjamin Franklin Bridge at Philadelphia, Pennsylvania (Pa.) (U.S. Geological Survey [USGS] site number 01467200); and (*B*), Delaware River at Chester, Pa. (USGS site number 01477050).

Tables 1, 3–11, and 13–20

Table 1. Precipitation in the Delaware River Basin upstream of Montague, New Jersey.

[Data provided daily from the National Weather Service, the New York City Department of Environmental Protection, and the Office of the Delaware River Master. in., inches; —, not applicable]

Month	December 1940 to November 2014 monthly average precipitation (in.)	December 2013 to November 2014			
		Precipitation (in.)	Percent of average	Excess or deficit precipitation compared with long-term average (in.)	
				Month	Cumulative
December	3.50	3.69	105	0.19	0.19
January	3.02	2.75	91	−0.27	−0.08
February	2.62	3.75	143	1.13	1.05
March	3.40	2.44	72	−0.96	0.09
April	3.77	2.82	75	−0.95	−0.86
May	4.19	4.71	112	0.52	−0.34
June	4.21	5.23	124	1.02	0.68
July	4.18	5.52	132	1.34	2.02
August	4.07	2.75	68	−1.32	0.70
September	4.12	1.36	33	−2.76	−2.06
October	3.71	5.07	137	1.36	−0.70
November	3.72	2.31	62	−1.41	−2.11
Total	**44.51**	**42.40**	**95**	—	—

Table 3. Storage in Pepacton Reservoir, New York, for report year ending November 30, 2014.

[Delaware River Master daily operations record; gage reading at 0800 hours; data provided daily through written communication from New York City Department of Environmental Protection. Storage is given in millions of gallons above the elevation of 1,152.00 feet. Add 7,711 million gallons for total contents above the sill of the outlet tunnel at the elevation of 1,126.50 feet. Storage at the spillway level is 140,190 million gallons. —, not applicable; Mgal/d, million gallons per day; ft^3/s, cubic foot per second]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	104,288	116,763	127,216	120,225	122,756	138,719	139,693	140,468	132,344	118,579	104,192	93,572
2	104,479	117,064	126,883	119,936	124,153	139,252	139,509	140,209	131,987	118,090	103,704	93,110
3	104,606	117,283	126,533	119,614	125,539	139,675	139,345	140,116	131,576	117,719	103,215	92,709
4	104,685	117,400	126,097	119,325	126,831	140,264	139,345	140,431	131,185	117,132	102,727	92,279
5	104,827	117,602	125,870	119,019	128,146	140,671	139,252	140,653	130,777	116,663	102,383	91,792
6	105,050	118,293	125,835	118,613	129,430	140,690	139,032	140,523	130,369	116,177	101,945	91,394
7	105,288	120,684	125,471	118,293	130,475	140,542	138,848	140,264	129,925	115,709	101,492	90,908
8	105,352	121,591	125,140	117,956	131,363	140,486	138,627	139,822	129,501	115,210	101,086	90,614
9	105,304	122,275	124,794	117,686	132,219	140,449	138,443	139,509	129,042	114,694	100,683	90,233
10	105,241	123,050	124,447	117,350	133,096	140,468	138,241	139,124	128,585	114,180	100,234	89,884
11	105,209	123,876	124,065	117,031	133,815	140,357	138,058	138,645	128,110	113,683	99,784	89,491
12	105,399	126,516	123,670	116,880	134,750	140,227	137,857	138,076	127,653	113,206	99,351	89,257
13	105,446	128,146	123,325	116,981	135,421	140,024	137,730	137,601	127,547	112,728	98,936	88,980
14	105,383	129,183	123,187	116,930	136,073	139,877	138,369	138,040	127,163	112,250	98,491	88,720
15	105,336	130,334	122,860	116,863	136,763	139,840	138,811	138,388	126,726	111,792	98,061	88,460
16	105,241	131,043	122,584	116,830	140,301	139,712	139,124	138,829	126,236	111,301	97,908	88,172
17	105,446	131,737	122,395	116,730	141,580	141,506	139,087	139,068	125,747	110,794	97,709	87,955
18	105,320	132,200	122,104	116,511	141,709	141,894	138,976	139,105	125,278	110,306	97,725	87,869
19	105,209	132,487	121,797	116,227	141,468	141,580	138,885	139,087	124,759	109,916	97,740	87,739
20	105,066	132,505	121,609	116,110	141,209	141,320	138,866	138,682	124,291	109,396	97,725	87,466
21	105,002	132,361	121,368	116,093	140,968	141,005	138,682	138,205	123,825	108,895	97,298	87,352
22	106,596	132,200	121,436	116,060	140,634	140,727	138,461	137,730	123,376	108,443	96,825	87,037
23	108,813	131,773	121,540	115,993	140,431	140,727	138,168	136,981	122,912	107,991	96,400	86,708
24	110,582	131,434	121,557	115,959	140,153	140,616	137,875	136,690	122,464	107,525	96,295	86,523
25	111,628	130,830	121,300	115,809	139,785	140,708	137,893	136,091	121,968	107,060	96,053	86,580
26	112,299	130,387	121,043	116,076	139,455	140,653	141,580	135,475	121,522	106,612	95,720	86,508
27	112,843	129,855	120,787	115,993	139,124	140,616	141,727	134,877	120,975	106,100	95,373	86,737
28	113,453	129,306	120,480	115,826	138,958	140,431	141,246	134,426	120,463	105,605	95,040	87,066
29	114,047	128,743	—	116,194	138,737	140,153	140,857	133,977	120,004	105,145	94,755	87,138
30	115,426	128,128	—	118,107	138,461	139,914	140,597	133,437	119,512	104,669	94,366	86,980
31	116,311	127,618	—	121,009	—	139,822	—	132,826	119,019	—	93,976	—
Change[1]	12,023	10,855	−6,736	784	15,705	1,103	904	−7,642	−13,325	−13,910	−10,216	−6,592
Equivalent change[2] (Mgal/d)	387.8	350.2	−240.6	25.3	523.5	35.6	30.1	−246.5	−429.8	−463.7	−329.5	−219.7
Equivalent change[3] (ft^3/s)	600	542	−372	39.1	810	55.1	46.6	−381	−665	−717	−510	−340

[1]Change is calculated as the storage on the last day of each month minus the storage on the first day of each month. The net change for the year is –17,047.0 million gallons. Minimum and maximum storage for December through May is 104,288 and 141,894 million gallons, respectively; minimum and maximum storage for June through November are 86,508 and 141,727 million gallons, respectively.

[2]The net equivalent for the year is –46.7 million gallons per day.

[3]The net equivalent for the year is –72.2 cubic feet per second.

Table 4. Storage in Cannonsville Reservoir, New York, for report year ending November 30, 2014.

[Delaware River Master daily operations record; gage reading at 0800 hours; data provided daily through written communication from New York City Department of Environmental Protection. Storage is given in millions of gallons above the elevation of 1,040.00 feet. Add 2,584 million gallons for total contents above the sill of the outlet tunnel at the elevation of 1,020.50 feet. Storage at spillway level is 95,706 million gallons. —, not applicable; Mgal/d, million gallons per day; ft^3/s, cubic foot per second]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	66,579	83,634	87,652	82,406	86,525	95,037	95,113	94,413	88,526	76,122	55,933	49,212
2	67,037	84,154	87,175	82,030	87,898	95,265	94,748	94,444	88,237	75,887	55,030	49,142
3	67,437	84,516	86,698	81,683	89,073	95,371	94,322	94,459	87,970	75,555	54,217	49,060
4	67,808	84,646	86,250	81,264	90,153	95,478	94,276	94,596	87,710	75,265	53,517	48,937
5	68,351	84,704	86,005	80,861	91,127	95,539	94,139	94,611	87,421	75,058	52,910	48,815
6	68,987	85,109	85,759	80,474	92,329	95,676	93,744	94,550	87,204	74,837	52,071	48,848
7	69,582	87,565	85,499	79,811	93,227	95,867	93,364	94,428	86,886	74,602	51,138	48,603
8	69,953	88,057	85,528	79,134	93,561	95,980	92,938	94,246	86,409	74,368	50,227	48,303
9	70,311	88,587	85,557	78,774	93,637	96,205	92,527	94,200	85,875	74,022	49,609	47,880
10	70,550	89,165	85,629	78,360	93,744	96,317	92,131	94,139	85,340	73,569	48,892	47,436
11	70,656	89,712	85,672	78,097	93,744	96,462	91,736	93,713	84,964	73,092	48,147	46,924
12	70,669	91,736	85,687	78,097	93,866	96,462	91,325	93,485	84,617	72,311	47,469	46,379
13	70,523	92,618	85,701	78,650	93,987	96,414	91,401	93,029	84,342	71,437	46,824	45,801
14	70,523	93,090	85,788	78,968	93,972	96,269	92,390	92,968	84,053	70,497	46,124	45,312
15	70,602	93,987	85,788	79,065	93,911	96,157	93,090	92,831	83,490	69,596	45,412	44,934
16	70,629	94,474	85,658	79,258	96,350	95,996	93,303	92,786	82,854	68,854	45,701	44,567
17	70,430	94,763	85,369	79,341	97,637	99,166	93,394	92,694	82,232	68,139	46,435	44,189
18	70,271	94,869	85,036	79,355	97,878	99,890	93,759	92,527	81,582	67,241	46,713	43,888
19	70,245	94,900	84,501	79,410	97,701	99,441	94,094	92,329	80,888	66,528	46,880	43,644
20	70,338	94,763	84,097	79,424	97,412	98,957	94,170	92,070	80,419	65,599	46,980	43,372
21	70,616	94,550	83,793	79,590	97,058	98,426	94,109	91,827	80,060	64,619	47,046	43,277
22	72,483	94,109	83,620	79,755	96,671	97,943	93,866	91,583	79,686	63,701	47,147	42,930
23	75,542	93,561	83,692	79,811	96,382	97,734	93,577	91,309	79,272	62,810	47,236	42,584
24	77,572	93,014	83,677	79,880	96,060	97,508	93,455	91,279	78,996	61,906	47,525	42,542
25	78,885	92,420	83,533	79,880	95,554	97,170	93,364	91,036	78,664	61,218	47,869	42,783
26	79,755	91,842	83,287	79,838	95,250	96,832	93,759	90,594	78,332	60,781	48,136	43,004
27	80,613	91,264	83,027	79,797	95,219	96,494	94,368	90,275	78,001	59,987	48,381	43,435
28	81,062	90,670	82,767	79,755	95,143	96,269	94,413	90,093	77,655	59,059	48,603	43,911
29	81,308	90,001	—	80,253	94,946	95,996	94,307	89,712	77,310	58,070	48,804	44,089
30	82,189	89,332	—	81,698	94,900	95,691	94,352	89,530	76,923	56,971	48,970	44,166
31	83,013	88,404	—	84,617	—	95,417	—	89,073	76,468	—	49,119	—
Change[1]	16,434	4,770	−4,885	2,211	8,375	380	−761	−5,340	−12,058	−19,151	−6,814	−5,046
Equivalent change[2] (Mgal/d)	530.1	153.9	−174.5	71.3	279.2	12.3	−25.4	−172.3	−389	−638.4	−219.8	−168.2
Equivalent change[3] (ft^3/s)	820	238	−270	110.3	432	19	−39.3	−267	−602	−988	−340	−260

[1]Change is calculated as the storage on the last day of each month minus the storage on the first day of each month. Net change for the year is –22,413.0 million gallons. Minimum and maximum storage for December through May are 66,579 and 99,890 million gallons, respectively; minimum and maximum storage for June through November are 42,542 and 95,113 million gallons, respectively.

[2]The net equivalent for the year is –61.4 million gallons per day.

[3]The net equivalent for the year is –95.0 cubic feet per second.

Table 5. Storage in Neversink Reservoir, New York, for report year ending November 30, 2014.

[Delaware River Master daily operations record; gage reading at 0800 hours; data provided daily through written communication from by New York City Department of Environmental Protection. Storage is given in millions of gallons above the elevation of 1,319.00 feet. Add 525 million gallons for total contents above the sill of the outlet tunnel at the elevation of 1,314.00 feet. Storage at spillway level is 34,941 million gallons. —, not applicable; Mgal/d, million gallons per day; ft^3/s, cubic foot per second]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	29,275	32,781	30,721	26,868	26,684	33,929	34,828	34,577	34,497	30,164	27,176	24,822
2	29,387	32,866	30,762	26,864	27,060	34,281	34,833	34,492	34,473	29,823	27,141	24,523
3	29,509	32,771	30,799	26,829	27,430	34,321	34,837	34,582	34,419	29,509	27,111	24,242
4	29,575	32,647	30,657	26,578	27,844	34,330	34,715	34,557	34,345	29,181	27,090	23,963
5	29,661	32,705	30,533	26,329	28,207	34,306	34,759	34,591	34,281	28,959	27,107	23,653
6	29,810	32,866	30,538	26,068	28,508	34,286	34,616	34,513	34,101	28,769	27,090	23,385
7	30,009	33,553	30,542	25,809	28,650	34,253	34,621	34,414	34,018	28,738	27,064	23,187
8	30,146	33,403	30,227	25,562	29,057	34,330	34,626	34,243	33,939	28,694	27,039	23,004
9	30,273	33,221	30,232	25,557	29,616	34,301	34,660	34,096	33,853	28,504	27,026	22,818
10	30,350	32,933	30,259	25,545	29,995	34,276	34,675	34,062	33,780	28,315	27,009	22,630
11	30,401	32,943	29,914	25,345	30,324	34,384	34,562	34,096	33,698	28,158	26,988	22,431
12	30,442	34,468	29,571	25,197	30,762	34,492	34,587	34,106	33,465	28,105	26,962	22,427
13	30,401	34,931	29,159	25,027	31,132	34,404	34,306	34,101	33,427	28,071	26,923	22,408
14	30,346	34,936	28,879	24,789	31,512	34,340	34,873	34,863	33,369	28,049	26,897	22,408
15	30,442	34,966	28,884	24,625	31,873	34,194	34,803	34,996	33,302	28,005	26,872	22,400
16	30,487	34,892	28,778	24,649	32,848	34,121	34,621	35,329	33,235	27,957	26,919	22,392
17	30,510	34,655	28,592	24,670	33,062	35,254	34,448	35,130	33,163	27,909	27,077	22,392
18	30,433	34,325	28,451	24,686	33,005	35,244	34,321	35,070	33,101	27,862	27,102	22,501
19	30,355	33,988	28,460	24,670	32,958	35,041	34,276	35,060	32,890	27,809	27,107	22,568
20	30,255	33,620	28,469	24,719	32,871	34,976	34,267	35,041	32,657	27,757	27,094	22,595
21	30,204	33,254	28,478	24,780	32,762	35,021	34,291	35,016	32,430	27,719	27,081	22,611
22	30,447	32,834	28,526	24,826	32,624	35,095	34,325	35,001	32,396	27,658	27,090	22,615
23	31,113	32,377	28,596	24,879	32,757	35,135	34,345	34,863	32,330	27,606	26,936	22,630
24	31,765	31,925	28,623	24,924	32,876	35,110	34,257	34,749	32,264	27,554	26,846	22,665
25	31,981	31,658	28,228	24,949	32,972	35.105	34,047	34,734	32,189	27,507	26,651	22,969
26	32,169	31,652	27,831	24,981	33,081	35,070	34,281	34,710	31,990	27,442	26,427	23,100
27	32,173	31,545	27,417	24,998	33,201	35,045	34,340	34,680	31,771	27,395	26,169	23,195
28	32,184	31,341	27,048	25,023	33,288	35,016	34,443	34,680	31,541	27,339	25,913	23,286
29	32,321	31,141	—	25,097	33,369	34,966	34,492	34,650	31,211	27,288	25,650	23,346
30	32,667	31,021	—	25,470	33,461	34,892	34,533	34,591	30,850	27,227	25,379	23,401
31	32,824	30,877	—	26,257	—	34,853	—	34,547	30,501	—	25,106	—
Change[1]	3549	−1,904	−3,673	−611	6777	924	−295	−30.0	−3,996	−2,937	−2,070	−1,421
Equivalent change[2] (Mgal/d)	114.5	−61.4	−131.2	−19.7	225.9	29.8	−9.8	−1.0	−128.9	−97.9	−66.8	−47.4
Equivalent change[3] (ft^3/s)	177	−95.0	−203	−30.5	349	46.1	−15.2	−2.0	−199	−151	−103	−73.0

[1]Change is calculated as the storage on the last day of each month minus the storage on the first day of each month. Net change for year is more than –5,874.0 million gallons. Minimum and maximum storage for December through May is 24,625 and 35,254 million gallons, respectively. Minimum and maximum storage for June through November is 22,392 and 35,329 million gallons, respectively.

[2]The net equivalent for the year is–16.1 million gallons per day.

[3]The net equivalent for year is –24.9 cubic feet per second.

Table 6. Diversions to New York City water-supply system for report year ending November 30, 2014.

[Delaware River Master daily operations record. Diversions in million gallons per day (Mgal/d) for each 24-hour period beginning 0800 local time. For December 1–May 31, the average is computed beginning June 1, 2013, to the given date. For June 1–November 30, the average is computed beginning June 1, 2014, to the given date. The diversion calculation is computed as authorized within the Decree. —, not applicable.]

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
12/1/2013	448	273	0	620
12/2/2013	451	273	0	620
12/3/2013	426	250	0	620
12/4/2013	299	0	0	619
12/5/2013	299	0	0	617
12/6/2013	399	187	0	617
12/7/2013	448	273	0	617
12/8/2013	431	253	0	618
12/9/2013	446	276	0	618
12/10/2013	308	400	0	619
12/11/2013	180	411	0	619
12/12/2013	208	440	94	619
12/13/2013	368	311	115	620
12/14/2013	398	273	0	620
12/15/2013	364	250	0	620
12/16/2013	0	427	0	619
12/17/2013	237	311	96	619
12/18/2013	350	274	152	620
12/19/2013	350	115	149	620
12/20/2013	336	0	129	619
12/21/2013	0	0	0	616
12/22/2013	0	0	0	613
12/23/2013	328	223	26	613
12/24/2013	353	302	130	614
12/25/2013	353	303	22	614
12/26/2013	353	99	151	614
12/27/2013	103	361	131	614
12/28/2013	0	436	0	613
12/29/2013	0	437	0	613
12/30/2013	5	354	22	611
12/31/2013	301	184	129	611
Total	**8,542**	**7,696**	**1,346**	**—**

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
1/1/2014	303	181	19	611
1/2/2014	303	293	167	612
1/3/2014	273	224	149	612
1/4/2014	206	302	0	611
1/5/2014	206	302	0	611
1/6/2014	205	302	0	610
1/7/2014	205	303	328	611
1/8/2014	205	12	351	611
1/9/2014	0	0	397	610
1/10/2014	0	0	131	608
1/11/2014	0	0	0	605
1/12/2014	0	0	0	603
1/13/2014	0	0	263	601
1/14/2014	0	0	297	600
1/15/2014	0	0	298	599
1/16/2014	0	0	414	598
1/17/2014	0	0	447	597
1/18/2014	0	0	447	597
1/19/2014	0	0	447	596
1/20/2014	156	0	447	596
1/21/2014	156	0	447	596
1/22/2014	289	0	447	597
1/23/2014	343	0	460	597
1/24/2014	400	0	265	598
1/25/2014	401	0	0	597
1/26/2014	401	0	103	596
1/27/2014	400	0	243	597
1/28/2014	400	0	223	597
1/29/2014	400	0	165	597
1/30/2014	400	189	210	597
1/31/2014	342	236	206	598
Total	**5,994**	**2,344**	**7,371**	**—**

Table 6. Diversions to New York City water-supply system for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. Diversions in million gallons per day (Mgal/d) for each 24-hour period beginning 0800 local time. For December 1–May 31, the average is computed beginning June 1, 2013, to the given date. For June 1–November 30, the average is computed beginning June 1, 2014, to the given date. The diversion calculation is computed as authorized within the Decree. —, not applicable.]

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
2/1/2014	259	236	0	598
2/2/2014	260	236	20	597
2/3/2014	400	236	190	598
2/4/2014	400	236	170	599
2/5/2014	158	295	0	599
2/6/2014	450	301	2	599
2/7/2014	401	5	354	600
2/8/2014	401	0	0	599
2/9/2014	401	0	2	598
2/10/2014	401	0	352	599
2/11/2014	401	0	353	600
2/12/2014	401	0	443	601
2/13/2014	401	0	376	601
2/14/2014	401	0	0	600
2/15/2014	306	0	129	600
2/16/2014	300	0	190	599
2/17/2014	301	0	152	599
2/18/2014	300	191	0	598
2/19/2014	300	64	0	598
2/20/2014	300	0	0	596
2/21/2014	278	0	0	595
2/22/2014	208	0	0	594
2/23/2014	209	0	2	592
2/24/2014	400	0	428	593
2/25/2014	400	0	430	594
2/26/2014	400	0	404	595
2/27/2014	400	0	404	596
2/28/2014	400	0	204	596
Total	**9,637**	**1,800**	**4,605**	—

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
3/1/2014	400	0	0	595
3/2/2014	400	0	21	594
3/3/2014	406	0	262	595
3/4/2014	400	0	265	595
3/5/2014	400	0	264	595
3/6/2014	400	233	263	596
3/7/2014	400	276	243	597
3/8/2014	383	16	0	597
3/9/2014	396	0	3	596
3/10/2014	399	0	207	596
3/11/2014	400	0	207	596
3/12/2014	400	82	238	596
3/13/2014	413	253	299	598
3/14/2014	400	301	209	599
3/15/2014	400	259	0	599
3/16/2014	400	302	0	599
3/17/2014	400	302	0	600
3/18/2014	400	302	0	600
3/19/2014	400	302	0	600
3/20/2014	399	302	0	601
3/21/2014	399	302	0	601
3/22/2014	399	302	0	601
3/23/2014	399	302	0	602
3/24/2014	383	302	0	602
3/25/2014	0	288	0	601
3/26/2014	305	292	0	601
3/27/2014	400	300	0	601
3/28/2014	400	301	0	602
3/29/2014	1	301	0	601
3/30/2014	4	302	0	600
3/31/2014	205	303	0	599
Total	**10,891**	**6,225**	**2,481**	—

Table 6. Diversions to New York City water-supply system for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. Diversions in million gallons per day (Mgal/d) for each 24-hour period beginning 0800 local time. For December 1–May 31, the average is computed beginning June 1, 2013, to the given date. For June 1–November 30, the average is computed beginning June 1, 2014, to the given date. The diversion calculation is computed as authorized within the Decree. —, not applicable.]

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
4/1/2014	201	303	0	599
4/2/2014	202	302	0	599
4/3/2014	202	302	0	598
4/4/2014	100	303	0	598
4/5/2014	0	18	0	596
4/6/2014	5	0	0	594
4/7/2014	206	187	0	593
4/8/2014	202	201	0	593
4/9/2014	205	8	0	592
4/10/2014	206	0	0	590
4/11/2014	221	0	0	589
4/12/2014	396	0	0	589
4/13/2014	383	0	0	588
4/14/2014	51	0	0	586
4/15/2014	233	0	0	585
4/16/2014	177	0	249	585
4/17/2014	51	0	393	584
4/18/2014	154	0	329	584
4/19/2014	182	0	298	584
4/20/2014	178	0	298	583
4/21/2014	400	0	298	584
4/22/2014	401	0	3	583
4/23/2014	500	50	0	583
4/24/2014	500	196	0	583
4/25/2014	500	58	0	583
4/26/2014	500	0	0	583
4/27/2014	300	145	0	582
4/28/2014	301	201	0	582
4/29/2014	301	51	0	582
4/30/2014	25	0	0	580
Total	**7,283**	**2,325**	**1,868**	—

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
5/1/2014	0	0	146	579
5/2/2014	0	0	232	578
5/3/2014	0	0	208	576
5/4/2014	0	0	199	575
5/5/2014	251	0	134	575
5/6/2014	301	0	148	574
5/7/2014	301	0	3	574
5/8/2014	301	0	153	573
5/9/2014	303	0	148	573
5/10/2014	449	0	0	573
5/11/2014	448	0	0	572
5/12/2014	449	0	152	572
5/13/2014	420	119	152	573
5/14/2014	449	216	152	573
5/15/2014	449	274	149	574
5/16/2014	144	25	149	573
5/17/2014	253	0	0	573
5/18/2014	487	0	294	573
5/19/2014	472	0	258	574
5/20/2014	499	0	92	574
5/21/2014	432	101	0	574
5/22/2014	400	0	0	573
5/23/2014	400	0	0	573
5/24/2014	288	225	0	572
5/25/2014	250	302	0	572
5/26/2014	251	302	0	572
5/27/2014	362	221	0	572
5/28/2014	439	273	87	573
5/29/2014	376	302	134	574
5/30/2014	307	302	64	574
5/31/2014	297	302	64	574
Total	**9,778**	**2,964**	**3,118**	—

Table 6. Diversions to New York City water-supply system for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. Diversions in million gallons per day (Mgal/d) for each 24-hour period beginning 0800 local time. For December 1–May 31, the average is computed beginning June 1, 2013, to the given date. For June 1–November 30, the average is computed beginning June 1, 2014, to the given date. The diversion calculation is computed as authorized within the Decree. —, not applicable.]

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
6/1/2014	300	302	0	602
6/2/2014	299	302	0	602
6/3/2014	300	85	202	597
6/4/2014	300	236	0	582
6/5/2014	300	302	225	631
6/6/2014	300	301	0	626
6/7/2014	300	301	0	622
6/8/2014	300	301	0	620
6/9/2014	300	301	0	617
6/10/2014	297	301	132	629
6/11/2014	300	301	3	626
6/12/2014	300	6	396	633
6/13/2014	74	0	226	607
6/14/2014	0	0	436	595
6/15/2014	0	134	372	589
6/16/2014	338	99	302	598
6/17/2014	489	0	212	604
6/18/2014	485	0	192	608
6/19/2014	319	0	102	599
6/20/2014	396	222	32	601
6/21/2014	396	231	0	602
6/22/2014	400	234	0	604
6/23/2014	400	38	134	602
6/24/2014	99	0	199	590
6/25/2014	0	0	116	571
6/26/2014	493	268	152	584
6/27/2014	500	301	0	592
6/28/2014	500	301	0	599
6/29/2014	500	13	0	596
6/30/2014	500	0	0	593
Total	**9,485**	**4,880**	**3,433**	—

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
7/1/2014	500	0	117	594
7/2/2014	481	0	106	594
7/3/2014	82	0	256	586
7/4/2014	0	0	303	578
7/5/2014	304	0	228	576
7/6/2014	422	0	179	577
7/7/2014	494	0	211	581
7/8/2014	500	0	229	584
7/9/2014	501	0	115	585
7/10/2014	501	244	0	589
7/11/2014	501	33	0	588
7/12/2014	401	224	0	589
7/13/2014	174	102	0	582
7/14/2014	0	0	267	574
7/15/2014	0	0	273	568
7/16/2014	0	0	259	561
7/17/2014	0	0	92	551
7/18/2014	1	0	0	540
7/19/2014	304	0	0	535
7/20/2014	304	0	0	530
7/21/2014	301	0	0	526
7/22/2014	426	0	140	526
7/23/2014	450	0	140	528
7/24/2014	451	0	0	526
7/25/2014	451	193	0	528
7/26/2014	451	39	0	528
7/27/2014	451	0	0	526
7/28/2014	451	214	0	529
7/29/2014	451	4	0	527
7/30/2014	451	210	0	530
7/31/2014	451	288	0	533
Total	**10,255**	**1,551**	**2,915**	—

Table 6. Diversions to New York City water-supply system for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. Diversions in million gallons per day (Mgal/d) for each 24-hour period beginning 0800 local time. For December 1–May 31, the average is computed beginning June 1, 2013, to the given date. For June 1–November 30, the average is computed beginning June 1, 2014, to the given date. The diversion calculation is computed as authorized within the Decree. —, not applicable.]

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
8/1/2014	450	5	0	532
8/2/2014	450	0	0	531
8/3/2014	450	0	0	529
8/4/2014	450	0	0	528
8/5/2014	450	0	152	529
8/6/2014	450	0	0	528
8/7/2014	450	178	0	529
8/8/2014	450	228	0	532
8/9/2014	450	228	0	534
8/10/2014	450	58	0	533
8/11/2014	449	0	151	534
8/12/2014	21	30	0	528
8/13/2014	448	0	0	527
8/14/2014	450	264	0	529
8/15/2014	450	298	0	532
8/16/2014	450	298	0	535
8/17/2014	450	298	0	538
8/18/2014	450	297	152	542
8/19/2014	450	98	162	544
8/20/2014	450	0	151	545
8/21/2014	450	0	0	544
8/22/2014	450	0	0	543
8/23/2014	450	0	0	541
8/24/2014	450	0	0	540
8/25/2014	450	0	151	541
8/26/2014	450	0	152	542
8/27/2014	450	0	155	543
8/28/2014	450	0	280	545
8/29/2014	437	0	307	547
8/30/2014	450	0	303	549
8/31/2014	450	0	303	551
Total	**13,505**	**2,280**	**2,419**	—

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
9/1/2014	450	0	303	554
9/2/2014	450	0	303	556
9/3/2014	450	0	303	558
9/4/2014	450	0	189	559
9/5/2014	450	0	156	559
9/6/2014	450	0	0	558
9/7/2014	450	0	0	557
9/8/2014	450	0	142	557
9/9/2014	450	0	138	557
9/10/2014	450	0	138	558
9/11/2014	450	193	0	559
9/12/2014	415	228	0	559
9/13/2014	451	227	0	561
9/14/2014	451	227	0	562
9/15/2014	450	74	0	561
9/16/2014	450	0	0	560
9/17/2014	450	214	0	561
9/18/2014	379	226	0	562
9/19/2014	450	226	0	563
9/20/2014	450	226	0	564
9/21/2014	450	225	0	565
9/22/2014	418	225	0	565
9/23/2014	450	230	0	566
9/24/2014	450	0	0	565
9/25/2014	450	0	0	564
9/26/2014	450	248	0	565
9/27/2014	450	280	0	567
9/28/2014	450	279	0	568
9/29/2014	449	279	0	570
9/30/2014	450	278	0	571
Total	**13,363**	**3,885**	**1,672**	—

Table 6. Diversions to New York City water-supply system for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. Diversions in million gallons per day (Mgal/d) for each 24-hour period beginning 0800 local time. For December 1–May 31, the average is computed beginning June 1, 2013, to the given date. For June 1–November 30, the average is computed beginning June 1, 2014, to the given date. The diversion calculation is computed as authorized within the Decree. —, not applicable.]

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
10/1/2014	450	278	0	572
10/2/2014	450	277	0	573
10/3/2014	449	277	0	575
10/4/2014	400	277	0	575
10/5/2014	401	276	0	576
10/6/2014	401	280	0	577
10/7/2014	401	280	0	578
10/8/2014	401	6	0	577
10/9/2014	401	0	0	575
10/10/2014	401	0	0	574
10/11/2014	401	0	0	573
10/12/2014	401	0	0	571
10/13/2014	401	0	0	570
10/14/2014	401	0	0	569
10/15/2014	401	0	0	568
10/16/2014	399	0	0	566
10/17/2014	0	0	0	562
10/18/2014	0	0	0	558
10/19/2014	0	0	0	554
10/20/2014	375	0	0	553
10/21/2014	498	0	0	553
10/22/2014	497	0	214	554
10/23/2014	486	0	301	555
10/24/2014	494	0	303	557
10/25/2014	493	0	303	559
10/26/2014	460	0	303	560
10/27/2014	472	0	303	561
10/28/2014	366	0	303	562
10/29/2014	494	0	303	564
10/30/2014	494	0	303	565
10/31/2014	494	0	303	567
Total	**12,182**	**1,951**	**2,939**	—

Date	East Delaware Tunnel (Mgal/d)	West Delaware Tunnel (Mgal/d)	Neversink Tunnel (Mgal/d)	Average (Mgal/d) from June 1
11/1/2014	515	0	315	568
11/2/2014	493	0	303	570
11/3/2014	493	0	303	571
11/4/2014	493	0	303	573
11/5/2014	493	0	303	574
11/6/2014	489	0	220	575
11/7/2014	400	0	203	575
11/8/2014	400	0	203	575
11/9/2014	400	0	203	576
11/10/2014	400	0	203	576
11/11/2014	300	0	0	574
11/12/2014	299	0	0	572
11/13/2014	296	0	0	571
11/14/2014	298	0	0	569
11/15/2014	299	0	0	568
11/16/2014	297	0	0	566
11/17/2014	301	0	0	564
11/18/2014	301	0	0	563
11/19/2014	301	0	0	561
11/20/2014	217	0	0	559
11/21/2014	421	179	0	560
11/22/2014	450	227	0	560
11/23/2014	450	231	0	561
11/24/2014	450	231	0	562
11/25/2014	456	231	0	562
11/26/2014	149	68	0	560
11/27/2014	0	0	0	557
11/28/2014	215	229	0	557
11/29/2014	397	275	0	557
11/30/2014	485	276	0	558
Total	**10,958**	**1,947**	**2,559**	—

Table 7. Consumption of water by New York City, from 1950 to 2014.

[Data provided through written communication by New York City Department of Environmental Protection, Bureau of Water Supply. Mgal/d, million gallons per day; Ggal, billion gallons]

Year	Average daily consumption			Annual consumption (Ggal)
	City proper (Mgal/d)	Outside communities (Mgal/d)	Total (Mgal/d)	
1950	953.3	29.1	982.4	358.6
1951	1,041.9	28.1	1,070.0	390.6
1952	1,087.0	32.7	1,119.7	409.8
1953	1,093.9	44.6	1,138.5	415.6
1954	1,063.4	46.3	1,109.7	405.0
1955	1,109.9	45.3	1,155.2	421.6
1956	1,111.3	48.9	1,160.2	424.6
1957	1,169.0	57.2	1,226.2	447.6
1958	1,152.9	49.6	1,202.5	438.9
1959	1,204.3	60.3	1,264.6	461.6
1960	1,199.4	58.9	1,258.3	460.5
1961	1,221.0	64.0	1,285.0	469.0
1962	1,207.6	68.8	1,276.4	465.9
1963	1,218.0	76.7	1,294.7	472.6
1964	1,189.2	79.4	1,268.6	464.3
1965	1,052.1	71.2	1,123.3	410.0
1966	1,044.9	73.2	1,118.1	408.1
1967	1,135.3	71.0	1,206.3	440.3
1968	1,242.0	78.2	1,320.2	483.2
1969	1,328.7	80.1	1,408.8	514.2
1970	1,400.3	90.4	1,490.7	544.1
1971	1,423.6	87.9	1,511.5	551.7
1972	1,412.4	83.0	1,495.4	547.3
1973	1,448.9	95.4	1,544.3	563.7
1974	1,441.8	96.3	1,538.1	561.4
1975	1,415.0	92.1	1,507.1	550.1
1976	1,435.0	95.8	1,530.8	560.3
1977	1,483.0	104.7	1,587.7	579.5
1978	1,479.4	103.0	1,582.4	577.6
1979	1,513.0	104.6	1,617.6	590.4
1980	1,506.3	110.1	1,616.3	591.6
1981	1,309.5	100.0	1,409.5	514.5
1982	1,383.0	104.8	1,487.8	543.1
1983	1,424.2	112.6	1,536.8	561.0
1984	1,465.2	113.9	1,579.1	578.0
1985	1,325.4	106.5	1,431.9	522.7
1986	1,351.1	115.2	1,466.3	535.2
1987	1,447.1	119.8	1,566.9	571.9
1988	1,484.3	125.6	1,609.9	589.1
1989	1,402.0	113.4	1,515.4	553.2

Table 7. Consumption of water by New York City, from 1950 to 2014.—Continued

[Data provided through written communication by New York City Department of Environmental Protection, Bureau of Water Supply. Mgal/d, million gallons per day; Ggal, billion gallons]

Year	Average daily consumption			Annual consumption (Ggal)
	City proper (Mgal/d)	Outside communities (Mgal/d)	Total (Mgal/d)	
1990	1,424.4	122.4	1,546.8	564.6
1991	1,469.9	123.6	1,593.5	581.6
1992	1,368.7	113.9	1,482.6	542.6
1993	1,368.9	118.8	1,487.7	543.0
1994	1,357.8	119.2	1,477.0	539.1
1995	1,326.1	123.1	1,449.2	529.0
1996	1,283.5	120.2	1,403.7	512.4
1997	1,201.3	123.5	1,324.8	483.6
1998	1,220.0	124.7	1,344.7	490.8
1999	1,237.2	128.6	1,365.8	498.5
2000	1,240.4	124.9	1,365.3	499.7
2001	1,184.0	128.4	1,312.4	479.0
2002	1,135.6	121.1	1,256.7	458.7
2003	1,093.7	115.9	1,209.6	441.5
2004	1,099.6	117.5	1,217.1	445.5
2005	1,107.6	123.8	1,231.4	449.5
2006	1,069.2	116.8	1,186.0	432.9
2007	1,114.0	122.9	1,237.0	451.5
2008	1,082.9	114.8	1,197.7	438.4
2009	1,007.2	109.4	1,116.6	407.6
2010	1,039.0	119.0	1,158.0	422.7
2011	1,021.0	116.0	1,137.0	415.0
2012	1,009.1	110.2	1,119.3	409.7
2013	1,006.1	110.1	1,116.2	407.4
2014	996.0	109.6	1,105.6	403.5

Table 8. Diversions by the State of New Jersey, daily mean discharge, Delaware and Raritan Canal at Port Mercer, New Jersey (U.S. Geological Survey site number 01460440), for report year ending November 30, 2014.

[Data from U.S. Geological Survey (2019e). All values except total are in million gallons per day (Mgal/d); total in million gallons (Mgal). —, not applicable; e, estimated]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	69	88	96	97	85	160	84	96	97	e100	90	90
2	67	87	97	98	89	67	83	94	98	e90	89	89
3	67	83	104	98	90	81	81	87	96	86	90	89
4	67	81	100	97	90	85	74	96	94	87	90	89
5	70	81	e72	98	90	90	83	96	94	85	90	90
6	86	74	89	98	92	93	81	95	94	86	91	89
7	79	94	100	98	93	94	79	96	93	87	91	85
8	77	94	99	97	89	92	80	95	89	87	90	85
9	75	92	97	101	89	89	74	98	90	87	90	84
10	76	92	101	100	90	87	72	96	90	86	93	85
11	72	80	98	101	92	81	77	92	88	87	93	88
12	76	88	98	100	90	76	78	91	91	87	92	89
13	76	92	104	100	91	76	81	92	92	90	93	88
14	87	91	105	99	97	74	83	94	92	89	93	89
15	80	90	104	96	94	78	83	81	92	88	93	89
16	78	88	107	98	91	79	81	74	92	90	81	89
17	76	87	109	100	91	65	82	89	91	87	85	83
18	78	87	109	94	89	52	85	90	90	88	89	92
19	72	89	103	90	89	68	96	98	90	89	91	92
20	76	87	100	79	87	71	89	98	90	88	92	94
21	81	96	89	83	87	74	89	97	89	87	92	95
22	84	98	88	90	86	65	90	94	85	87	90	95
23	83	98	88	94	87	68	89	96	86	89	84	94
24	86	94	96	88	83	71	82	94	92	90	87	97
25	81	92	100	89	84	78	88	95	87	88	90	94
26	79	90	101	90	87	81	98	95	90	89	89	91
27	76	87	98	89	88	84	94	96	89	89	92	76
28	75	90	96	93	88	81	96	98	89	90	91	86
29	69	90	—	57	88	84	98	97	90	89	92	89
30	85	95	—	6	60	84	98	96	e94	90	91	89
31	92	97	—	74	—	84	—	94	e97	—	92	—
Total[1]	**2,395**	**2,772**	**2,676**	**2,792**	**2,246**	**2,515**	**2,548**	**2,900**	**2,831**	**2,652**	**2,796**	**2,674**
Mean[2]	77.3	89.4	99.1	90.1	88.2	81.0	84.9	93.5	91.3	88.4	90.2	89.1

[1]The year's total is 31,099 million gallons.

[2]The combined mean is 88.5 million gallons per day.

Table 9. New York City reservoir release design data, from December 1, 2013, to November 30, 2014.

[Delaware River Master daily operations record. The Montague flow objective was 1,750 ft³/s. Column (col.) 1 was provided by electric utility PPL Corporation; col. 2 provided by electric utility Eagle Creek Renewable Energy; col. 3 computed from index stations (fig. 1); 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, directed release amount from the Office of the Delaware River Master = col. 6 + col. 7, when positive, otherwise col. 8 =0; col. 9 = col. 7 from table 10; col. 10 = summation of col. 9; col. 11 = flow objective − (col. 9 + col. 10 from table 10) when positive, otherwise col. 11 = 0; col. 12 = summation of col. 11; col. 13 = col. 10 − col. 12; col. 14 = col. 13 divided by −10, limited to ±50 cubic feet per second ; cols. 10, 12, 13, and 14 are accumulated from the previous water year starting June 1, 2011, with these values being reset on June 1, 2012; X, a miscalculation of col. 12 – Col 10 was recorded during the directed release design process; Y, the balancing adjustment was not reset on June 15, 2012. ft³/s, cubic foot per second; (ft³/s)-d, cubic foot per second for a day]

Advance estimate of discharge of Delaware River at Montague, New Jersey, exclusive of New York City reservoir releases							Indicated deficiency	Balancing adjustment	Directed release (ft³/s)	Computation of balancing adjustment					
Date of advance estimate	Powerplant release forecasts		Uncontrolled runoff		Montague site[1] date	Discharge (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)		
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
The estimated Montague discharge was greater than the Montague design rate from 12/01/2013 to 08/01/2014															
7/29/2014	222	142	1,535	1	8/1/2014	1,900	0	0	0	0	0	58	148	−148	15
7/30/2014	335	71	1,535	29	8/2/2014	1,970	0	0	0	0	0	0	148	−148	15
7/31/2014	222	0	1,483	102	8/3/2014	1,807	0	9	0	0	0	318	466	−466	47
8/1/2014	222	71	1,394	191	8/4/2014	1,878	0	15	0	0	0	207	673	−673	50
8/2/2014	221	142	1,375	66	8/5/2014	1,754	0	15	0	0	0	99	772	−772	50
8/3/2014	221	142	1,500	65	8/6/2014	1,928	0	47	0	0	0	180	952	−952	50
8/4/2014	221	142	1,375	23	8/7/2014	1,761	0	50	0	0	0	180	1,132	−1,132	50
8/5/2014	221	142	1,219	50	8/8/2014	1,632	118	50	168	168	168	300	1,432	−1,264	50
8/6/2014	347	142	1,121	6	8/9/2014	1,616	134	50	184	184	352	156	1,588	−1,236	50
8/7/2014	221	319	1,100	0	8/10/2014	1,640	110	50	170	170	522	489	2,077	−1,555	50
8/8/2014	221	0	1,162	0	8/11/2014	1,383	367	50	417	417	939	579	2,656	−1,717	50
8/9/2014	182	0	1,091	0	8/12/2014	1,273	477	50	527	527	1,466	470	3,126	−1,660	50
8/10/2014	182	0	966	412	8/13/2014	1,560	190	50	240	240	1,706	432	3,558	−1,852	50
8/11/2014	182	0	853	1,803	8/14/2014	2,838	0	50	0	0	1,706	139	3,697	−1,991	50
8/12/2014	182	124	919	2,793	8/15/2014	4,018	0	50	0	0	1,706	359	4,056	−2,350	50
8/13/2014	83	0	1,255	88	8/16/2014	1,426	324	50	374	374	2,080	702	4,758	−2,678	50
8/14/2014	182	0	1,213	4	8/17/2014	1,399	351	50	401	401	2,481	828	5,586	−3,105	50
8/15/2014	182	0	1,453	15	8/18/2014	1,650	100	50	150	150	2,631	896	6,482	−3,851	50
8/16/2014	165	0	1,116	5	8/19/2014	1,286	464	50	514	514	3,145	766	7,248	−4,103	50
8/17/2014	165	0	675	0	8/20/2014	840	910	50	960	962	4,107	682	7,930	−3,823	50
8/18/2014	165	0	625	13	8/21/2014	803	947	50	997	976	5,083	686	8,616	−3,533	50
8/19/2014	165	0	600	17	8/22/2014	782	968	50	1,018	1,018	6,071	0	8,616	−2,545	50
8/20/2014	165	0	600	48	8/23/2014	813	937	50	987	985	7,056	0	8,616	−1,558	50
8/21/2014	0	0	600	49	8/24/2014	649	1,101	50	1,151	1,151	8,209	101	8,717	−508	50

Table 9. New York City reservoir release design data, from December 1, 2013, to November 30, 2014.—Continued

[Delaware River Master daily operations record. The Montague flow objective was 1,750 ft³/s. Column (col.) 1 was provided by electric utility PPL Corporation; col. 2 provided by electric utility Eagle Creek Renewable Energy; col. 3 computed from index stations (fig. 1); 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, directed release amount from the Office of the Delaware River Master = col. 6 + col. 7, when positive, otherwise col. 8 =0; col. 9 = col. 7 from table 10; col. 10 = summation of col. 9; col. 11 = flow objective − (col. 9 + col. 10 from table 10) when positive, otherwise col. 11 = 0; col. 12 = summation of col. 11; col. 13 = col. 10 − col. 12; col. 14 = col. 13 divided by −10, limited to ±50 cubic feet per second ; cols. 10, 12, 13, and 14 are accumulated from the previous water year starting June 1, 2011, with these values being reset on June 1, 2012; X, a miscalculation of col. 12 – Col 10 was recorded during the directed release design process; Y, the balancing adjustment was not reset on June 15, 2012. ft³/s, cubic foot per second; (ft³/s)-d, cubic foot per second for a day]

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 site[1] date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment	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)		
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
8/22/2014	0	53	1,750	38	8/25/2014	1,841	0	50	0	0	8,209	285	9,002	−793	50
8/23/2014	352	71	2,027	5	8/26/2014	2,455	0	50	0	0	8,209	245	9,247	−1,038	50
8/24/2014	352	71	1,750	0	8/27/2014	2,173	0	50	0	0	8,209	192	9,439	1,230	50
8/25/2014	352	71	1,298	2	8/28/2014	1,723	27	50	77	77	8,286	316	9,755	−1,469	50
8/26/2014	352	53	1,096	4	8/29/2014	1,505	245	50	295	295	8,581	660	10,415	−1,834	50
8/27/2014	352	0	1,053	24	8/30/2014	1,429	321	50	371	371	8,952	742	11,157	−2,205	50
8/28/2014	0	0	967	1	8/31/2014	968	782	50	832	832	9,784	582	11,739	−1,955	50
8/29/2014	0	0	750	9	9/1/2014	759	991	50	1,041	1,039	10,823	769	12,508	−1,685	50
8/30/2014	204	0	475	33	9/2/2014	698	1,052	50	1,102	1,103	11,926	663	13,171	−1,245	50
8/31/2014	204	0	450	169	9/3/2014	823	927	50	977	763	12,689	483	13,654	−965	50
9/1/2014	204	0	650	58	9/4/2014	912	838	50	888	888	13,579	338	13,992	−415	42
9/2/2014	204	0	665	64	9/5/2014	933	817	50	867	865	14,442	475	14,467	−25	2
9/3/2014	349	0	720	2	9/6/2014	1,071	679	50	288	288	14,607	306	14,768	−161	16
9/4/2014	470	0	654	9	9/7/2014	1,133	617	50	667	670	15,277	560	15,328	−51	5
9/5/2014	204	0	900	113	9/8/2014	1,217	533	42	575	575	15,910	863	16,191	−281	28
9/6/2014	204	0	877	86	9/9/2014	1,167	583	2	585	585	16,541	901	17,097	−556	50
9/7/2014	204	0	803	0	9/10/2014	1,007	743	16	759	761	17,302	891	17,988	−686	50
9/8/2014	204	0	620	0	9/11/2014	824	926	5	931	930	18,232	890	18,878	−646	50
9/9/2014	204	124	446	0	9/12/2014	774	976	28	1,004	1,004	19,236	1,014	19,892	−656	50
9/10/2014	204	0	573	20	9/13/2014	797	953	50	1,003	1,002	20,238	1,122	21,014	−776	50
9/11/2014	204	0	563	16	9/14/2014	783	967	50	1,017	1,021	21,259	1,041	22,055	−796	40
9/12/2014	0	0	500	38	9/15/2014	538	1,212	50	1,262	1,262	22,521	1,072	23,127	−606	50
9/13/2014	0	0	495	55	9/16/2014	550	1,200	50	1,250	1,247	23,768	1,107	24,234	−466	47
9/14/2014	235	0	348	38	9/17/2014	621	1,129	50	1,179	1,177	24,945	947	25,181	−236	24
9/15/2014	235	0	429	26	9/18/2014	690	1,060	40	1,100	1,100	26,050	945	26,126	−76	8

Table 9. New York City reservoir release design data, from December 1, 2013, to November 30, 2014.—Continued

[Delaware River Master daily operations record. The Montague flow objective was 1,750 ft³/s. Column (col.) 1 was provided by electric utility PPL Corporation; col. 2 provided by electric utility Eagle Creek Renewable Energy; col. 3 computed from index stations (fig. 1); 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, directed release amount from the Office of the Delaware River Master = col. 6 + col. 7, when positive, otherwise col. 8 =0; col. 9 = col. 7 from table 10; col. 10 = summation of col. 9; col. 11 = flow objective − (col. 9 + col. 10 from table 10) when positive, otherwise col. 11 = 0; col. 12 = summation of col. 11; col. 13 = col. 10 − col. 12; col. 14 = col. 13 divided by −10, limited to ±50 cubic feet per second ; cols. 10, 12, 13, and 14 are accumulated from the previous water year starting June 1, 2011, with these values being reset on June 1, 2012; X, a miscalculation of col. 12 – Col 10 was recorded during the directed release design process; Y, the balancing adjustment was not reset on June 15, 2012. ft³/s, cubic foot per second; (ft³/s)-d, cubic foot per second for a day]

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 site[1] date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment	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)		
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
9/16/2014	235	0	500	3	9/19/2014	738	1,012	50	1,062	1,061	27,111	1,041	27,167	−56	6
9/17/2014	235	0	473	0	9/20/2014	708	1,042	47	1,089	1,087	28,198	1,007	28,174	24	−2
9/18/2014	0	106	563	0	9/21/2014	669	1,081	24	1,105	1,114	29,340	1,074	29,248	95	−10
9/19/2014	0	0	471	0	9/22/2014	471	1,279	8	1,287	1,278	30,618	1,248	30,496	125	−12
9/20/2014	235	0	420	30	9/23/2014	685	1,065	6	1,071	1,075	31,693	1,045	31,541	155	−16
9/21/2014	235	0	419	13	9/24/2014	667	1,083	−2	1,081	1,087	32,780	977	32,518	268	−27
9/22/2014	235	0	451	0	9/25/2014	686	1,064	−10	1,055	1,050	33,830	1,050	33,568	262	−26
9/23/2014	235	0	430	0	9/26/2014	665	1,085	−12	1,073	1,067	34,897	1,097	34,665	232	−23
9/24/2014	235	0	431	79	9/27/2014	745	1,005	−16	990	995	35,892	915	35,580	312	−50
9/25/2014	248	0	437	9	9/28/2014	694	1,056	−27	1,029	1,036	36,928	996	36,576	352	−50
9/26/2014	151	0	465	0	9/29/2014	616	1,134	−26	1,108	1,110	38,038	1,110	37,686	352	−50
9/27/2014	151	0	400	0	9/30/2014	551	1,199	−23	1,176	1,173	39,211	1,033	38,719	492	−50
9/28/2014	0	0	400	4	10/1/2014	404	1,346	−50	1,296	1,300	40,511	1,210	39,929	582	−50
9/29/2014	0	0	410	32	10/2/2014	442	1,308	−50	1,258	1,258	41,769	1,178	41,107	662	−50
9/30/2014	0	106	410	60	10/3/2014	576	1,174	−50	1,124	1,124	42,893	1,164	42,271	622	−50
10/1/2014	0	106	435	106	10/4/2014	647	1,103	−50	1,053	1,054	43,947	944	43,215	732	−50
10/2/2014	0	0	394	340	10/5/2014	734	1,016	−50	966	965	44,912	1,125	44,340	572	−50
10/3/2014	0	0	410	516	10/6/2014	926	824	−50	774	773	45,685	1,093	45,433	252	−25
10/4/2014	0	0	432	292	10/7/2014	724	1,026	−50	976	982	46,667	1,152	46,585	82	−8
10/5/2014	0	0	492	28	10/8/2014	520	1,230	−50	1,180	1,181	47,848	1,181	47,766	82	−8
10/6/2014	0	0	400	99	10/9/2014	499	1,251	−50	1,201	1,198	49,046	1,218	48,984	62	−6
10/7/2014	0	0	443	89	10/10/2014	532	1,218	−25	1,193	1,193	50,239	1,273	50,257	−18	2
10/8/2014	0	0	514	6	10/11/2014	520	1,230	−8	1,222	1,227	51,466	1,277	51,534	−68	7
10/9/2014	0	0	474	1	10/12/2014	475	1,275	−8	1,267	1,267	52,733	1,307	52,841	−108	11
10/10/2014	0	0	457	9	10/13/2014	466	1,284	−6	1,278	1,277	54,010	1,207	54,048	−38	4

Table 9. New York City reservoir release design data, from December 1, 2013, to November 30, 2014.—Continued

[Delaware River Master daily operations record. The Montague flow objective was 1,750 ft³/s. Column (col.) 1 was provided by electric utility PPL Corporation; col. 2 provided by electric utility Eagle Creek Renewable Energy; col. 3 computed from index stations (fig. 1); 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, directed release amount from the Office of the Delaware River Master = col. 6 + col. 7, when positive, otherwise col. 8 =0; col. 9 = col. 7 from table 10; col. 10 = summation of col. 9; col. 11 = flow objective − (col. 9 + col. 10 from table 10) when positive, otherwise col. 11 = 0; col. 12 = summation of col. 11; col. 13 = col. 10 − col. 12; col. 14 = col. 13 divided by −10, limited to ±50 cubic feet per second ; cols. 10, 12, 13, and 14 are accumulated from the previous water year starting June 1, 2011, with these values being reset on June 1, 2012; X, a miscalculation of col. 12 – Col 10 was recorded during the directed release design process; Y, the balancing adjustment was not reset on June 15, 2012. ft³/s, cubic foot per second; (ft³/s)-d, cubic foot per second for a day]

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 site[1] date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment	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)		
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
10/11/2014	0	106	438	17	10/14/2014	561	1,189	2	1,191	1,195	55,205	1,225	55,273	−68	7
10/12/2014	0	0	411	46	10/15/2014	457	1,293	7	1,300	1,297	56,502	1,327	56,600	−98	10
10/13/2014	0	0	411	87	10/16/2014	498	1,252	11	1,263	1,263	57,765	0	56,600	1,165	−50
10/14/2014	0	0	400	299	10/17/2014	699	1,051	4	1,055	1,056	58,821	0	56,600	2,221	−50
10/15/2014	0	0	404	680	10/18/2014	1,084	666	7	586	586	59,251	0	56,600	2,651	−50
10/16/2014	0	0	1,907	229	10/19/2014	2,136	0	10	0	0	59,251	0	56,600	2,651	−50
10/17/2014	0	18	1,809	12	10/20/2014	1,839	0	−50	0	0	59,251	0	56,600	2,651	−50
10/18/2014	0	53	2,182	0	10/21/2014	2,235	0	−50	0	0	59,251	167	56,767	2,484	−50
10/19/2014	0	124	2,027	87	10/22/2014	2,238	0	−50	0	0	59,251	277	57,044	2,207	−50
10/20/2014	0	71	1,907	204	10/23/2014	2,182	0	−50	0	0	59,251	127	57,171	2,080	−50
10/21/2014	0	0	1,655	449	10/24/2014	2,104	0	−50	0	0	59,251	0	57,171	2,080	−50
10/22/2014	0	0	1,346	467	10/25/2014	1,813	0	−50	0	0	59,251	0	57,171	2,080	−50
10/23/2014	0	0	1,428	0	10/26/2014	1428	322	−50	272	272	59,523	7	57,178	2,345	−50
10/24/2014	0	0	1,753	0	10/27/2014	1,753	0	−50	0	0	59,523	199	57,377	2,146	−50
10/25/2014	0	0	1,833	0	10/28/2014	1,833	0	−50	0	0	59,523	239	57,616	1,907	−50
10/26/2014	54	0	1,700	11	10/29/2014	1,765	0	−50	0	0	59,523	259	57,875	1,648	−50
10/27/2014	0	0	1,690	69	10/30/2014	1,759	0	−50	0	0	59,523	419	58,294	1,229	−50
10/28/2014	0	0	1,344	32	10/31/2014	1,376	374	−50	324	326	59,849	436	58,730	1,119	−50
10/29/2014	0	0	1,720	32	11/1/2014	1,752	0	−50	0	0	59,849	484	59,214	635	−50
10/30/2014	0	0	1,344	6	11/2/2014	1,350	400	−50	350	353	60,202	593	59,807	395	−40
10/31/2014	0	71	1,116	3	11/3/2014	1,190	560	−50	510	513	60,715	563	60,370	345	−34
11/1/2014	0	0	1,099	9	11/4/2014	1,108	642	−50	592	596	61,311	576	60,946	365	−36
11/2/2014	54	0	1,002	0	11/5/2014	1,056	694	−50	644	674	61,985	654	61,600	385	−38
11/3/2014	0	0	982	3	11/6/2014	985	765	−40	725	742	62,727	762	62,362	365	−36
11/4/2014	0	0	1,012	955	11/7/2014	1,967	0	−34	0	0	62,727	670	63,032	−305	30

Table 9. New York City reservoir release design data, from December 1, 2013, to November 30, 2014.—Continued

[Delaware River Master daily operations record. The Montague flow objective was 1,750 ft³/s. Column (col.) 1 was provided by electric utility PPL Corporation; col. 2 provided by electric utility Eagle Creek Renewable Energy; col. 3 computed from index stations (fig. 1); 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, directed release amount from the Office of the Delaware River Master = col. 6 + col. 7, when positive, otherwise col. 8 =0; col. 9 = col. 7 from table 10; col. 10 = summation of col. 9; col. 11 = flow objective − (col. 9 + col. 10 from table 10) when positive, otherwise col. 11 = 0; col. 12 = summation of col. 11; col. 13 = col. 10 − col. 12; col. 14 = col. 13 divided by −10, limited to ±50 cubic feet per second ; cols. 10, 12, 13, and 14 are accumulated from the previous water year starting June 1, 2011, with these values being reset on June 1, 2012; X, a miscalculation of col. 12 – Col 10 was recorded during the directed release design process; Y, the balancing adjustment was not reset on June 15, 2012. ft³/s, cubic foot per second; (ft³/s)-d, cubic foot per second for a day]

Advance estimate of discharge of Delaware River at Montague, New Jersey, exclusive of New York City reservoir releases															
Date of advance estimate	Powerplant release forecasts		Uncontrolled runoff		Montague site[1] date	Discharge (ft³/s)	Indicated deficiency	Balancing adjustment	Directed release (ft³/s)	Computation of balancing adjustment					
										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)		
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14
11/5/2014	0	0	751	459	11/8/2014	1,210	540	−36	651	649	63,376	849	63,881	−505	50
11/6/2014	0	0	713	167	11/9/2014	880	870	−38	832	833	64,209	803	64,684	−475	48
11/7/2014	0	0	750	6	11/10/2014	756	994	−36	958	959	65,168	839	65,523	−355	36
11/8/2014	0	0	750	0	11/11/2014	750	1,000	30	1,030	1,034	66,202	904	66,427	−225	22
11/9/2014	54	0	725	0	11/12/2014	779	971	50	1,021	1,019	67,221	679	67,106	115	−12
11/10/2014	0	0	714	3	11/13/2014	717	1,033	48	1,081	1,079	68,300	719	67,825	475	−48
11/11/2014	0	106	678	13	11/14/2014	792	958	36	994	985	69,285	835	68,660	625	−50
11/12/2014	0	0	680	11	11/15/2014	691	1,059	22	1,081	1,081	70,366	1,051	69,711	655	−50
11/13/2014	0	0	831	13	11/16/2014	844	906	−12	894	901	71,267	1,021	70,732	535	−50
11/14/2014	0	0	807	1	11/17/2014	808	942	−48	894	883	72,150	943	71,675	475	−48
11/15/2014	0	0	732	66	11/18/2014	798	952	−50	902	903	73,053	703	72,378	675	−50
11/16/2014	0	124	350	146	11/19/2014	620	1,130	−50	1,080	1,074	74,127	114	72,492	1,635	−50
11/17/2014	0	106	350	113	11/20/2014	569	1,181	−50	1,131	1,130	75,257	380	72,872	2,385	−50
11/18/2014	0	0	639	0	11/21/2014	639	1,115	−48	1,067	1,068	76,325	618	73,490	2,835	−50
11/19/2014	0	0	966	2	11/22/2014	968	782	−50	732	736	77,061	756	74,246	2,815	−50
11/20/2014	0	0	906	9	11/23/2014	915	835	−50	785	785	77,846	735	74,981	2,865	−50
11/21/2014	0	0	828	75	11/24/2014	903	847	−50	797	785	78,631	425	75,406	3,225	−50
11/22/2014	0	0	809	347	11/25/2014	1,156	594	−50	544	548	79,179	0	75,406	3,773	−50
11/23/2014	0	0	844	300	11/26/2014	1,144	606	−50	556	559	79,738	0	75,406	4,332	−50
11/24/2014	0	0	916	414	11/27/2014	1,330	420	−50	370	375	80,113	0	75,406	4,707	−50
11/25/2014	0	0	1,079	732	11/28/2014	1,811	0	−50	0	0	80,113	0	75,406	4,707	−50
11/26/2014	0	0	2,307	1,048	11/29/2014	3,355	0	−50	0	0	80,113	0	75,406	4,707	−50
11/27/2014	0	0	2,531	2	11/30/2014	2,533	0	−50	0	0	80,113	0	75,406	4,707	−50

[1]The site is the USGS streamgage at Montague, New Jersey (U.S. Geological Survey site number 01438500).

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
11/28/2013	0	102	150	56	11/30/2013	8	106	12/1/2013	0	308	114	3,968	4,390	0
11/29/2013	0	101	150	56	12/1/2013	0	142	12/2/2013	0	307	142	3,591	4,040	0
11/30/2013	0	101	150	56	12/2/2013	0	89	12/3/2013	0	307	89	3,164	3,560	0
12/1/2013	0	101	150	56	12/3/2013	0	0	12/4/2013	0	307	0	2,973	3,280	0
12/2/2013	0	101	150	56	12/4/2013	0	106	12/5/2013	0	307	106	2,807	3,220	0
12/3/2013	0	101	150	56	12/5/2013	0	142	12/6/2013	0	307	142	3,181	3,630	0
12/4/2013	0	101	152	56	12/6/2013	0	53	12/7/2013	0	309	53	5,138	5,500	0
12/5/2013	0	101	152	56	12/7/2013	8	160	12/8/2013	0	309	168	4,903	5,380	0
12/6/2013	0	101	152	56	12/8/2013	0	0	12/9/2013	0	309	0	4,151	4,460	0
12/7/2013	0	101	152	59	12/9/2013	0	124	12/10/2013	0	312	124	3,804	4,240	0
12/8/2013	0	102	189	74	12/10/2013	0	124	12/11/2013	0	365	124	3,421	3,910	0
12/9/2013	0	150	224	74	12/11/2013	0	372	12/12/2013	0	448	372	2,850	3,670	0
12/10/2013	0	150	220	74	12/12/2013	0	496	12/13/2013	0	444	496	2,330	3,270	0
12/11/2013	0	150	221	74	12/13/2013	0	355	12/14/2013	0	445	355	2,270	3,070	0
12/12/2013	0	150	224	74	12/14/2013	0	177	12/15/2013	0	448	177	2,125	2,750	0
12/13/2013	0	150	224	74	12/15/2013	0	301	12/16/2013	0	448	301	1,901	2,650	0
12/14/2013	0	150	226	74	12/16/2013	0	532	12/17/2013	0	450	532	1,618	2,600	0
12/15/2013	0	150	226	74	12/17/2013	0	532	12/18/2013	0	450	532	1,618	2,600	0
12/16/2013	0	150	226	74	12/18/2013	0	532	12/19/2013	0	450	532	1,768	2,750	0
12/17/2013	0	150	226	74	12/19/2013	0	106	12/20/2013	0	450	106	2,714	3,270	0
12/18/2013	0	150	226	74	12/20/2013	0	213	12/21/2013	0	450	213	2,507	3,170	0
12/19/2013	0	150	226	74	12/21/2013	0	319	12/22/2013	0	450	319	4,281	5,050	0
12/20/2013	0	150	226	74	12/22/2013	0	0	12/23/2013	0	450	0	16,650	17,100	0
12/21/2013	0	150	227	74	12/23/2013	0	0	12/24/2013	0	451	0	14,649	15,100	0
12/22/2013	0	150	226	74	12/24/2013	0	0	12/25/2013	0	450	0	9,750	10,200	0
12/23/2013	0	152	226	74	12/25/2013	0	0	12/26/2013	0	452	0	6,948	7,400	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
12/24/2013	0	150	224	74	12/26/2013	0	142	12/27/2013	0	448	142	5,870	6,460	0
12/25/2013	0	152	227	74	12/27/2013	0	89	12/28/2013	0	453	89	5,008	5,550	0
12/26/2013	0	150	226	74	12/28/2013	0	89	12/29/2013	0	450	89	4,551	5,090	0
12/27/2013	0	150	227	74	12/29/2013	0	142	12/30/2013	0	451	142	9,387	9,980	0
12/28/2013	0	150	227	87	12/30/2013	4	426	12/31/2013	0	464	430	9,406	10,300	0
12/29/2013	0	150	224	125	12/31/2013	0	426	1/1/2014	0	499	426	6,635	7,560	0
12/30/2013	0	152	226	125	1/1/2014	102	230	1/2/2014	0	503	332	6,035	6,870	0
12/31/2013	0	150	224	125	1/2/2014	383	550	1/3/2014	0	499	933	4,958	6,390	0
1/1/2014	0	150	224	125	1/3/2014	1,148	816	1/4/2014	0	499	1,964	4,137	6,600	0
1/2/2014	0	150	224	125	1/4/2014	648	532	1/5/2014	0	499	1,180	3,451	5,130	0
1/3/2014	0	152	224	125	1/5/2014	112	319	1/6/2014	0	501	431	4,618	5,550	0
1/4/2014	0	152	224	125	1/6/2014	1,109	709	1/7/2014	0	501	1,818	14,581	16,900	0
1/5/2014	0	150	224	125	1/7/2014	1,286	851	1/8/2014	0	499	2,137	9,164	11,800	0
1/6/2014	0	150	385	125	1/8/2014	902	798	1/9/2014	0	660	1,700	7,640	10,000	0
1/7/2014	0	150	693	125	1/9/2014	109	337	1/10/2014	0	968	446	6,356	7,770	0
1/8/2014	0	152	696	125	1/10/2014	412	0	1/11/2014	0	973	412	6,335	7,720	0
1/9/2014	0	150	696	130	1/11/2014	0	0	1/12/2014	0	976	0	16,924	17,900	0
1/10/2014	0	150	811	190	1/12/2014	99	0	1/13/2014	0	1,151	99	15,750	17,000	0
1/11/2014	0	152	1,406	190	1/13/2014	457	301	1/14/2014	0	1,748	758	10,794	13,300	0
1/12/2014	0	150	1,497	190	1/14/2014	502	390	1/15/2014	0	1,837	892	12,271	15,000	0
1/13/2014	0	373	1,484	190	1/15/2014	663	372	1/16/2014	0	2,047	1,035	9,818	12,900	0
1/14/2014	0	500	1,504	190	1/16/2014	585	230	1/17/2014	0	2,194	815	7,891	10,900	0
1/15/2014	0	500	1,505	190	1/17/2014	683	89	1/18/2014	0	2,195	772	6,793	9,760	0
1/16/2014	0	507	1,507	190	1/18/2014	703	0	1/19/2014	0	2,204	703	6,103	9,010	0
1/17/2014	0	695	1,502	190	1/19/2014	676	337	1/20/2014	0	2,387	1,013	5,240	8,640	0
1/18/2014	0	699	1,497	190	1/20/2014	547	851	1/21/2014	0	2,386	1,398	4,616	8,400	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
1/19/2014	0	698	1,496	178	1/21/2014	676	851	1/22/2014	0	2,372	1,527	3,601	7,500	0
1/20/2014	0	698	1,499	190	1/22/2014	543	851	1/23/2014	0	2,387	1,394	3,039	6,820	0
1/21/2014	0	698	1,497	190	1/23/2014	697	851	1/24/2014	0	2,385	1,548	3,407	7,340	0
1/22/2014	0	699	1,496	190	1/24/2014	432	851	1/25/2014	0	2,385	1,283	3,292	6,960	0
1/23/2014	0	699	1,499	190	1/25/2014	335	851	1/26/2014	0	2,388	1,186	3,226	6,800	0
1/24/2014	0	699	1,497	190	1/26/2014	294	851	1/27/2014	0	2,386	1,145	2,719	6,250	0
1/25/2014	0	698	1,496	175	1/27/2014	484	851	1/28/2014	0	2,369	1,335	2,166	5,870	0
1/26/2014	0	699	1,490	114	1/28/2014	759	851	1/29/2014	0	2,303	1,610	1,747	5,660	0
1/27/2014	0	701	1,497	74	1/29/2014	587	656	1/30/2014	0	2,272	1,243	1,885	5,400	0
1/28/2014	0	699	1,505	74	1/30/2014	41	213	1/31/2014	0	2,278	254	2,338	4,870	0
1/29/2014	0	696	1499	74	1/31/2014	44	0	2/1/2014	0	2,269	44	2,537	4,850	0
1/30/2014	0	509	1457	74	2/1/2014	0	0	2/2/2014	0	2,040	0	2,320	4,360	0
1/31/2014	0	500	897	74	2/2/2014	7	0	2/3/2014	0	1,471	7	2,332	3,810	0
2/1/2014	0	500	794	74	2/3/2014	0	0	2/4/2014	0	1,368	0	2,172	3,540	0
2/2/2014	0	501	758	74	2/4/2014	63	0	2/5/2014	0	1,333	63	1,924	3,320	0
2/3/2014	0	467	619	74	2/5/2014	328	0	2/6/2014	0	1,160	328	1,862	3,350	0
2/4/2014	0	206	314	74	2/6/2014	251	195	2/7/2014	0	594	446	2,130	3,170	0
2/5/2014	0	186	257	74	2/7/2014	453	177	2/8/2014	0	517	630	2,073	3,220	0
2/6/2014	0	150	226	74	2/8/2014	288	0	2/9/2014	0	450	288	1,962	2,700	0
2/7/2014	0	150	229	74	2/9/2014	328	142	2/10/2014	0	453	470	1,887	2,810	0
2/8/2014	0	150	229	74	2/10/2014	524	337	2/11/2014	0	453	861	1,456	2,770	0
2/9/2014	0	150	226	74	2/11/2014	837	532	2/12/2014	0	450	1,369	781	2,600	0
2/10/2014	0	152	227	74	2/12/2014	740	514	2/13/2014	0	453	1,254	633	2,340	0
2/11/2014	0	150	226	74	2/13/2014	757	266	2/14/2014	0	450	1,023	727	2,200	0
2/12/2014	0	149	224	74	2/14/2014	651	71	2/15/2014	0	447	722	1,851	3,020	0
2/13/2014	0	149	241	74	2/15/2014	742	71	2/16/2014	0	464	813	2,073	3,350	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey						
Directed								Controlled releases						
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
2/14/2014	0	149	410	74	2/16/2014	547	142	2/17/2014	0	633	689	1,948	3,270	0
2/15/2014	0	149	647	74	2/17/2014	516	301	2/18/2014	0	870	817	2,013	3,700	0
2/16/2014	0	150	760	74	2/18/2014	885	89	2/19/2014	0	984	974	2,242	4,200	0
2/17/2014	0	150	764	74	2/19/2014	1,070	0	2/20/2014	0	988	1,070	2,042	4,100	0
2/18/2014	0	150	761	74	2/20/2014	1,091	0	2/21/2014	0	985	1,091	2,124	4,200	0
2/19/2014	0	150	769	74	2/21/2014	459	35	2/22/2014	0	993	494	2,513	4,000	0
2/20/2014	0	150	777	74	2/22/2014	412	0	2/23/2014	0	1,001	412	3,137	4,550	0
2/21/2014	0	150	778	74	2/23/2014	631	0	2/24/2014	0	1,002	631	3,427	5,060	0
2/22/2014	0	150	777	74	2/24/2014	437	106	2/25/2014	0	1,001	543	3,256	4,800	0
2/23/2014	0	150	774	74	2/25/2014	424	248	2/26/2014	0	998	672	2,680	4,350	0
2/24/2014	0	150	775	74	2/26/2014	362	461	2/27/2014	0	999	823	2,448	4,270	0
2/25/2014	0	150	775	74	2/27/2014	646	372	2/28/2014	0	999	1,018	2,513	4,530	0
2/26/2014	0	150	774	74	2/28/2014	246	160	3/1/2014	0	998	406	2,046	3,450	0
2/27/2014	0	150	829	74	3/1/2014	333	71	3/2/2014	0	1,053	404	2,183	3,640	0
2/28/2014	0	150	919	74	3/2/2014	310	160	3/3/2014	0	1,143	470	2,207	3,820	0
3/1/2014	0	150	919	74	3/3/2014	407	124	3/4/2014	0	1,143	531	1,986	3,660	0
3/2/2014	0	150	916	74	3/4/2014	67	35	3/5/2014	0	1,140	102	1,958	3,200	0
3/3/2014	0	150	924	74	3/5/2014	7	53	3/6/2014	0	1,148	60	1,742	2,950	0
3/4/2014	0	150	925	74	3/6/2014	0	0	3/7/2014	0	1,149	0	1,691	2,840	0
3/5/2014	0	150	919	74	3/7/2014	0	0	3/8/2014	0	1,143	0	1,717	2,860	0
3/6/2014	0	150	927	74	3/8/2014	0	0	3/9/2014	0	1,151	0	1,769	2,920	0
3/7/2014	0	150	925	71	3/9/2014	0	0	3/10/2014	0	1,146	0	1,784	2,930	0
3/8/2014	0	144	888	68	3/10/2014	0	0	3/11/2014	0	1,100	0	1,920	3,020	0
3/9/2014	0	141	758	56	3/11/2014	0	0	3/12/2014	0	955	0	2,845	3,800	0
3/10/2014	0	102	566	57	3/12/2014	82	177	3/13/2014	0	725	259	5,036	6,020	0
3/11/2014	0	104	415	53	3/13/2014	264	426	3/14/2014	0	572	690	5,358	6,620	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
3/12/2014	0	96	322	56	3/14/2014	0	177	3/15/2014	0	474	177	4,399	5,050	0
3/13/2014	0	101	286	56	3/15/2014	0	0	3/16/2014	0	443	0	4,657	5,100	0
3/14/2014	0	101	230	56	3/16/2014	0	35	3/17/2014	0	387	35	4,348	4,770	0
3/15/2014	0	101	167	56	3/17/2014	0	248	3/18/2014	0	324	248	3,748	4,320	0
3/16/2014	0	101	153	56	3/18/2014	0	124	3/19/2014	0	310	124	3,526	3,960	0
3/17/2014	0	101	153	56	3/19/2014	0	0	3/20/2014	0	310	0	4,340	4,650	0
3/18/2014	0	101	150	56	3/20/2014	0	0	3/21/2014	0	307	0	5,853	6,160	0
3/19/2014	0	101	150	56	3/21/2014	0	0	3/22/2014	0	307	0	6,013	6,320	0
3/20/2014	0	101	150	56	3/22/2014	0	0	3/23/2014	0	307	0	6,643	6,950	0
3/21/2014	0	101	150	56	3/23/2014	0	177	3/24/2014	0	307	177	5,816	6,300	0
3/22/2014	0	101	150	56	3/24/2014	0	230	3/25/2014	0	307	230	4,733	5,270	0
3/23/2014	0	101	150	56	3/25/2014	0	266	3/26/2014	0	307	266	4,147	4,720	0
3/24/2014	0	101	150	56	3/26/2014	66	266	3/27/2014	0	307	332	3,671	4,310	0
3/25/2014	0	101	150	56	3/27/2014	0	124	3/28/2014	0	307	124	3,379	3,810	0
3/26/2014	0	101	149	56	3/28/2014	0	0	3/29/2014	0	306	0	4,514	4,820	0
3/27/2014	0	101	152	56	3/29/2014	260	0	3/30/2014	0	309	260	15,231	15,800	0
3/28/2014	0	101	150	56	3/30/2014	908	71	3/31/2014	0	307	979	24,414	25,700	0
3/29/2014	0	101	150	56	3/31/2014	616	284	4/1/2014	0	307	900	18,293	19,500	0
3/30/2014	0	101	150	56	4/1/2014	520	709	4/2/2014	0	307	1,229	14,564	16,100	0
3/31/2014	0	101	266	56	4/2/2014	471	851	4/3/2014	0	423	1,322	12,955	14,700	0
4/1/2014	0	101	396	56	4/3/2014	529	851	4/4/2014	0	553	1,380	11,667	13,600	0
4/2/2014	0	101	398	56	4/4/2014	382	851	4/5/2014	0	555	1,233	11,712	13,500	0
4/3/2014	0	101	401	56	4/5/2014	0	851	4/6/2014	0	558	851	10,891	12,300	0
4/4/2014	0	101	416	74	4/6/2014	64	851	4/7/2014	0	591	915	9,094	10,600	0
4/5/2014	0	141	466	76	4/7/2014	422	851	4/8/2014	0	683	1,273	8,544	10,500	0
4/6/2014	0	150	688	76	4/8/2014	387	851	4/9/2014	0	914	1,238	10,248	12,400	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
4/7/2014	0	150	1,496	76	4/9/2014	1,246	851	4/10/2014	0	1,722	2,097	8,381	12,200	0
4/8/2014	0	150	1,497	76	4/10/2014	1,238	851	4/11/2014	0	1,723	2,089	6,988	10,800	0
4/9/2014	0	150	1,496	76	4/11/2014	635	851	4/12/2014	0	1,722	1,486	7,092	10,300	0
4/10/2014	0	150	1,496	76	4/12/2014	0	851	4/13/2014	0	1,722	851	7,147	9,720	0
4/11/2014	0	150	1,488	76	4/13/2014	453	851	4/14/2014	0	1,714	1,304	6,622	9,640	0
4/12/2014	0	150	1,494	76	4/14/2014	1,018	798	4/15/2014	0	1,720	1,816	6,564	10,100	0
4/13/2014	0	234	1,494	76	4/15/2014	1,221	585	4/16/2014	0	1,804	1,806	20,890	24,500	0
4/14/2014	0	483	1,497	76	4/16/2014	1,422	621	4/17/2014	0	2,056	2,043	16,401	20,500	0
4/15/2014	0	630	1,504	76	4/17/2014	1,417	266	4/18/2014	0	2,210	1,683	13,207	17,100	0
4/16/2014	0	702	1,508	76	4/18/2014	534	0	4/19/2014	0	2,286	534	10,880	13,700	0
4/17/2014	0	699	1,504	76	4/19/2014	0	0	4/20/2014	0	2,279	0	9,321	11,600	0
4/18/2014	0	699	1,490	76	4/20/2014	362	0	4/21/2014	0	2,265	362	7,873	10,500	0
4/19/2014	0	699	1,491	76	4/21/2014	591	0	4/22/2014	0	2,266	591	6,303	9,160	0
4/20/2014	0	699	1,491	76	4/22/2014	433	35	4/23/2014	0	2,266	468	5,506	8,240	0
4/21/2014	0	699	1,496	76	4/23/2014	171	248	4/24/2014	0	2,271	419	5,080	7,770	0
4/22/2014	0	699	1,497	76	4/24/2014	429	230	4/25/2014	0	2,272	659	4,229	7,160	0
4/23/2014	0	702	1,499	76	4/25/2014	301	301	4/26/2014	0	2,277	602	3,511	6,390	0
4/24/2014	0	668	1,426	76	4/26/2014	0	53	4/27/2014	0	2,170	53	3,467	5,690	0
4/25/2014	0	571	1,078	76	4/27/2014	197	124	4/28/2014	0	1,725	321	3,534	5,580	0
4/26/2014	0	521	769	76	4/28/2014	1,064	390	4/29/2014	0	1,366	1,454	3,360	6,180	0
4/27/2014	0	501	705	76	4/29/2014	1,422	851	4/30/2014	0	1,282	2,273	4,235	7,790	0
4/28/2014	0	500	705	76	4/30/2014	1,426	762	5/1/2014	0	1,281	2,188	12,231	15,700	0
4/29/2014	0	500	705	79	5/1/2014	1,619	674	5/2/2014	0	1,284	2,293	11,923	15,500	0
4/30/2014	0	500	705	90	5/2/2014	384	319	5/3/2014	0	1,295	703	8,402	10,400	0
5/1/2014	0	452	705	90	5/3/2014	0	230	5/4/2014	0	1,247	230	7,083	8,560	0
5/2/2014	0	436	705	90	5/4/2014	106	213	5/5/2014	0	1,231	319	5,990	7,540	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
5/3/2014	0	128	705	90	5/5/2014	117	284	5/6/2014	0	923	401	5,396	6,720	0
5/4/2014	0	101	605	90	5/6/2014	148	372	5/7/2014	0	796	520	4,934	6,250	0
5/5/2014	0	101	404	90	5/7/2014	224	301	5/8/2014	0	595	525	4,560	5,680	0
5/6/2014	0	101	404	90	5/8/2014	230	337	5/9/2014	0	595	567	4,728	5,890	0
5/7/2014	0	101	404	90	5/9/2014	277	390	5/10/2014	0	595	667	5,458	6,720	0
5/8/2014	0	101	419	101	5/10/2014	0	390	5/11/2014	0	621	390	5,169	6,180	0
5/9/2014	0	124	456	101	5/11/2014	0	390	5/12/2014	0	681	390	4,949	6,020	0
5/10/2014	0	149	478	101	5/12/2014	307	195	5/13/2014	0	728	502	4,280	5,510	0
5/11/2014	0	150	478	101	5/13/2014	411	71	5/14/2014	0	729	482	3,979	5,190	0
5/12/2014	0	150	478	97	5/14/2014	672	106	5/15/2014	0	725	778	3,627	5,130	0
5/13/2014	0	144	435	90	5/15/2014	1,225	426	5/16/2014	0	669	1,651	4,140	6,460	0
5/14/2014	0	101	405	90	5/16/2014	457	426	5/17/2014	0	596	883	34,621	36,100	0
5/15/2014	0	101	348	90	5/17/2014	1,190	851	5/18/2014	0	539	2,041	26,020	28,600	0
5/16/2014	0	101	161	96	5/18/2014	1,464	496	5/19/2014	0	358	1,960	17,682	20,000	0
5/17/2014	0	127	430	101	5/19/2014	1,526	674	5/20/2014	0	658	2,200	12,542	15,400	0
5/18/2014	0	150	231	101	5/20/2014	1,653	709	5/21/2014	0	482	2,362	10,256	13,100	0
5/19/2014	0	150	478	101	5/21/2014	1,417	674	5/22/2014	0	729	2,091	8,580	11,400	0
5/20/2014	0	150	506	101	5/22/2014	1,495	621	5/23/2014	0	757	2,116	8,527	11400	0
5/21/2014	0	150	518	101	5/23/2014	606	160	5/24/2014	0	769	766	7,235	8,770	0
5/22/2014	0	150	523	101	5/24/2014	0	89	5/25/2014	0	774	89	6,597	7,460	0
5/23/2014	0	150	526	101	5/25/2014	0	124	5/26/2014	0	777	124	5,639	6,540	0
5/24/2014	0	150	526	101	5/26/2014	64	124	5/27/2014	0	777	188	4,905	5,870	0
5/25/2014	0	150	526	101	5/27/2014	408	248	5/28/2014	0	777	656	4,157	5,590	0
5/26/2014	0	150	526	101	5/28/2014	633	124	5/29/2014	0	777	757	3,506	5,040	0
5/27/2014	0	150	526	101	5/29/2014	1,049	160	5/30/2014	0	777	1,209	3,054	5,040	0
5/28/2014	0	150	526	91	5/30/2014	426	53	5/31/2014	0	767	479	2,554	3,800	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey						
Directed								Controlled releases						
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
5/29/2014	0	141	430	97	5/31/2014	0	89	6/1/2014	0	668	89	2,443	3,200	0
5/30/2014	0	139	438	110	6/1/2014	60	35	6/2/2014	0	687	95	2,188	2,970	0
5/31/2014	0	139	504	110	6/2/2014	409	53	6/3/2014	0	753	462	2,105	3,320	0
6/1/2014	0	139	504	110	6/3/2014	467	71	6/4/2014	0	753	538	2,099	3,390	0
6/2/2014	0	139	503	110	6/4/2014	720	71	6/5/2014	0	752	791	2,597	4,140	0
6/3/2014	0	139	504	110	6/5/2014	691	89	6/6/2014	0	753	780	2,547	4,080	0
6/4/2014	0	139	504	110	6/6/2014	112	89	6/7/2014	0	753	201	2,276	3,230	0
6/5/2014	0	139	503	110	6/7/2014	0	18	6/8/2014	0	752	18	1,970	2,740	0
6/6/2014	0	139	490	110	6/8/2014	269	0	6/9/2014	0	739	269	1,832	2,840	0
6/7/2014	0	139	495	110	6/9/2014	469	0	6/10/2014	0	744	469	1,947	3,160	0
6/8/2014	0	139	501	110	6/10/2014	384	71	6/11/2014	0	750	455	2,025	3,230	0
6/9/2014	0	139	498	110	6/11/2014	426	35	6/12/2014	0	747	461	1,972	3,180	0
6/10/2014	0	139	500	110	6/12/2014	476	71	6/13/2014	0	749	547	2,774	4,070	0
6/11/2014	0	139	498	110	6/13/2014	323	124	6/14/2014	0	747	447	13,806	15,000	0
6/12/2014	0	139	498	110	6/14/2014	236	177	6/15/2014	0	747	413	10,740	11,900	0
6/13/2014	0	139	501	110	6/15/2014	712	248	6/16/2014	0	750	960	6,330	8,040	0
6/14/2014	0	139	500	110	6/16/2014	548	124	6/17/2014	0	749	672	4,739	6,160	0
6/15/2014	0	139	501	110	6/17/2014	1,313	71	6/18/2014	0	750	1,384	3,866	6,000	0
6/16/2014	0	139	501	110	6/18/2014	775	284	6/19/2014	0	750	1,059	3,761	5,570	0
6/17/2014	0	139	503	110	6/19/2014	305	284	6/20/2014	0	752	589	3,649	4,990	0
6/18/2014	0	139	503	110	6/20/2014	421	89	6/21/2014	0	752	510	2,858	4,120	0
6/19/2014	0	139	503	110	6/21/2014	214	0	6/22/2014	0	752	214	2,554	3,520	0
6/20/2014	0	139	503	110	6/22/2014	302	0	6/23/2014	0	752	302	2,326	3,380	0
6/21/2014	0	139	503	110	6/23/2014	394	0	6/24/2014	0	752	394	2,174	3,320	0
6/22/2014	0	139	500	110	6/24/2014	336	0	6/25/2014	0	749	336	2,065	3,150	0
6/23/2014	0	139	501	110	6/25/2014	473	0	6/26/2014	0	750	473	5,997	7,220	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
6/24/2014	0	139	501	110	6/26/2014	369	106	6/27/2014	0	750	475	10,275	11,500	0
6/25/2014	0	139	503	110	6/27/2014	279	248	6/28/2014	0	752	527	6,761	8,040	0
6/26/2014	0	139	503	110	6/28/2014	321	177	6/29/2014	0	752	498	4,810	6,060	0
6/27/2014	0	139	503	110	6/29/2014	393	106	6/30/2014	0	752	499	3,659	4,910	0
6/28/2014	0	139	503	110	6/30/2014	299	89	7/1/2014	0	752	388	3,250	4,390	0
6/29/2014	0	144	503	110	7/1/2014	446	248	7/2/2014	0	757	694	2,989	4,440	0
6/30/2014	0	232	503	110	7/2/2014	478	284	7/3/2014	0	845	762	6,013	7,620	0
7/1/2014	0	149	503	110	7/3/2014	399	426	7/4/2014	0	762	825	12,113	13,700	0
7/2/2014	0	142	503	110	7/4/2014	392	426	7/5/2014	0	755	818	11,327	12,900	0
7/3/2014	0	139	504	110	7/5/2014	272	426	7/6/2014	0	753	698	6,649	8,100	0
7/4/2014	0	139	504	110	7/6/2014	328	426	7/7/2014	0	753	754	4,553	6,060	0
7/5/2014	0	139	504	116	7/7/2014	439	426	7/8/2014	0	759	865	3,756	5,380	0
7/6/2014	0	155	565	139	7/8/2014	510	266	7/9/2014	0	859	776	4,055	5,690	0
7/7/2014	0	487	600	139	7/9/2014	300	124	7/10/2014	0	1,226	424	4,530	6,180	0
7/8/2014	0	500	597	139	7/10/2014	314	213	7/11/2014	0	1,236	527	3,477	5,240	0
7/9/2014	0	500	597	139	7/11/2014	341	213	7/12/2014	0	1,236	554	2,880	4,670	0
7/10/2014	0	500	606	139	7/12/2014	291	248	7/13/2014	0	1,245	539	2,526	4,310	0
7/11/2014	0	500	605	139	7/13/2014	376	248	7/14/2014	0	1,244	624	4,052	5,920	0
7/12/2014	0	500	600	141	7/14/2014	324	301	7/15/2014	0	1,241	625	8,334	10,200	0
7/13/2014	0	500	603	190	7/15/2014	246	266	7/16/2014	0	1,293	512	7,455	9,260	0
7/14/2014	0	589	602	190	7/16/2014	282	426	7/17/2014	0	1,381	708	9,011	11,100	0
7/15/2014	0	684	603	190	7/17/2014	277	426	7/18/2014	0	1,477	703	5,930	8,110	0
7/16/2014	0	699	603	190	7/18/2014	388	426	7/19/2014	0	1,492	814	4,234	6,540	0
7/17/2014	0	701	602	190	7/19/2014	265	266	7/20/2014	0	1,493	531	3,416	5,440	0
7/18/2014	0	701	602	190	7/20/2014	303	248	7/21/2014	0	1,493	551	2,846	4,890	0
7/19/2014	0	698	602	190	7/21/2014	297	213	7/22/2014	0	1,490	510	2,510	4,510	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
7/20/2014	0	701	600	190	7/22/2014	360	142	7/23/2014	0	1,491	502	2,307	4,300	0
7/21/2014	0	701	602	189	7/23/2014	369	266	7/24/2014	0	1,492	635	2,023	4,150	0
7/22/2014	0	699	602	190	7/24/2014	212	266	7/25/2014	0	1,491	478	2,591	4,560	0
7/23/2014	0	699	600	190	7/25/2014	383	266	7/26/2014	0	1,489	649	1,952	4,090	0
7/24/2014	0	699	600	190	7/26/2014	277	213	7/27/2014	0	1,489	490	1,551	3,530	0
7/25/2014	0	520	600	190	7/27/2014	225	195	7/28/2014	0	1,310	420	1,640	3,370	0
7/26/2014	0	498	600	190	7/28/2014	123	195	7/29/2014	0	1,288	318	1,704	3,310	0
7/27/2014	0	500	599	190	7/29/2014	107	142	7/30/2014	0	1,289	249	1,602	3,140	0
7/28/2014	0	500	600	190	7/30/2014	77	142	7/31/2014	0	1,290	219	1,441	2,950	0
7/29/2014	0	498	600	190	7/31/2014	217	142	8/1/2014	0	1,288	359	1,333	2,980	0
7/30/2014	0	498	597	190	8/1/2014	360	71	8/2/2014	0	1,285	431	1,554	3,270	0
7/31/2014	0	309	599	190	8/2/2014	67	71	8/3/2014	0	1,098	138	1,294	2,530	0
8/1/2014	0	150	597	190	8/3/2014	140	71	8/4/2014	0	937	211	1,332	2,480	0
8/2/2014	0	150	599	190	8/4/2014	280	106	8/5/2014	0	939	386	1,265	2,590	0
8/3/2014	0	150	600	190	8/5/2014	257	106	8/6/2014	0	940	363	1,207	2,510	0
8/4/2014	0	150	600	190	8/6/2014	230	e142	8/7/2014	0	940	e372	e1,198	2,510	0
8/5/2014	168	150	600	190	8/7/2014	165	71	8/8/2014	168	772	236	1,214	2,390	0
8/6/2014	184	150	597	189	8/8/2014	370	142	8/9/2014	184	752	512	1,082	2,530	0
8/7/2014	170	150	599	190	8/9/2014	232	18	8/10/2014	170	769	250	1,011	2,200	0
8/8/2014	417	150	599	190	8/10/2014	216	35	8/11/2014	417	522	251	920	2,110	0
8/9/2014	527	150	600	190	8/11/2014	154	160	8/12/2014	527	413	314	966	2,220	0
8/10/2014	240	150	602	190	8/12/2014	0	266	8/13/2014	240	702	266	1,052	2,260	0
8/11/2014	0	149	600	190	8/13/2014	32	230	8/14/2014	0	939	262	1,349	2,550	0
8/12/2014	0	149	600	190	8/14/2014	13	89	8/15/2014	0	939	102	1,289	2,330	0
8/13/2014	374	149	599	184	8/15/2014	0	0	8/16/2014	374	558	0	1,048	1,980	0
8/14/2014	401	149	599	150	8/16/2014	0	0	8/17/2014	401	497	0	922	1,820	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
8/15/2014	150	150	596	150	8/17/2014	26	0	8/18/2014	150	746	26	828	1,750	0
8/16/2014	514	149	597	150	8/18/2014	179	0	8/19/2014	514	382	179	805	1,880	0
8/17/2014	960	150	662	150	8/19/2014	202	18	8/20/2014	962	0	220	848	2,030	0
8/18/2014	997	150	676	150	8/20/2014	225	0	8/21/2014	976	0	225	839	2,040	0
8/19/2014	1,018	150	718	150	8/21/2014	225	18	8/22/2014	1,018	0	243	3,099	4,360	0
8/20/2014	987	150	685	150	8/22/2014	292	0	8/23/2014	985	0	292	2,323	3,600	0
8/21/2014	1,151	150	851	150	8/23/2014	5	195	8/24/2014	1,151	0	200	1,449	2,800	0
8/22/2014	0	150	605	150	8/24/2014	208	0	8/25/2014	0	905	208	1,257	2,370	0
8/23/2014	0	150	605	150	8/25/2014	311	89	8/26/2014	0	905	400	1,105	2,410	0
8/24/2014	0	150	602	150	8/26/2014	440	177	8/27/2014	0	902	617	941	2,460	0
8/25/2014	77	150	606	150	8/27/2014	501	89	8/28/2014	77	829	590	844	2,340	0
8/26/2014	295	150	603	147	8/28/2014	308	18	8/29/2014	295	605	326	764	1,990	0
8/27/2014	371	150	603	139	8/29/2014	308	18	8/30/2014	371	521	326	682	1,900	0
8/28/2014	832	150	603	139	8/30/2014	442	18	8/31/2014	832	60	460	708	2,060	0
8/29/2014	1,041	150	750	139	8/31/2014	152	53	9/1/2014	1,039	0	205	776	2,020	0
8/30/2014	1,102	150	826	127	9/1/2014	140	213	9/2/2014	1,103	0	353	734	2,190	0
8/31/2014	977	150	512	101	9/2/2014	303	230	9/3/2014	763	0	533	734	2,030	0
9/1/2014	888	150	637	101	9/3/2014	387	213	9/4/2014	888	0	600	812	2,300	0
9/2/2014	867	150	625	90	9/4/2014	300	142	9/5/2014	865	0	442	833	2,140	0
9/3/2014	288	139	467	90	9/5/2014	386	248	9/6/2014	288	408	634	810	2,140	0
9/4/2014	667	139	441	90	9/6/2014	393	0	9/7/2014	670	0	393	797	1,860	0
9/5/2014	575	139	404	90	9/7/2014	187	18	9/8/2014	575	58	205	682	1,520	0
9/6/2014	585	139	402	90	9/8/2014	191	53	9/9/2014	585	46	244	605	1,480	0
9/7/2014	759	139	532	90	9/9/2014	173	106	9/10/2014	761	0	279	580	1,620	0
9/8/2014	931	139	701	90	9/10/2014	212	124	9/11/2014	930	0	336	554	1,820	0
9/9/2014	1,004	139	775	90	9/11/2014	13	89	9/12/2014	1,004	0	102	634	1,740	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					IERQ bank releases
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
9/10/2014	1,003	139	973	90	9/12/2014	32	0	9/13/2014	1,002	200	32	596	1,830	200
9/11/2014	1,017	139	992	90	9/13/2014	0	0	9/14/2014	1,021	200	0	709	1,930	200
9/12/2014	1,262	139	1,233	90	9/14/2014	0	0	9/15/2014	1,262	200	0	678	2,140	200
9/13/2014	1,250	139	1,118	90	9/15/2014	0	0	9/16/2014	1,247	100	0	643	1,990	100
9/14/2014	1,179	139	1,148	90	9/16/2014	201	0	9/17/2014	1,177	200	201	602	2,180	200
9/15/2014	1,100	133	1,176	90	9/17/2014	221	0	9/18/2014	1,099	300	221	584	2,210	300
9/16/2014	1,062	101	1,170	90	9/18/2014	186	0	9/19/2014	1,061	300	186	523	2,070	300
9/17/2014	1,089	101	896	90	9/19/2014	207	0	9/20/2014	1,087	0	207	536	1,830	0
9/18/2014	1,105	101	1,023	90	9/20/2014	17	106	9/21/2014	1,104	100	123	553	1,890	100
9/19/2014	1,287	101	1,287	90	9/21/2014	0	0	9/22/2014	1,278	200	0	502	1,980	200
9/20/2014	1,071	101	1,134	90	9/22/2014	221	0	9/23/2014	1,075	250	221	484	2,030	250
9/21/2014	1,081	101	1,146	90	9/23/2014	298	0	9/24/2014	1,087	250	298	475	2,110	250
9/22/2014	1,055	101	1,109	90	9/24/2014	237	0	9/25/2014	1,050	250	237	463	2,000	250
9/23/2014	1,073	101	1,126	90	9/25/2014	237	0	9/26/2014	1,067	250	237	416	1,970	250
9/24/2014	990	101	804	90	9/26/2014	267	89	9/27/2014	995	0	356	479	1,830	0
9/25/2014	1,029	101	845	90	9/27/2014	318	0	9/28/2014	1,036	0	318	436	1,790	0
9/26/2014	1,108	101	1,069	90	9/28/2014	171	35	9/29/2014	1,110	150	206	434	1,900	150
9/27/2014	1,176	101	1,132	90	9/29/2014	88	142	9/30/2014	1,173	150	230	487	2,040	150
9/28/2014	1,296	101	1,309	90	9/30/2014	0	142	10/1/2014	1,300	200	142	398	2,040	200
9/29/2014	1,258	101	1,278	79	10/1/2014	0	142	10/2/2014	1,258	200	142	430	2,030	200
9/30/2014	1,124	101	1,067	56	10/2/2014	0	142	10/3/2014	1,124	100	142	444	1,810	100
10/1/2014	1,053	101	947	56	10/3/2014	0	301	10/4/2014	1,054	50	301	505	1,910	50
10/2/2014	966	101	808	56	10/4/2014	0	18	10/5/2014	965	0	18	607	1,590	0
10/3/2014	774	101	616	56	10/5/2014	0	0	10/6/2014	773	0	0	657	1,430	0
10/4/2014	976	101	825	56	10/6/2014	34	0	10/7/2014	982	0	34	564	1,580	0
10/5/2014	1,180	101	1,024	56	10/7/2014	0	0	10/8/2014	1,181	0	0	569	1,750	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
10/6/2014	1,201	101	1,041	56	10/8/2014	0	0	10/9/2014	1,198	0	0	532	1,730	0
10/7/2014	1,193	101	1,086	56	10/9/2014	0	0	10/10/2014	1,193	50	0	477	1,720	50
10/8/2014	1,222	101	1,170	56	10/10/2014	0	0	10/11/2014	1,227	100	0	473	1,800	100
10/9/2014	1,267	101	1,210	56	10/11/2014	0	0	10/12/2014	1,267	100	0	443	1,810	100
10/10/2014	1,278	101	1,170	56	10/12/2014	0	160	10/13/2014	1,277	50	160	383	1,870	50
10/11/2014	1,191	101	1,038	56	10/13/2014	0	106	10/14/2014	1,195	0	106	419	1,720	0
10/12/2014	1,300	101	1,140	56	10/14/2014	0	0	10/15/2014	1,297	0	0	423	1,720	0
10/13/2014	1,263	101	1,106	56	10/15/2014	0	0	10/16/2014	1,263	0	0	2,477	3,740	0
10/14/2014	1,055	101	899	56	10/16/2014	46	0	10/17/2014	1,056	0	46	7,848	8,950	0
10/15/2014	586	101	430	56	10/17/2014	0	0	10/18/2014	587	0	0	3,943	4,530	0
10/16/2014	0	101	149	56	10/18/2014	8	177	10/19/2014	0	306	185	2,589	3,080	0
10/17/2014	0	101	152	56	10/19/2014	0	71	10/20/2014	0	309	71	1,920	2,300	0
10/18/2014	0	101	150	56	10/20/2014	2	0	10/21/2014	0	307	2	1,581	1,890	0
10/19/2014	0	101	150	56	10/21/2014	48	0	10/22/2014	0	307	48	1,425	1,780	0
10/20/2014	0	101	150	56	10/22/2014	30	0	10/23/2014	0	307	30	1,593	1,930	0
10/21/2014	0	101	150	56	10/23/2014	16	0	10/24/2014	0	307	16	1,817	2,140	0
10/22/2014	0	101	149	56	10/24/2014	0	0	10/25/2014	0	306	0	1,884	2,190	0
10/23/2014	272	101	150	56	10/25/2014	0	0	10/26/2014	272	35	0	1,743	2,050	0
10/24/2014	0	101	152	56	10/26/2014	0	0	10/27/2014	0	309	0	1,651	1,960	0
10/25/2014	0	101	152	56	10/27/2014	6	0	10/28/2014	0	309	6	1,605	1,920	0
10/26/2014	0	101	152	56	10/28/2014	88	0	10/29/2014	0	309	88	1,503	1,900	0
10/27/2014	0	101	152	56	10/29/2014	0	0	10/30/2014	0	309	0	1,421	1,730	0
10/28/2014	324	101	169	56	10/30/2014	0	0	10/31/2014	326	0	0	1,414	1,740	0
10/29/2014	0	101	147	56	10/31/2014	0	0	11/1/2014	0	304	0	1,356	1,660	0
10/30/2014	350	101	196	56	11/1/2014	0	0	11/2/2014	353	0	0	1,257	1,610	0
10/31/2014	510	101	353	59	11/2/2014	0	124	11/3/2014	513	0	124	1,163	1,800	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
11/1/2014	592	105	435	56	11/3/2014	0	106	11/4/2014	596	0	106	1,068	1,770	0
11/2/2014	644	101	517	56	11/4/2014	81	106	11/5/2014	674	0	187	909	1,770	0
11/3/2014	725	101	585	56	11/5/2014	0	0	11/6/2014	742	0	0	988	1,730	0
11/4/2014	0	101	153	56	11/6/2014	0	0	11/7/2014	0	310	0	1,080	1,390	0
11/5/2014	651	101	492	56	11/7/2014	8	0	11/8/2014	649	0	8	893	1,550	0
11/6/2014	832	101	736	56	11/8/2014	0	0	11/9/2014	833	60	0	947	1,840	60
11/7/2014	958	101	862	56	11/9/2014	0	0	11/10/2014	959	60	0	911	1,930	60
11/8/2014	1,030	101	937	56	11/10/2014	0	0	11/11/2014	1,034	60	0	846	1,940	60
11/9/2014	1,021	101	972	56	11/11/2014	54	124	11/12/2014	1,019	110	178	893	2,200	110
11/10/2014	1,081	101	1,072	56	11/12/2014	0	230	11/13/2014	1,079	150	230	801	2,260	150
11/11/2014	994	101	1,078	56	11/13/2014	0	106	11/14/2014	985	250	106	809	2,150	250
11/12/2014	1,081	101	1,074	56	11/14/2014	0	0	11/15/2014	1,081	150	0	699	1,930	150
11/13/2014	894	101	794	56	11/15/2014	0	0	11/16/2014	901	50	0	729	1,680	50
11/14/2014	894	101	726	56	11/16/2014	0	0	11/17/2014	883	0	0	807	1,690	0
11/15/2014	902	101	746	56	11/17/2014	0	0	11/18/2014	903	0	0	1,047	1,950	0
11/16/2014	1,080	101	917	56	11/18/2014	0	0	11/19/2014	1,074	0	0	1,636	2,710	0
11/17/2014	1,131	101	973	56	11/19/2014	0	0	11/20/2014	1,130	0	0	1,370	2,500	0
11/18/2014	1,067	101	911	56	11/20/2014	0	0	11/21/2014	1,068	0	0	1,132	2,200	0
11/19/2014	732	101	579	56	11/21/2014	37	0	11/22/2014	736	0	37	957	1,730	0
11/20/2014	785	101	628	56	11/22/2014	0	0	11/23/2014	785	0	0	1,015	1,800	0
11/21/2014	797	101	628	56	11/23/2014	0	0	11/24/2014	785	0	0	1,325	2,110	0
11/22/2014	544	101	391	56	11/24/2014	0	0	11/25/2014	548	0	0	1,832	2,380	0
11/23/2014	556	101	402	56	11/25/2014	0	0	11/26/2014	559	0	0	2,631	3,190	0
11/24/2014	370	101	218	56	11/26/2014	0	0	11/27/2014	375	0	0	2,405	2,780	0
11/25/2014	0	101	119	56	11/27/2014	0	0	11/28/2014	0	276	0	2,234	2,510	0
11/26/2014	0	101	101	56	11/28/2014	0	0	11/29/2014	0	258	0	2,022	2,280	0

Table 10. Controlled releases from reservoirs in the upper Delaware River Basin and segregation of flow of Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.—Continued

[Delaware River Master daily operations record. All provided measurements are the mean discharge in cubic feet per second for 24 hours. Column (col.) 1 = directed release ordered by the Office of Delaware River Master; 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 = Interim Excess Release Quantity (IERQ) bank releases; —, not applicable]

Controlled releases from New York City reservoirs					Controlled releases from powerplant reservoirs			Segregation of flow, Delaware River at Montague, New Jersey					
Directed								Controlled releases					
Date	Amount	Pepacton	Cannonsville	Neversink	Date	Lake Wallenpaupack	Rio Reservoir	Date	New York City reservoirs		Powerplants	Computed uncontrolled	Total	IERQ bank releases
									Directed	Other				
	Col. 1	Col. 2	Col. 3	Col. 4		Col. 5	Col. 6		Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
11/27/2014	0	101	101	56	11/29/2014	0	0	11/30/2014	0	258	0	1,822	2,080	0
Monthly totals														
Dec. 2013	0	4,117	6,202	2,130	—	20	5,869	—	0	12,449	5,889	149,302	167,640	0
Jan. 2014	0	12,522	31,949	4,780	—	15,974	15,815	—	0	49,251	31,789	197,530	278,570	0
Feb. 2014	0	6,563	17,190	2,072	—	13,493	4,059	—	0	25,825	17,552	59,063	102,440	0
Mar. 2014	0	3,703	14,566	1,923	—	2,950	2,924	—	0	20,192	5,874	143,674	169,740	0
Apr. 2014	0	11,104	32,747	2,158	—	17,545	15,707	—	0	46,009	33,252	268,559	347,820	0
May 2014	0	5,818	15,547	2,944	—	19,534	10,993	—	0	24,309	30,527	252,724	307,560	0
June 2014	0	4,172	14,899	3,287	—	12,197	2,730	—	0	22,358	14,927	119,145	156,430	0
July 2014	0	14,454	17,817	4,900	—	9,700	8,462	—	0	37,171	18,162	132,717	188,050	0
Aug. 2014	9,833	5,500	19,199	5,258	—	6,405	2,360	—	9,812	20,145	8,765	36,528	75,250	0
Sept. 2014	29,621	3,763	26,453	2,808	—	5,538	1,861	—	29,402	3,612	7,399	18,151	58,580	3,100
Oct. 2014	20,779	3,131	20,141	1,793	—	278	1,259	—	20,795	4,270	1,537	43,738	70,340	850
Nov. 2014	20,221	3,034	17,843	1,683	—	180	796	—	20,264	2,296	976	37,584	61,120	890

Table 11. Daily mean discharge, Delaware River at Montague, New Jersey (U.S. Geological Survey site number 01438500), for report year ending November 30, 2014.

[Data from U.S. Geological Survey (2019d). All values except the year's total discharge volume are in cubic feet per second (ft^3/s). The total volume discharged is given in cubic feet per second for a day ([ft^3/s]-d). —, not applicable]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	4,610	7,670	[1]5,000	[1]3,910	19,900	16,000	2,960	4,170	2,860	1,990	2,110	1,730
2	4,240	6,960	[1]4,880	[1]3,670	16,600	15,900	2,760	4,250	3,140	2,160	2,030	1,670
3	3,740	[1]5,700	[1]4,220	[1]3,800	15,100	10,600	3,120	7,380	2,420	2,010	1,810	1,860
4	3,450	[1]4,220	[1]3,670	[1]3,800	14,000	8,650	3,190	13,300	2,370	2,270	1,910	1,830
5	3,390	[1]4,420	[1]3,390	[1]3,350	13,800	7,590	3,950	12,500	2,480	2,110	1,590	1,830
6	3,820	7,420	[1]3,480	[1]3,040	12,600	6,750	3,880	7,830	2,400	2,110	1,430	1,790
7	5,770	17,300	[1]3,400	[1]3,020	10,800	6,230	3,030	5,850	2,400	1,830	1,580	1,450
8	5,650	12,100	[1]3,210	[1]3,070	10,700	5,650	2,540	5,170	2,280	1,500	1,750	1,610
9	4,680	10,200	[1]2,930	[1]3,290	12,700	5,860	2,650	5,460	2,420	1,470	1,730	1,900
10	4,460	7,890	[1]2,670	[1]3,370	12,500	6,710	2,960	5,940	2,100	1,610	1,720	2,000
11	[1]3,760	7,840	[1]2,780	[1]3,460	11,100	6,160	3,030	5,020	2,070	1,800	1,800	2,010
12	[1]3,400	18,300	[1]3,140	[1]4,630	10,500	5,970	2,980	4,460	2,170	1,720	1,810	2,260
13	[1]3,080	17,400	[1]3,090	[1]6,680	9,920	5,450	3,880	4,090	2,210	1,810	1,870	2,320
14	[1]2,720	13,600	[1]3,000	[1]7,030	9,840	5,120	15,300	5,670	2,500	1,900	1,720	2,210
15	[1]2,400	15,500	[1]3,290	[1]6,150	10,300	5,050	12,100	9,840	2,290	2,110	1,720	2,000
16	[1]2,400	13,200	[1]3,150	5,630	24,900	6,520	7,990	8,980	1,960	1,960	3,810	1,740
17	[1]2,590	11,200	[1]3,250	5,000	20,900	36,700	6,030	10,700	1,810	2,150	8,940	1,750
18	[1]2,770	9,960	[1]3,410	4,340	17,500	28,900	5,860	7,860	1,730	2,190	4,680	2,020
19	[1]2,740	9,170	[1]3,590	3,970	14,100	20,500	5,420	6,340	1,860	2,070	3,250	2,780
20	3,450	8,790	[1]3,880	4,680	11,900	15,800	4,820	5,250	2,000	1,820	2,470	2,560
21	3,340	8,540	[1]4,240	6,230	10,700	13,300	3,920	4,730	2,010	1,890	2,060	2,260
22	5,280	[1]7,350	[1]4,470	6,390	9,330	11,600	3,320	4,360	4,290	1,990	1,950	1,790
23	17,600	[1]6,300	[1]4,630	7,040	8,370	11,500	3,180	4,150	3,540	2,050	2,100	1,870
24	15,600	[1]5,920	[1]5,080	6,370	7,890	8,770	3,120	4,010	2,750	2,140	2,320	2,180
25	10,600	[1]5,690	[1]4,950	5,320	7,240	7,380	2,960	4,410	2,340	2,030	2,360	2,450
26	7,750	[1]5,460	[1]4,470	4,750	6,440	6,420	7,200	3,940	2,370	2,010	2,230	3,250
27	6,780	[1]5,470	[1]4,270	4,330	5,720	5,730	11,600	3,400	2,420	1,880	2,020	2,840
28	5,820	[1]5,450	[1]4,260	3,820	5,600	5,430	7,970	3,240	2,300	1,840	1,980	2,580
29	5,350	[1]5,130	—	4,850	6,220	4,840	5,900	3,180	1,960	1,950	1,970	2,340
30	10,400	[1]5,110	—	16,100	7,880	4,830	4,700	3,010	1,880	2,100	1,800	2,150
31	10,500	[1]5,040	—	26,100	—	3,560	—	2,840	2,030	—	1,800	—
Total[2]	**172,140**	**274,300**	**105,800**	**177,190**	**355,050**	**309,470**	**152,320**	**181,330**	**73,360**	**58,470**	**72,320**	**63,030**
Mean[3]	5,553	8,848	3,779	5,716	11,835	9,983	5,077	5,849	2,366	1,949	2,333	2,101

[1]Estimated.

[2]The year's total is 1,994,780 cubic feet per second for a day.

[3]The combined mean is 5,465.2 cubic feet per second.

Table 13. Daily mean discharge, East Branch Delaware River at Downsville, New York (U.S. Geological Survey site number 01417000), for report year ending November 30, 2014.

[Data from U.S. Geological Survey (2019a). All values except the year's total discharge volume are in cubic feet per second (ft^3/s). The total volume discharge is given in cubic feet per second for a day ([ft^3/s]-d). —, not applicable]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	106	151	577	148	101	453	143	350	204	137	98	99
2	106	151	507	148	101	358	143	206	153	139	98	99
3	106	151	507	148	101	166	144	157	154	133	98	98
4	106	151	332	151	101	165	143	347	154	129	98	98
5	106	150	204	151	117	394	143	423	153	129	98	99
6	106	151	167	151	147	380	143	253	152	129	98	100
7	106	150	154	151	147	329	143	333	151	129	98	99
8	106	151	154	151	148	279	143	484	151	129	98	99
9	129	151	155	147	148	294	143	485	151	129	98	99
10	151	151	155	115	149	285	143	487	151	129	98	99
11	151	151	155	97	148	220	142	487	151	129	98	98
12	151	151	155	98	147	158	140	487	151	129	98	98
13	151	202	155	97	165	150	140	486	151	125	98	98
14	151	493	155	98	385	119	139	527	150	125	98	98
15	151	498	155	98	535	105	139	622	151	125	98	98
16	151	498	154	98	1,160	138	139	675	149	102	98	98
17	151	604	155	98	2,420	1,730	140	680	147	92	98	99
18	151	704	155	98	2,450	2,000	140	681	147	95	98	98
19	151	704	155	98	2,000	1,430	140	673	146	95	98	98
20	151	704	153	98	1,580	1,020	140	672	145	95	98	98
21	151	704	149	99	1,250	712	140	680	143	95	98	98
22	151	704	147	100	940	571	140	680	143	95	98	98
23	151	704	147	100	758	504	140	680	139	95	98	98
24	151	710	147	100	700	442	140	679	139	95	98	98
25	151	716	147	98	598	498	151	593	139	95	98	98
26	151	717	147	99	544	432	2,080	479	139	96	98	98
27	151	717	147	101	488	348	2,050	479	139	97	98	98
28	151	717	147	101	488	238	1,230	479	139	98	98	98
29	151	717	—	101	489	161	718	480	139	98	98	98
30	151	717	—	101	488	148	466	479	139	98	98	98
31	151	677	—	101	—	146	—	410	138	—	98	—
Total[1]	**4,299**	**14,017**	**5,637**	**3,538**	**8,993**	**14,373**	**10,085**	**15,633**	**4,598**	**3,386**	**3,045**	**2,955**
Mean[2]	138.7	452.2	201.3	114.2	633.1	463.6	336.2	504.3	148.3	112.9	98.0	98.3

[1]The year's total is 100,559 cubic feet per second for a day.

[2]The combined mean is 275.1 cubic feet per second.

Table 14. Daily mean discharge, West Branch Delaware River at Stilesville, New York (U.S. Geological Survey site number 01425000), for report year ending November 30, 2014.

[Data from U.S. Geological Survey (2019b). All values except the year's total discharge volume are in cubic feet per second (ft^3/s). The total volume discharge is given in cubic feet per second for a day ([ft^3/s]-d). —, not applicable]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	143	235	904	906	261	721	418	463	557	490	1,070	328
2	150	235	782	910	382	717	454	464	557	604	933	391
3	154	233	745	910	383	724	456	466	558	584	802	466
4	156	232	601	917	385	720	456	463	557	444	586	569
5	160	232	316	923	398	612	455	463	560	420	810	149
6	162	234	262	917	440	405	456	463	560	388	1,020	455
7	162	345	232	917	670	417	450	517	557	386	1,040	750
8	162	652	232	917	1,500	450	453	550	557	489	1,090	883
9	191	653	232	910	1,500	529	456	551	558	678	1,160	947
10	232	655	231	801	1,500	639	456	549	562	765	1,200	988
11	230	772	229	525	1,500	729	456	557	565	985	1,160	1,090
12	230	1,360	229	387	1,510	724	456	552	567	994	1,040	1,100
13	232	1,470	229	331	1,500	670	470	565	566	1,220	1,140	1,100
14	233	1,480	235	289	1,500	567	464	561	560	1,110	1,100	816
15	234	1,490	368	240	1,520	500	458	559	557	1,140	899	752
16	232	1,500	597	179	1,940	692	456	557	557	1,160	437	760
17	234	1,500	741	161	2,740	3,160	461	557	562	1,160	167	934
18	235	1,500	744	157	2,860	3,960	458	557	638	889	168	983
19	235	1,500	738	151	2,670	3,140	456	557	649	1,010	168	940
20	235	1,500	744	149	2,380	2,770	457	557	698	1,260	168	594
21	236	1,500	758	147	2,080	2,150	463	557	670	1,130	168	614
22	242	1,500	762	148	1,840	1,710	463	557	840	1,130	168	622
23	241	1,500	763	147	1,690	1,520	462	562	567	1,110	168	384
24	236	1,500	753	148	1,580	1,300	463	557	567	1,110	168	385
25	235	1,500	750	149	1,450	1,070	464	557	567	797	168	207
26	235	1,490	751	147	1,100	852	463	557	567	826	168	125
27	235	1,480	754	149	793	686	463	558	567	1,060	168	100
28	235	1,490	803	155	718	581	463	558	564	1,130	168	100
29	238	1,500	—	155	716	498	463	557	569	1,290	180	101
30	237	1,500	—	180	719	420	463	557	737	1,270	168	101
31	235	1,460	—	170	—	397	—	557	812	—	197	—
Total[1]	**6,607**	**34,198**	**15,485**	**13,292**	**40,225**	**34,030**	**13,732**	**16,662**	**18,529**	**27,029**	**18,047**	**17,734**
Mean[2]	213.1	1,103.2	553.0	428.8	1,340.8	1,097.7	457.7	537.5	597.7	901.0	582.2	591.1

[1]The year's total is 255,570 cubic feet per second for a day.

[2]The combined mean is 700.3 cubic feet per second.

Table 15. Daily mean discharge, Neversink River at Neversink, New York (U.S. Geological Survey site number 01436000), for report year ending November 30, 2014.

[Data from U.S. Geological Survey (2019c). All values except the year's total discharge volume are in cubic feet per second (ft^3/s). The total volume discharge is given in cubic feet per second for a day ([ft^3/s]-d). —, not applicable]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	64	133	91	79	51	92	106	110	179	113	66	57
2	64	133	91	79	61	97	111	111	179	102	57	55
3	64	130	91	78	61	96	111	111	180	98	57	56
4	64	130	91	79	61	97	111	110	179	91	57	57
5	64	130	91	79	67	96	112	109	182	91	56	57
6	64	120	90	79	82	96	111	109	181	91	57	57
7	63	129	88	79	82	97	111	127	178	91	57	56
8	64	129	80	79	82	97	111	137	179	91	57	57
9	72	130	79	79	81	102	111	136	179	91	57	57
10	78	130	78	67	82	105	111	137	179	91	57	57
11	79	170	78	60	82	105	112	137	180	91	57	57
12	78	210	79	60	82	105	111	137	179	91	57	57
13	78	213	79	57	82	105	113	137	179	91	57	57
14	79	214	79	60	83	100	125	186	179	91	57	56
15	78	215	79	60	83	97	112	246	159	91	57	56
16	78	213	79	60	81	98	108	1,310	146	91	58	57
17	78	211	79	61	82	1,130	108	492	146	91	57	57
18	77	209	79	61	82	690	107	406	147	91	57	56
19	77	210	79	61	81	206	108	340	147	91	56	56
20	78	210	79	60	82	122	107	290	148	91	57	56
21	79	198	79	60	82	189	108	250	151	91	57	56
22	79	209	79	60	82	263	108	204	151	91	57	57
23	79	208	79	60	81	348	108	180	151	91	57	57
24	78	208	78	60	80	300	108	183	151	91	56	57
25	78	209	79	61	82	262	108	179	151	91	57	57
26	77	208	79	58	82	228	108	179	152	91	56	57
27	77	170	78	60	82	202	108	179	152	91	56	57
28	77	113	79	61	82	144	108	179	145	91	57	56
29	78	89	—	61	82	107	109	179	141	91	57	57
30	111	89	—	62	83	100	110	179	140	91	57	57
31	132	89	—	60	—	102	—	179	140	—	57	—
Total[1]	**2,388**	**5,159**	**2,289**	**2,041**	**2,356**	**5,978**	**3,300**	**6,948**	**5,030**	**2,776**	**1,770**	**1,699**
Mean[2]	77.0	166.4	81.8	65.8	78.3	192.8	110.0	224.1	162.3	92.3	57.2	56.6

[1]The year's total is 41,734 cubic feet per second for a day.

[2]The combined mean 113.7 cubic feet per second.

Table 16. Daily mean discharge, Delaware River at Trenton, New Jersey (U.S. Geological Survey site number 01463500), for report year ending November 30, 2014.

[Data from U.S. Geological Survey (2019f). All values except the year's total discharge volume are in cubic feet per second (ft^3/s). The total volume discharge is given in cubic feet per second for a day ([ft^3/s]-d). —, not applicable]

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	9,140	18,400	[1]9,350	[1]7,950	43,100	74,900	9,650	8,280	5,300	3,710	3,040	3,390
2	7,610	14,500	[1]9,200	[1]7,850	34,500	55,700	8,170	7,380	5,230	3,770	3,150	3,380
3	6,910	13,100	[1]9,100	[1]7,400	29,700	40,300	7,760	8,460	5,640	3,440	[1]3,190	3,070
4	6,450	[1]10,200	[1]8,050	[1]6,650	27,500	30,500	7,750	11,600	5,270	3,550	[1]3,260	2,930
5	5,930	[1]9,750	[1]7,850	7,010	26,300	24,900	8,210	19,400	4,740	3,330	3,090	3,150
6	5,780	[1]13,900	[1]7,400	6,820	24,900	21,200	9,620	17,800	4,490	3,570	3,010	3,250
7	8,990	[1]19,900	[1]7,350	6,120	22,400	18,200	9,100	12,900	4,390	3,780	2,750	3,290
8	11,000	[1]21,600	[1]6,950	6,170	21,500	16,500	8,070	10,500	4,210	3,750	2,610	3,140
9	10,600	[1]17,900	[1]6,650	7,050	21,500	15,600	7,720	9,750	4,120	[1]3,340	2,920	2,770
10	10,100	[1]15,600	[1]6,300	8,570	21,900	14,800	7,630	10,000	[1]4,060	[1]3,040	3,130	2,780
11	9,110	[1]19,300	[1]5,900	10,200	20,700	15,400	7,140	11,100	[1]4,220	[1]3,000	3,140	3,130
12	8,190	[1]35,100	[1]5,850	14,600	19,200	13,800	[1]7,020	9,720	[1]3,980	3,070	3,060	3,160
13	7,230	40,900	[1]6,200	20,400	18,200	12,900	[1]10,100	[1]8,440	[1]4,200	[1]3,140	3,020	3,150
14	6,380	34,000	[1]6,500	18,100	17,100	12,300	21,100	8,860	5,300	3,120	3,060	3,470
15	6,540	31,200	[1]6,750	16,400	20,600	11,300	26,100	12,700	4,610	3,150	3,180	3,510
16	5,870	28,700	[1]6,700	16,200	35,400	13,100	21,100	15,700	4,490	3,280	3,930	3,300
17	5,510	24,100	[1]6,600	15,100	43,800	38,900	16,000	14,000	4,040	3,410	7,760	3,510
18	5,290	20,400	[1]6,700	13,400	35,400	56,300	12,700	15,000	3,920	3,200	12,600	4,110
19	5,560	18,300	[1]6,700	11,800	29,300	42,700	11,600	12,100	3,740	3,310	8,530	3,580
20	5,460	16,800	[1]7,400	14,700	23,900	32,700	10,700	10,400	3,380	3,290	6,210	3,560
21	5,950	15,900	[1]8,350	15,200	20,700	26,100	9,960	9,100	3,410	3,300	5,180	4,130
22	8,700	[1]14,300	[1]9,500	15,800	19,100	25,700	8,990	8,280	5,530	3,130	4,570	3,750
23	13,800	[1]12,000	[1]10,400	16,000	17,400	27,400	7,800	7,600	5,720	3,090	4,100	3,420
24	30,700	[1]10,400	[1]11,100	16,200	15,800	22,900	7,150	7,370	7,050	3,200	3,820	3,370
25	25,300	[1]10,200	[1]10,900	14,700	14,600	18,800	6,850	7,120	5,820	3,230	3,920	4,270
26	18,600	[1]10,600	[1]9,800	12,900	14,300	16,400	7,430	6,990	5,050	3,300	3,990	5,100
27	14,600	[1]10,800	[1]8,700	11,600	13,400	14,600	9,230	6,850	4,320	3,150	3,950	6,340
28	12,400	[1]10,900	[1]8,050	10,700	12,000	13,100	15,100	7,150	4,110	3,170	3,750	6,590
29	12,600	[1]10,200	—	10,700	11,300	12,400	11,800	6,430	4,020	3,040	3,510	5,730
30	17,200	[1]9,950	—	24,400	30,600	11,500	9,630	5,920	3,720	3,000	3,430	5,090
31	19,500	[1]9,800	—	43,700	—	10,700	—	5,490	3,440	—	3,390	—
Total[2]	**327,000**	**548,700**	**220,300**	**414,390**	**706,100**	**761,600**	**321,180**	**312,390**	**141,520**	**98,860**	**128,250**	**113,420**
Mean[3]	10,548.0	17,700.0	7,868.0	13,367.0	23,537.0	24,568.0	10,706.0	10,077.0	4,565.0	3,295.0	4,137.0	3,781.0

[1]Estimated.

[2]The year's total is 4,093,710 cubic feet per second for a day.

[3]The combined mean is 11,179.0 cubic feet per second.

Table 17. Daily maximum and minimum chloride concentrations, Delaware River at Chester, Pennsylvania (U.S. Geological Survey site number 01477050), for report year ending November 30, 2014.

[Record provided by Kimberly-Clark Chester Operations through written communication with the Delaware River Basin Commission. Concentrations are in milligrams per liter. *, missing data; —, not applicable; max, maximum; min, minimum]

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	103	54	81	65	57	49	109	99	81	51	44	38	51	44	50	50	50	50	96	78	294	174	203	148
2	93	74	81	65	57	49	119	99	73	51	44	38	51	44	50	50	50	50	87	78	423	254	148	105
3	126	74	73	58	83	57	99	90	65	58	51	38	51	38	50	50	50	50	87	71	366	273	203	115
4	126	93	65	58	73	65	99	90	65	51	44	44	51	44	56	50	50	50	87	71	490	219	188	78
5	93	74	73	65	119	81	99	90	65	58	44	44	51	44	56	50	50	50	105	78	394	176	219	105
6	93	83	90	73	99	90	99	90	65	51	44	44	44	38	56	50	50	50	105	71	316	203	203	125
7	81	51	90	73	90	81	109	90	51	51	51	44	51	38	66	50	71	50	87	78	316	203	188	136
8	81	58	90	51	119	99	99	90	51	51	51	44	44	38	66	50	50	50	115	87	316	254	188	125
9	81	58	81	73	109	90	99	90	49	49	44	44	44	38	50	50	56	50	96	87	340	217	174	136
10	73	65	81	73	109	90	90	81	49	42	49	44	44	38	50	50	56	50	125	87	366	203	316	105
11	73	58	90	73	109	99	90	90	57	42	51	44	44	44	50	50	50	50	148	87	423	203	294	160
12	73	65	104	73	119	90	93	83	57	49	58	44	44	38	63	50	78	56	160	96	490	219	366	148
13	73	73	93	83	99	90	83	80	49	42	58	41	44	44	50	50	87	56	174	105	490	254	455	160
14	73	58	83	74	130	119	93	65	49	44	56	56	44	38	50	43	71	53	188	136	455	254	423	188
15	81	65	74	74	138	126	74	65	57	49	56	50	44	38	50	37	71	56	174	125	366	316	254	188
16	74	65	74	66	151	119	74	65	65	49	50	50	44	38	50	50	71	63	174	125	366	294	294	203
17	83	74	65	57	*	*	*	*	49	49	50	50	44	38	50	50	71	63	219	105	366	254	366	188
18	93	66	57	49	151	138	*	*	49	42	50	50	56	44	50	50	71	71	203	125	366	219	219	136
19	83	74	57	49	151	138	*	*	51	42	50	50	44	44	50	50	87	71	174	125	301	178	203	125
20	93	74	57	49	165	138	*	*	51	44	50	43	50	50	50	50	87	63	188	115	236	136	203	148
21	93	83	57	49	151	135	*	*	51	44	50	43	56	50	50	43	87	63	188	115	174	115	188	125
22	83	74	49	49	151	138	65	49	51	44	50	50	50	50	50	43	87	71	174	125	136	115	188	148
23	93	83	49	49	151	138	57	49	49	35	43	43	50	50	50	50	78	71	188	136	136	105	160	125
24	90	73	49	49	151	98	57	42	49	49	43	37	50	50	50	43	87	71	125	125	136	96	203	148
25	103	83	49	42	151	138	57	49	51	44	50	38	50	50	50	50	87	71	174	136	148	96	203	125
26	103	83	49	42	138	114	57	49	51	42	44	38	50	50	50	50	78	71	174	136	148	87	219	125
27	93	83	49	49	165	126	57	42	51	38	44	38	50	50	50	50	71	71	236	136	148	87	254	148
28	83	74	57	49	109	93	51	51	51	38	44	38	56	50	50	50	78	63	273	174	160	96	148	125
29	83	74	57	49	—	—	58	51	51	44	44	38	50	50	50	43	87	71	340	160	148	87	166	105
30	74	65	49	49	—	—	81	73	51	44	44	44	50	50	50	50	96	71	294	174	136	96	136	125
31	93	73	49	49	—	—	73	65	—	—	44	44	—	—	50	50	105	78	—	—	203	125	—	—
Mean	88	71	68	59	122	103	82	72	55	46	48	44	48	44	52	48	72	61	165	112	295	181	232	137
Max	126	93	104	83	165	138	119	99	81	58	58	56	56	50	66	50	105	78	340	174	490	316	455	203
Min	73	51	49	42	57	49	51	42	49	35	43	37	44	38	50	37	50	50	87	71	136	87	136	78

Table 18. Daily maximum and minimum specific conductance, Delaware River at Reedy Island Jetty, Delaware (U.S. Geological Survey site number 01482800), for report year ending November 30, 2014.

[Data from U.S. Geological Survey (2020f). Specific conductance measurements provided in microsiemens per centimeter at 25 degrees Celsius. *, missing data; —, not applicable; max, maximum; min, minimum]

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	21,100	9,890	10,000	2,650	12,800	4,600	10,000	2,960	8,270	1,180	5,260	264	7,180	1,230	8,610	3,240	12,400	4,860	14,900	6,770	21,700	13,900	22,000	13,200
2	21,300	10,500	11,100	2,630	12,800	4,860	9,900	2,920	7,340	897	1,020	264	6,540	1,460	8,000	2,830	12,700	4,800	15,600	7,330	22,400	13,700	22,600	14,200
3	21,700	10,900	9,930	2,400	12,300	4,850	9,360	3,130	4,990	821	602	353	6,160	1,350	7,430	2,590	13,000	5,240	16,100	7,890	22,600	14,800	24,200	12,900
4	21,100	11,100	13,800	3,550	12,700	4,560	11,200	3,550	3,620	768	415	326	7,540	1,490	8,140	2,450	13,500	5,390	16,700	7,810	21,400	15,300	21,900	13,000
5	20,100	11,000	9,690	3,320	11,600	4,660	12,000	3,930	4,290	678	551	301	8,080	1,740	11,600	2,630	14,400	5,770	16,200	8,180	20,500	14,000	22,700	12,800
6	19,100	10,900	10,200	3,650	9,770	3,760	11,900	4,770	3,570	575	5,110	321	9,510	1,960	11,800	3,130	15,800	6,100	16,200	8,100	19,800	13,800	23,500	13,400
7	18,800	10,500	4,130	2,070	11,500	3,260	13,900	4,850	4,740	711	6,010	779	11,400	2,160	12,300	2,790	16,500	6,430	16,500	7,480	19,800	12,900	22,200	13,600
8	18,200	9,940	5,350	1,430	10,700	3,360	14,700	5,640	6,850	1,570	6,520	1,120	13,500	2,860	13,600	2,970	16,900	7,030	17,100	8,770	18,300	12,100	22,500	13,900
9	17,900	9,650	7,500	1,150	12,300	3,370	12,900	5,430	7,040	1,340	6,920	1,800	13,500	4,460	13,500	2,970	16,300	7,230	18,000	9,790	18,400	11,800	21,400	13,500
10	16,800	9,330	9,190	1,330	13,100	4,190	14,500	5,320	7,500	1,560	8,490	2,010	12,600	4,050	13,300	3,860	17,100	7,690	17,900	9,740	18,000	11,700	22,200	13,600
11	15,300	8,490	10,400	2,090	14,300	4,700	14,900	5,150	8,010	1,860	6,940	2,010	13,100	4,150	13,300	4,330	17,300	7,980	17,400	10,100	18,400	11,800	22,500	13,800
12	14,200	8,010	8,650	1,390	15,700	6,400	17,600	6,340	7,580	1,670	8,260	1,860	13,900	4,810	13,800	4,670	17,300	8,920	16,900	9,890	19,000	12,100	22,600	14,000
13	15,900	7,160	6,570	1,140	20,200	9,830	17,100	4,430	7,580	1,700	8,260	2,000	12,700	4,820	13,600	5,010	16,100	8,200	17,600	10,100	18,300	12,100	23,100	13,800
14	16,400	6,940	7,130	933	20,200	8,310	13,300	4,020	7,640	1,880	9,000	2,510	12,100	4,000	12,400	4,710	15,400	7,840	17,800	10,100	18,100	12,200	23,200	14,600
15	18,500	8,430	6,380	792	14,400	8,220	12,100	3,970	6,060	1,430	8,950	2,670	10,300	3,520	12,000	4,350	14,700	8,040	17,300	10,400	17,200	12,600	23,900	15,000
16	13,300	6,950	5,150	773	15,500	7,330	11,600	3,720	2,190	622	8,250	2,680	9,800	3,350	11,100	4,060	14,800	7,770	17,200	10,600	17,200	12,000	24,200	14,800
17	*	*	6,840	727	14,300	6,750	12,100	4,090	4,560	695	5,990	1,780	9,760	3,120	10,100	3,880	14,600	7,960	18,600	10,400	17,800	11,700	24,600	16,300
18	*	*	3,800	746	14,300	6,860	12,900	4,590	4,440	598	5,110	1,220	9,220	3,000	9,500	3,660	15,400	7,800	18,200	10,700	16,700	11,200	20,900	15,000
19	*	*	5,480	677	15,500	7,050	12,600	4,110	3,060	536	3,480	991	8,740	2,890	10,100	3,610	16,000	8,180	20,000	11,000	17,500	10,100	20,400	12,300
20	12,800	5,770	4,280	663	12,500	6,500	12,000	4,150	1,800	535	3,270	747	9,340	2,720	11,600	3,630	16,400	8,270	19,600	12,200	18,500	10,400	20,400	10,600
21	14,200	6,110	6,360	700	13,800	6,230	10,100	3,560	2,280	519	3,420	738	10,200	2,990	11,200	3,940	16,100	8,500	19,400	11,500	18,000	11,000	19,000	10,900
22	13,700	6,540	10,700	2,270	11,400	5,560	9,600	3,140	3,140	509	4,040	700	10,800	3,100	11,000	4,150	16,600	8,690	19,800	11,800	18,800	11,000	21,800	11,200
23	13,000	5,540	12,500	2,380	11,000	4,590	9,540	2,860	2,570	437	4,550	566	10,800	3,500	11,000	4,080	16,700	8,880	18,800	11,200	21,200	12,400	19,500	10,200
24	14,600	5,160	9,420	2,280	10,600	4,300	9,710	2,560	5,930	467	5,220	604	10,100	3,580	11,700	3,690	16,800	9,080	19,200	12,200	22,000	11,900	22,100	12,000
25	13,300	4,630	12,100	2,640	10,700	3,430	10,900	2,740	7,800	540	5,970	625	10,100	3,460	12,500	4,000	16,200	9,000	19,900	13,400	21,600	12,500	19,700	10,600
26	13,000	4,430	9,650	2,160	11,000	3,260	11,500	3,160	7,910	1,120	5,760	717	9,200	3,080	13,300	4,590	15,700	8,910	21,500	13,000	19,000	12,200	20,100	11,300
27	13,000	4,110	12,500	3,600	12,600	3,240	13,700	2,920	6,790	1,290	5,980	714	9,480	3,330	13,500	4,750	15,400	8,750	20,800	12,700	20,200	11,500	20,800	11,400
28	12,400	3,900	12,500	2,620	8,980	3,010	9,410	3,630	7,130	1,280	6,600	886	10,600	3,300	13,800	4,570	15,500	8,440	20,800	12,800	20,000	11,400	17,700	11,100
29	12,900	3,660	14,400	3,660	—	—	8,810	3,050	6,940	1,560	7,860	1,080	9,700	3,380	11,500	4,260	16,400	8,530	20,700	13,100	19,500	11,400	20,400	10,800
30	13,000	3,000	13,600	3,700	—	—	10,600	2,630	9,820	1,840	6,640	1,080	8,820	3,360	12,600	4,280	16,600	8,930	21,100	12,600	19,900	10,800	18,500	11,200
31	12,600	2,860	13,800	4,650	—	—	6,940	1,600	—	—	5,490	1,180	—	—	13,200	4,950	15,700	9,160	—	—	20,400	11,700	—	—
Mean	16,007	7,336	9,132	2,089	13,091	5,251	11,851	3,836	5,715	1,040	5,482	1,126	10,159	3,074	11,648	3,827	15,623	7,640	18,260	14,891	19,426	12,194	21,687	12,833
Max	21,700	11,100	14,400	4,650	20,200	9,830	17,600	6,340	9,820	1,880	9,000	2,680	13,900	4,820	13,800	5,010	17,300	9,160	21,500	13,400	22,600	15,300	24,600	16,300
Min	12,400	2,860	3,800	663	8,980	3,010	6,940	1,600	1,800	437	415	264	6,160	1,230	7,430	2,450	12,400	4,800	14,900	6,770	16,700	10,100	17,700	10,200

Table 19. Daily mean dissolved-oxygen concentration, Delaware River at Benjamin Franklin Bridge at Philadelphia, Pennsylvania (U.S. Geological Survey site number 01467200), from April 1 to November 30, 2014.

[Data from U.S. Geological Survey (2020d). Concentrations are in milligrams per liter. *, missing data; —, not applicable]

Day	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	12.3	9.7	7.0	7.3	6.1	5.4	5.8	7.6
2	12.0	9.7	7.0	7.6	5.9	5.2	5.9	7.9
3	12.0	9.5	7.1	7.6	5.7	5.3	5.8	8.3
4	12.0	9.2	7.1	7.6	5.6	5.2	5.8	8.4
5	11.9	9.2	7.2	7.6	5.5	5.1	6.0	8.3
6	11.8	9.1	7.4	7.8	5.4	5.2	6.2	8.2
7	11.6	9.1	7.9	7.9	5.3	5.2	6.4	8.1
8	11.2	9.0	8.3	7.8	5.4	5.1	6.4	8.3
9	11.3	9.0	8.4	7.5	5.5	5.2	6.5	8.3
10	11.3	8.8	8.1	7.4	5.5	5.3	6.5	8.3
11	11.2	8.6	7.5	7.3	5.5	5.3	6.3	8.2
12	11.1	8.5	6.8	7.1	5.4	5.4	6.2	8.1
13	11.0	8.4	6.2	6.8	5.2	5.3	6.2	8.2
14	10.8	8.3	6.1	6.4	5.2	5.2	6.2	8.3
15	10.4	8.1	6.7	5.9	5.1	5.3	6.3	8.6
16	10.0	7.9	7.3	5.7	5.2	5.3	6.2	8.7
17	9.8	7.5	7.9	6.0	5.1	5.3	6.2	8.7
18	9.5	7.6	8.3	6.6	5.1	5.3	6.5	9.0
19	9.7	7.7	8.4	7.0	5.2	5.5	7.0	9.6
20	10.1	7.8	8.5	7.2	5.1	5.7	7.1	9.8
21	10.2	8.0	8.7	7.2	5.1	5.7	7.1	10.1
22	10.3	8.1	8.6	7.3	5.2	5.6	7.1	10.3
23	10.3	8.3	8.2	7.3	5.2	5.8	7.2	10.5
24	10.2	8.4	7.8	7.3	5.1	5.9	7.3	10.5
25	10.1	8.1	7.4	7.1	5.1	6.2	7.4	10.5
26	9.8	7.9	6.7	6.9	5.2	6.2	7.5	10.6
27	9.7	7.7	6.4	6.7	5.2	6.1	7.6	10.6
28	9.6	7.4	6.4	6.5	5.2	6.1	7.5	10.8
29	9.5	7.3	6.6	6.5	5.5	6.0	7.5	10.8
30	9.4	6.9	7.0	6.2	5.6	5.8	7.4	10.9
31	—	7.0	—	6.1	5.6	—	*	—
Mean	10.7	8.3	7.4	7.0	5.4	5.5	6.6	9.2
Max	21.7	9.7	8.7	7.9	6.1	6.2	7.6	10.9
Min	9.4	6.9	6.1	5.7	5.1	5.1	5.8	7.6

Table 20. Daily mean dissolved-oxygen concentration, Delaware River at Chester, Pennsylvania (U.S. Geological Survey site number 01477050), from April 1 to November 30, 2014.

[Data from U.S. Geological Survey (2020e). Concentrations are in milligrams per liter. *, Missing data; —, not applicable]

Day	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	11.3	9.4	7.5	6.8	6.0	5.2	6.7	7.9
2	11.4	9.1	7.9	5.9	5.9	4.9	6.6	8.3
3	11.3	9.1	8.2	5.5	5.9	5.0	6.7	8.5
4	11.2	8.9	8.4	5.6	5.6	4.9	6.8	8.6
5	11.0	8.9	8.6	5.9	5.1	5.0	6.8	8.5
6	10.8	8.8	9.2	6.3	5.0	4.9	7.0	8.5
7	10.9	8.7	9.8	6.5	5.1	4.9	7.3	8.4
8	10.5	8.6	10.0	6.5	5.3	5.4	7.3	8.6
9	10.7	8.5	9.4	6.5	5.5	5.9	7.3	8.6
10	10.6	8.4	8.5	6.2	5.5	5.8	7.2	8.5
11	10.4	8.3	7.6	6.2	5.3	5.8	7.2	8.4
12	10.3	8.2	6.8	6.2	5.7	5.6	7.2	8.3
13	10.3	8.2	6.2	6.0	5.6	5.7	7.1	8.3
14	10.3	8.3	5.9	5.7	5.4	5.7	7.2	8.5
15	9.9	8.1	5.9	5.3	5.5	5.9	7.3	8.7
16	9.8	7.9	5.9	5.0	5.6	5.9	7.2	8.9
17	9.9	7.7	6.3	5.0	5.5	6.0	7.1	*
18	9.5	7.1	6.9	5.2	5.4	6.0	6.8	9.4
19	9.2	7.1	7.1	5.4	5.3	6.2	6.8	9.8
20	9.7	7.3	7.6	5.6	5.3	6.6	7.0	10.1
21	9.3	7.1	7.7	5.5	5.0	6.3	7.0	10.2
22	9.3	6.9	7.6	5.4	5.4	6.2	7.1	10.3
23	9.4	7.1	7.4	5.5	5.7	6.3	7.3	10.3
24	9.7	7.2	7.4	5.5	5.6	6.7	7.6	10.4
25	9.5	7.3	7.3	5.8	5.3	7.3	7.8	10.2
26	9.4	7.5	7.1	5.7	5.1	7.1	7.8	10.1
27	9.4	7.4	7.0	5.7	5.0	7.1	7.8	10.3
28	9.4	7.3	7.0	6.3	5.3	6.9	7.7	10.2
29	9.5	7.7	7.1	5.8	5.5	6.8	7.6	10.2
30	10.0	7.5	7.0	5.8	5.6	6.7	7.6	10.2
31	—	7.5	—	6	5.5	—	7.6	—
Mean	10.1	8.0	7.5	5.8	5.4	6.0	7.2	9.2
Max	11.4	9.4	10.0	6.8	6.0	7.3	7.8	10.4
Min	9.2	6.9	5.9	5.0	5.0	4.9	6.6	7.9

References Cited

Delaware River Basin Commission [DRBC], 2021, Delaware Estuary water quality monitoring program: DRBC web page, accessed November 5, 2021, at https://www.nj.gov/drbc/programs/quality/boat-run.html.

DiFrenna, V.J., Andrews, W.J., Russell, K.L., Norris, J.M., and Mason, R.R., Jr., 2020, Report of the River Master of the Delaware River for the period December 1, 2010–November 30, 2011: U.S. Geological Survey Open-File Report 2020–1020, 127 p., accessed April 15, 2021, at https://doi.org/10.3133/ofr20201020.

DiFrenna, V.J., Andrews, W.J., Russell, K.L., Norris, J.M., and Mason, R.R., Jr., 2022, Report of the River Master of the Delaware River for the period December 1, 2012–November 30, 2013: U.S. Geological Survey Open-File Report 2022–1068, 99 p., accessed May 1, 2023, at https://doi.org/10.3133/ofr20221068.

Kauffman, G., Belden, A., and Homsey, A., 2009, Technical summary—State of the Delaware Basin report—A report on the health of the 13,539-square-mile Delaware River Basin in Delaware, New Jersey, New York, and Pennsylvania: Delaware River Basin Commission and Partnership for the Delaware Estuary, prepared by University of Delaware, 209 p., accessed March 11, 2019, at http://udspace.udel.edu/handle/19716/3808.

Russell, K.L., Ockerman, D., Krejmas, B.E., Paulachok, G.N., and Mason, R.R., Jr., 2019, Report of the River Master of the Delaware River for the Period December 1, 2009–November 30, 2010: U.S. Geological Survey Open-File Report 2019–1093, 128 p. [Also available at https://doi.org/10.3133/ofr20191093.]

U.S. Environmental Protection Agency, 2016, Indicators—Conductivity: U.S. Environmental Protection Agency web page, accessed August 7, 2018, at https://www.epa.gov/national-aquatic-resource-surveys/indicators-conductivity.

U.S. Geological Survey, [USGS], 2019a, USGS 01417000 East Branch Delaware River at Downsville NY: USGS National Water Information System, accessed January 23, 2019, at https://waterdata.usgs.gov/nwis/dv?cb_00060=on&format=html&site_no=01417000&referred_module=sw&period=&begin_date=2013-12-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2019b, USGS 01425000 West Branch Delaware River at Stilesville NY: USGS National Water Information System, accessed January 23, 2019, at https://nwis.waterdata.usgs.gov/nwis/dv?cb_00060=on&format=html&site_no=01425000&referred_module=sw&period=&begin_date=2013-12-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2019c, USGS 01436000 Neversink River at Neversink NY: USGS National Water Information System, accessed January 23, 2019, at https://nwis.waterdata.usgs.gov/nwis/dv?cb_00060=on&format=html&site_no=01436000&referred_module=sw&period=&begin_date=2013-12-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2019d, USGS 01438500 Delaware River at Montague NJ: USGS National Water Information System, accessed January 23, 2019, at https://nwis.waterdata.usgs.gov/nwis/dv?cb_00060=on&format=html&site_no=01438500&referred_module=sw&period=&begin_date=2013-12-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2019e, USGS 01460440 Delaware and Raritan Canal at Port Mercer NJ: USGS National Water Information System, accessed January 23, 2019, at https://nwis.waterdata.usgs.gov/nwis/dv?cb_00060=on&format=html&site_no=01460440&referred_module=sw&period=&begin_date=2013-12-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2019f, USGS 01463500 Delaware River at Trenton NJ: USGS National Water Information System, accessed January 23, 2019, at https://waterdata.usgs.gov/nwis/dv?cb_00060=on&format=html&site_no=01463500&referred_module=sw&period=&begin_date=2013-12-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2019g, USGS water data for the Nation: USGS National Water Information System database, accessed January 23, 2019, at https://doi.org/10.5066/F7P55KJN.

U.S. Geological Survey, [USGS], 2020a, Dissolved oxygen and water: USGS web page, accessed April 10, 2020, at https://usgs.gov/special-topic/water-science-school/science/dissolved-oxygen-and-water?qt-science_center_objects=0.

U.S. Geological Survey, [USGS], 2020b, pH and water: USGS web page, accessed April 10, 2020, at https://usgs.gov/special-topic/water-science-school/science/ph-and-water?qt-science_center_objects=0.

U.S. Geological Survey, [USGS], 2020c, Temperature and water: USGS web page, accessed April 10, 2020, at https://usgs.gov/special-topic/water-science-school/science/temperature-and-water?qt_science_center_objects=0.

U.S. Geological Survey, [USGS], 2020d, USGS 01467200 Delaware River at Ben Franklin Bridge, at Philadelphia, PA: USGS National Water Information System, accessed April 10, 2020, at https://nwis.waterdata.usgs.gov/pa/nwis/dv?cb_all_=on&cb_00010=on&cb_00010=on&cb_00010=on&cb_00010=on&cb_00010=on&cb_00011=on&cb_00065=on&cb_00095=on&cb_00095=on&cb_00095=on&cb_00095=on&cb_00095=on&cb_00300=on&cb_00300=on&cb_00301=on&cb_00400=on&cb_00400=on&cb_32315=on&cb_32322=on&cb_63680=on&cb_99133=on&format=html&site_no=01467200&referred_module=qw&period=&begin_date=2014-04-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2020e, USGS 01477050 Delaware River at Chester PA: USGS National Water Information System, accessed April 10, 2020, at https://waterdata.usgs.gov/nwis/dv?cb_all_=on&cb_00010=on&cb_00011=on&cb_00095=on&cb_00300=on&cb_00400=on&cb_99133=on&format=html&site_no=01477050&referred_module=sw&period=&begin_date=2014-04-01&end_date=2014-11-30.

U.S. Geological Survey, [USGS], 2020f, USGS 01482800 Delaware River at Reedy Island Jetty, DE: USGS National Water Information System, accessed April 10, 2020, at https://waterdata.usgs.gov/nwis/dv?cb_00010=on&cb_00095=on&cb_00300=on&cb_00400=on&format=html&site_no=01482800&referred_module=sw&period=&begin_date=2013-12-01&end_date=2014-11-30.

Glossary

The following definitions apply to various terms and procedures used in this report.

Balancing adjustment An operating procedure used by the Office of the Delaware River Master to correct for inaccuracies inherent in the design of releases from New York City reservoirs to meet the Montague flow objective at Montague, New Jersey. The balancing adjustment calls for more water to be released when previous directed releases (or lack of releases) were insufficient to meet the Montague flow objective. This adjustment calls for less water to be released when previous directed releases were higher than required to meet the Montague flow objective. Based on provisional data, 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 useable volume in a reservoir between the point of maximum depletion and the elevation of the lower crest of the spillway.

Conservation releases Controlled releases from the Pepacton, Cannonsville, and Neversink Reservoirs in New York designed to maintain specified minimum flows in stream channels immediately below the reservoirs (tailwaters). The following conservation release rate zones are defined in the June 1, 2014, Flexible Flow Management Program (appendix 1):

- L1—Spill mitigation when New York City combined reservoir storage is in the spill mitigation (L1) storage zone.
- L2—Conservation releases when New York City combined reservoir storage is in the normal (L2) storage zone.
- L3—Conservation releases when New York City combined reservoir storage is in the drought watch (L3) storage zone.
- L4—Conservation releases when New York City combined reservoir storage is in the drought warning (L4) storage zone.
- L5—Conservation releases when New York City combined reservoir storage is in the drought (L5) storage zone (also referred to as "Drought Emergency").

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

Discharge mitigation releases Designed to help mitigate the effects of spilling immediately below the Delaware River Basin reservoirs. The 2014 Flexible Flow Management Program details the releases in section 7 (appendix 1).

Diversions The out-of-basin transfer of water by New York City from the Pepacton, Cannonsville, and Neversink Reservoirs of New York State in the upper Delaware River Basin through the East Delaware, West Delaware, and Neversink Tunnels, respectively, to New York 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 Canals.

Excess quantity As defined by the Decree, the excess quantity of water is "equal to 83 per cent [sic] of the amount by which the estimated consumption during such year is less than the City's estimate of the continuous safe yield during such year of all its sources obtainable without pumping." The excess quantity shall not exceed 70 billion gallons, and the seasonal period for releasing the excess quantity begins on June 15 and concludes on the following March 15.

Flexible Flow Management Program (FFMP) A set of rules for the management of storage, diversions, releases, and flow targets relating to the apportioning of water from the Delaware River Basin under the 1954 Decree of the Supreme Court of the United States and unanimously agreed to by the Decree Parties (Delaware, New Jersey, New York, New York City, and Pennsylvania).

Index gaging stations Specific sites on tributaries of the upper Delaware River where systematic observations of gage height and discharge are made.

Interim Excess Release Quantity An Interim Excess Release Quantity (IERQ) was defined in the 2014 Flexible Flow Management Program (appendix 1). 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 (1,257 million gallons per day) and New York City's current estimate of continuous safe yield of the New York City water-supply system of 1,290 million gallons per day, obtainable without pumping. During the 2014 report year, the IERQ available for release was 15,468 cubic feet per second for a day. 6,045 cubic feet per second for a day of the IERQ is incorporated in the releases tables to enhance base releases from the New York City Delaware River Basin reservoirs.

Interim Excess Release Quantity Extraordinary Needs Bank From the 2014 Flexible Flow Management Program (appendix 1): "In addition to the hydrologic criteria described in Section 2.5.6.A. [sic] of the Water Code and subject to other provisional uses of the IERQ as provided herein, the Decree Parties [Delaware, New Jersey, New York State, New York City, and Pennsylvania], the DRBC and the River Master may at any time review extraordinary water needs to support such research, aquatic-life, or other water-use activity as may be approved by the DRBC. Upon unanimous agreement, the Decree Parties may bank all or a portion of the IERQ remaining at such time, and such portion shall be placed in an IERQ Extraordinary Needs Bank and used to provide for such extraordinary water needs. Such quantity as may be so banked shall be deducted from the IERQ. Any unused Extraordinary Needs Bank water shall be returned to IERQ."

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. Data from these stations are used year-round in Office of the Delaware 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 level is also referred to as "minimum full-operating level."

Montague flow objective In section 3a of the June 1, 2014, Flexible Flow Management Program (appendix 1), "Except with respect to limitations provided herein in Section 5, releases from the City Delaware Basin Reservoirs shall be in quantities designed to maintain, during Normal storage conditions, a minimum basic rate of flow at the gaging station of the U.S. Geological Survey * * * at Montague, N. J. of 1,750 cubic feet per second (cfs), as directed by the River Master in accordance with Section VII. [sic] of the Decree. During Basinwide Drought Watch, Drought Warning, and Drought Emergency, in accordance with Section 5 of this Agreement and Section 2.5.3.B. [sic] and Tables 1 and 2 of the Delaware River Basin Water Code * * *, the Montague flow objective shall vary based upon the time of year and location of the salt front, and minimum compensating releases shall be made by the City of New York from its reservoirs in the upper Delaware Basin."

Rate of flow Mean discharge for a specified 24-hour period, measured in cubic feet per second for a day ([ft^3/s]-d) or million gallons per day (Mgal/d).

Rate of flow at Montague Daily mean discharge of the Delaware River at Montague, New Jersey, streamgaging site (U.S. Geological Survey site number 01438500) computed on a calendar-day basis.

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

Salt front The salt front is the 250 parts per million isochlor, or line of equal chloride concentration, in the Delaware River estuary. One part per million is one part of solute (in this case, chloride) per one million parts of solvent (river water). The 7-day average location of the salt front is used as an indicator of salinity intrusion in the Delaware River estuary and a factor affecting the Montague and Trenton flow objectives during drought emergencies.

Storage or contents Usable volume of water in a reservoir. Unless otherwise indicated, volume is computed based on the pool level 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 11 and a 25-hour day on November 4.

Trenton flow objective In section 3b of the June 1, 2014, Flexible Flow Management Program (appendix 1), "Section 2.5.3 of the Water Code establishes a set of equivalent flow objectives at Trenton, N.J. to control salinity intrusion in the Delaware Estuary. During Basinwide Drought Watch, Drought Warning, and Drought Emergency, in accordance with Section 5 of this Agreement and Section 2.5.3.B. [sic] and Tables 1 and 2 of the Water Code, the Trenton Equivalent Flow Objective shall vary based upon the time of year and location of the salt front, and minimum compensating releases shall be made by the City of New York from its reservoirs in the upper Delaware Basin."

Uncontrolled runoff at Montague Runoff from the 3,480-square-mile drainage area above Montague, New Jersey, excluding the drainage area above the Pepacton, Cannonsville, and Neversink Reservoirs; Lake Wallenpaupack; and Rio Reservoir, but including spillway overflow at these dams.

Appendix 1. Agreement of the Parties to the 1954 U.S. Supreme Court Decree Effective June 1, 2014

An agreement affecting the Amended Decree of the U.S. Supreme Court in *New Jersey* v. *New York*, 347 U.S. 995 (1954), for managing diversions and releases under the Decree, was consented to by all of the Decree Parties: the State of Delaware, the State of New Jersey, the State of New York, the Commonwealth of Pennsylvania, and the City of New York. The agreement is a 1-year successor to the Flexible Flow Management Program that ended on May 31, 2014. A copy of the agreement, which is in effect through May 31, 2015, is included as appendix 1 here; the original page numbers were removed to avoid confusion. The agreement is also available through the U.S. Geological Survey website (https://webapps.usgs.gov/odrm/documents/ffmp/FFMP_2014_Agreement.pdf).

Agreement of the Parties to the 1954 U.S. Supreme Court Decree Effective June 1, 2014

1. FLEXIBLE FLOW MANAGEMENT PROGRAM
    a. Program History
    b. Current Program
    c. Criteria for Flexible Flow Management Program Modification
2. DIVERSIONS
    a. New York City
    b. New Jersey
3. FLOW OBJECTIVES
    a. Montague Flow Objective
    b. Trenton Equivalent Flow Objective
4. RELEASES
    a. Conservation Releases from the City Delaware Basin Reservoirs
    b. Excess Release Quantity
    c. Interim Excess Release Quantity
    d. Interim Excess Release Quantity Extraordinary Needs Bank
5. DROUGHT MANAGEMENT
    a. Drought Watch
    b. Drought Warning
    c. Drought Emergency
    d. New Jersey Diversion Offset Bank
    e. Entry and Exit Criteria
    f. Balancing Adjustment
6. HABITAT PROTECTION PROGRAM
    a. Applicability and Management Objectives
    b. Controlled Releases for Habitat Protection Program
7. DISCHARGE MITIGATION PROGRAM
8. SALINITY REPULSION
9. DWARF WEDGEMUSSELS

10. LAKE WALLENPAUPACK
11. RECREATIONAL BOATING
12. ESTUARY AND BAY ECOLOGICAL HEALTH
13. WARM WATER AND MIGRATORY FISH
14. MONITORING AND REPORTING
    a. Temperature
    b. IERQ
15. REASSESSMENT STUDY
16. PERIODIC EVALUATION AND REVISION
17. TEMPORARY SUSPENSION OR MODIFICATION
18. RESERVATIONS
19. EFFECTIVE DATE
20. RENEWAL AND REVISION
21. REVERSION

An Agreement, consented to by the Parties (the State of Delaware (Del.), the State of New Jersey (N.J.), the State of New York (N.Y.), the Commonwealth of Pennsylvania (Pa.), and the City of New York (NYC or City); hereafter Decree Parties) to the Amended Decree of the U.S. Supreme Court in New Jersey v. New York, 347 U.S. 995 (1954), (hereafter Decree) that succeeds for a one-year period the Flexible Flow Management Program (FFMP) that terminated on May 31, 2014, for managing diversions and releases under the Decree. The Decree Parties hereby agree to support all provisions of this Agreement.

1. FLEXIBLE FLOW MANAGEMENT PROGRAM

a. Program History

On September 26, 2007, the Decree Parties unanimously agreed to implement a Flexible Flow Management Program (FFMP) for operation of the three New York City reservoirs in the Delaware River Basin. The FFMP was designed to provide a more natural flow regime and a more adaptive means than the previous operating regime for managing releases and diversions from New York City's Pepacton, Cannonsville, and Neversink Reservoirs (City Delaware Basin Reservoirs). The FFMP addresses competing needs and uses including safe and reliable water supplies to serve the needs of more than 17 million people; drought management; flood mitigation; protection of the cold water fishery; a diverse array of habitat needs in the mainstem river, estuary, and bay; and salinity repulsion. The Decree, which resolved an interstate dispute related to these reservoirs, made no provision for spill mitigation, conservation, and ecological releases. The Initial Implementation Cycle of the FFMP was from October 1, 2007 to May 31, 2011.

The conceptual framework of the FFMP eliminated the reservoir storage "banks" previously relied upon for habitat protection purposes and instead based releases on reservoir storage levels, resulting in larger releases when water is abundant and smaller releases when storage is at or below Normal levels. The discharge mitigation component of the FFMP was intended to reduce the likelihood that the three reservoirs could be full and spilling coincident with a major storm or thaw.

The FFMP was designed to provide an adaptive framework which allows increased flexibility for program modifications and adjustments compared to the previous operating regime. This framework provides a tool to inform program-management decisions as new scientific and technical information is accumulated. During the Initial Implementation Cycle, notable revisions to the FFMP included the following:

Temporary Modifications – Such modifications have been made in support of increased reservoir releases for maintenance, inspection, and repair of the Delaware Aqueduct and appurtenant infrastructure; increased releases for supplemental flood mitigation; emergency thermal releases for protection of the cold water fishery; and enhanced summer releases through the use of Interim Excess Release Quantity (IERQ) Extraordinary Needs Banks.

Permanent Changes – Such changes have been made to the FFMP agreement to allow for increased reservoir releases for habitat protection needs in late May and early September; to clarify the meaning of "temporary" releases schedules during periods of maintenance and repair of City Delaware Basin Reservoirs and appurtenant infrastructure; to address the issue of storage zone bouncing; and to allow the use of up to 100 percent of the water equivalent of snow pack for the calculation of combined storage to determine reservoir releases rates.

b. Current Program

The original FFMP, effective October 1, 2007 and its subsequent modifications on December 10, 2008 and February 14, 2011, expired on May 31, 2011. Collectively, these programs are referred to herein as the Initial Implementation Cycle FFMP. The subsequent FFMP Agreement, effective June 1, 2011 and expired on May 31, 2012, was a one-year program unanimously approved by the Decree Parties and built upon the framework of the previous FFMP agreements. The FFMP Agreement effective June 1, 2012 and expiring on May 31, 2013 was a one-year extension of the June 1, 2011 Agreement and was unanimously approved by the Decree Parties. The 2013 FFMP was an extension of the June 1, 2011 Agreement. The current FFMP is also an extension of the June 1, 2011 Agreement that incorporates the edits from the previous three extensions of the 2011 Agreement and shall be effective from June 1, 2014 to May 31, 2015. Although several limited studies and evaluations have been conducted to assess the effectiveness of selected elements of the Initial Implementation Cycle FFMP and suggest opportunities for its improvement, some of which were incorporated in the previous extensions of the Agreement, additional analyses and studies are needed prior to the Decree Parties reaching a longer term agreement for managing diversions and releases under the Decree.

The current FFMP is informed by impact assessments of previous FFMP Agreements, information and experience accumulated during the previous programs, and input from various stakeholder groups and the public. The current FFMP differs from the Initial Implementation Cycle FFMP mainly in the following key elements:

- Use of additional tables (i.e., schedules) of reservoir releases rates for the City Delaware Basin Reservoirs, developed on the basis of Forecast-based Available Water (FAW) not needed contemporaneously for New York City's water supply;
- Use of new releases tables that replace releases tables utilized in the Initial Implementation Cycle FFMP;
- Use of new rule curves that replace rule curves utilized in the Initial Implementation Cycle FFMP;
- Use of New York City's Operations Support Tool (OST) to guide selection of appropriate releases tables;
- Releases rates based, in part, upon recommendations provided jointly by the New York State Department of Environmental Conservation and the Pennsylvania Fish and Boat Commission Joint Fisheries Paper (January 12, 2010);

- Drought condition releases rates (L3-L5) that are consistent among the releases tables;
- Modifications to New Jersey's diversion during drought conditions and the establishment of a Diversion Offset Bank for New Jersey;
- Incorporation of the seasonal releases design of the FFMP Temporary Summer 2010 fisheries program;
- Redirection of the IERQ used to support the seasonal flow increment, which was intended to increase the Montague flow objective from 1,750 cfs to 1,850 cfs between June 15 and September 15;
- Use of 3.91 billion gallons (6,045 cfs-days) of IERQ to increase the base releases rates in the tables;
- Reattachment of the Montague flow objective with the location of the Delaware Estuary salt front (salinity vernier);
- Modified spill mitigation program that endeavors to maintain reservoir levels at the Conditional Seasonal Storage Objective (CSSO), creating a high probability of maintaining ten (10) percent void spaces from September 1, 2014 through March 15, 2015; and
- Postponement of a water-resources reassessment study until more information is available.

The additional releases tables and use of OST will facilitate the redirection of spilled water to managed water to benefit downstream interests when water in the City Delaware Basin Reservoirs is forecasted to be available for purposes other than New York City's water supply.

The June 1, 2012 FFMP Agreement differed from the previous FFMP Agreement in the following elements:

- Section, 1.b., Current Program, was updated to reflect the June 1, 2012 FFMP one-year extension;
- The dates were revised to correspond to the effective term of the June 1, 2012 FFMP Agreement;
- Additional units of measurement for water volume were provided; and
- The State of Delaware had one party signing the current FFMP Agreement, as opposed to two.

The June 1, 2013 FFMP Agreement was an extension of, and incorporates herein the same terms as the June 1, 2011 and 2012 FFMP Agreements.

The June 1, 2014 FFMP Agreement is an extension of the June 1, 2011 Agreement and incorporation the changes of the 2012, and 2013 Agreements. This Agreement also changes the term Conditional Storage Objective (CSO) to Conditional Seasonal Storage Objective (CSSO).

c. Criteria for Flexible Flow Management Program Modification

In reviewing proposed modifications to address the purposes of the FFMP, as provided in Sections 16 and 17 herein, the Decree Parties will consider criteria that may include, without any particular priority, and not limited to, the following:

i. Decree Party equity

ii. Net benefits and costs to environmental and economic resources

iii. Source and sustainability of water available to support modification and the environmental or economic resource(s)

iv. Habitat types—with naturally-occurring habitats receiving consideration over man-made habitats

v. Scientific basis for modification

vi. Impacts to drought management, water supply and flood mitigation, including but not limited to: 1) frequency, duration and seasonal timing of the various levels of drought; and 2) frequency, duration, levels of storage, diversions, releases and flows

vii. Extent to which the diversions and the Montague minimum basic rate of flow provided in the Decree are met

viii. Potential impacts to water quality, existing National and State Pollution Discharge Elimination System permits and the assimilative capacity of the Delaware River

ix. Ease and practicability of operation

x. Consistency with adaptive management principles

xi. Applicability and implementation of water conservation practices

xii. Impacts to salinity

The Decree Parties agree to evaluate these parameters as well as potential additional parameters, when considering modifications to this program.

2. DIVERSIONS

a. New York City

In accordance with Section III.A. of the Decree, and subject to the limitations provided herein, at no time during the twelve-month period, commencing June 1, 2014 shall the aggregate total quantity of water diverted by the City, divided by the number of days elapsed since May 31, 2014 exceed 800 million gallons per day (mgd). The City shall be subject to the conditions and obligations in connection with the diversions, and releases

to maintain the Montague flow objective, set forth in Section III.B. of the Decree. For this Agreement, the City shall make releases from its Delaware Basin Reservoirs in accordance with the releases schedules incorporated herein.

b. New Jersey

In accordance with Section V. of the Decree, except with respect to limitations provided herein in Section 5, the State of New Jersey may divert outside the Delaware River watershed, from the Delaware River or its tributaries in New Jersey, without compensating releases, the equivalent of 100 mgd under the supervision of the Delaware River Master (River Master) established by the Decree and shall be subject to the following conditions and obligations:

i. Until the State of New Jersey builds and utilizes one or more reservoirs to store waters of the Delaware River or its tributaries for the purpose of diverting the same to another watershed, or purchases or leases reallocated water or new storage from an existing or new storage facility, the State of New Jersey may divert not to exceed 100 mgd as a monthly average, with the diversion on any day not to exceed 120 million gallons.

ii. If and when the State of New Jersey has built and is utilizing one or more reservoirs to store waters of the Delaware River or its tributaries for the purpose of diversion to another watershed, it may withdraw water from the Delaware River or its tributaries into such impounding reservoirs without limitation except during the months of July, August, September and October of any year, when not more than 100 mgd as a monthly average and not more than 120 million gallons in any day shall be withdrawn. This restriction may be modified upon unanimous consent of the Decree Parties should the State of New Jersey purchase or lease reallocated water or new storage from an existing or new facility.

iii. Regardless of whether the State of New Jersey builds and utilizes storage reservoirs for diversion, its total diversion for use outside of the Delaware River watershed without compensating releases shall not exceed an average of 100 mgd during any calendar year.

3. FLOW OBJECTIVES

a. Montague Flow Objective

Except with respect to limitations provided herein in Section 5, releases from the City Delaware Basin Reservoirs shall be in quantities designed to maintain, during Normal storage conditions, a minimum basic rate of flow at the gaging station of the U.S. Geological Survey (USGS) at Montague, N. J. of 1,750 cubic feet per second (cfs), as directed by the River Master in accordance with Section VII. of the Decree.

During Basinwide Drought Watch, Drought Warning, and Drought Emergency, in accordance with Section 5 of this Agreement and Section 2.5.3.B. and Tables 1 and 2 of the Delaware River Basin Water Code (Water Code), the Montague flow objective shall vary based upon the time of year and location of the salt front, and minimum compensating releases shall be made by the City of New York from its reservoirs in the upper Delaware Basin.

The Decree Parties, with the guidance of the Operations Support Tool described herein in Section 6, shall seek to maximize the frequency of the minimum basic rate of 1,750 cfs flows at the USGS gaging station at Montague, N.J. without adversely impacting basin water supplies and other objectives of the FFMP.

b. Trenton Equivalent Flow Objective

Section 2.5.3 of the Water Code establishes a set of equivalent flow objectives at Trenton, N.J. to control salinity intrusion in the Delaware Estuary. One means for salinity management is through releases from Beltzville and Blue Marsh Reservoirs. Blue Marsh Reservoir is located on the Schuylkill River and is downstream of the USGS gaging station at Trenton, N. J. Releases from Blue Marsh Reservoir, as well as bypass flows from Yardley and the Point Pleasant Pumping station, are considered to be as effective at repelling salinity as water entering the estuary from the main stem Delaware River at Trenton. The Trenton Equivalent Flow is computed as the sum of flows at the USGS Trenton gaging station, releases in excess of conservation releases from Blue Marsh Reservoir, and 70 cfs to account for bypass flows via Yardley and the Point Pleasant Pumping Station. This value is compared to the Trenton Equivalent Flow Objective to determine if the flow objective was satisfied.

During Basinwide Drought Watch, Drought Warning, and Drought Emergency, in accordance with Section 5 of this Agreement and Section 2.5.3.B. and Tables 1 and 2 of the Water Code, the Trenton Equivalent Flow Objective shall vary based upon the time of year and location of the salt front, and minimum compensating releases shall be made by the City of New York from its reservoirs in the upper Delaware Basin.

4. RELEASES

a. Conservation Releases from the City Delaware Basin Reservoirs

Conservation releases designed for protection of the ecology in the stream reaches below the City Delaware Basin Reservoirs, including water quality, fisheries, and aquatic habitat needs, shall be made at the rates described in the Habitat Protection Program in Section 6 below.

b. Excess Release Quantity

For the period of the current program, the Decree Parties agree to use the Excess Release Quantity, as defined in the Decree, in support of an Interim Excess Release Quantity (IERQ) as defined in Paragraph c. below.

c. Interim Excess Release Quantity

For the period of the current program, an IERQ equivalent to 10.0 billion gallons (15,468 cfs-days) shall be provided as computed in the Initial Implementation Cycle of the FFMP based upon 83 percent of the difference between 1,257 mgd, the highest year's consumption of the NYC water supply system between 2002 and 2006 inclusive and NYC's estimate of continuous safe yield of the NYC water supply system at that time, of 1,290 mgd obtainable without pumping.

For the current program, 3.91 billion gallons (6,045 cfs-days) of the IERQ is incorporated in the releases tables to enhance base releases from the City Delaware Basin Reservoirs. The IERQ balance of 6.09 billion gallons (9,423 cfs-days) is reserved and may be used for additional releases to meet the Trenton Equivalent Flow Objective or to establish an Extraordinary Needs Bank as provided for in Section d., below.

Upon request by the Lower Basin States or DRBC, NYC shall release from the IERQ, water in sufficient quantities to maintain a flow at Trenton of 3,000 cfs during basinwide Normal conditions for the period commencing on June 15 and continuing through March 15 (seasonal period). The IERQ required to be released in any seasonal period shall not exceed 70 billion gallons. In releasing the IERQ, NYC shall not be required to release at rates exceeding the capacity of its release works. NYC shall make releases from the IERQ as provided above until May 31, 2015 or until the aggregate quantity of the IERQ is exhausted, whichever occurs first.

d. Interim Excess Release Quantity Extraordinary Needs Bank

In addition to the hydrologic criteria described in Section 2.5.6.A. of the Water Code and subject to other provisional uses of the IERQ as provided herein, the Decree Parties, the DRBC and the River Master may at any time review extraordinary water needs to support such research, aquatic-life, or other water-use activity as may be approved by the DRBC. Upon unanimous agreement, the Decree Parties may bank all or a portion of the IERQ remaining at such time, and such portion shall be placed in an IERQ Extraordinary Needs Bank and used to provide for such extraordinary water needs. Such quantity as may be so banked shall be deducted from the IERQ. Any unused Extraordinary Needs Bank water shall be returned to IERQ.

5. DROUGHT MANAGEMENT

Figure 1 defines six zones of combined reservoir usable storage relative to the three drought management rule curves (Drought Watch, Drought Warning, and Drought Emergency creating Zones L3, L4, and L5, respectively) and two additional curves that subdivide the Normal storage zone into three zones (L1, L2-a, and L2-b). The three drought management rule curves are described below. The two Normal conditions rule curves are described in Section 6.

During the effective period of this Agreement, the following drought stage definitions and procedures will be in effect:

a. Drought Watch (L3)

The seasonally segmented line (shown as dashes) dividing the current Drought Warning in Figure 1 of DRBC Resolution No. 83-13 and DRBC Docket No. D-77-20 CP (Revised) is raised by four (4) billion gallons during the entire year. In addition, the upper half of the Drought Warning zone, previously referred to as DW1, is hereby designated Drought Watch, with diversions and flow objectives as shown in Table 1.

b. Drought Warning (L4)

The lower half of the Drought Warning zone (DW2), based upon the rule curves included in DRBC Resolution No. 83-13 and as modified by Paragraph a. above, is hereby designated Drought Warning, with diversions and flow objectives as shown in Table 1.

c. Drought Emergency (L5)

The operation level formerly named Drought in accordance with the rule curves included in DRBC Resolution No. 83-13 and Docket D-77-20 (Revised) is hereby designated Drought Emergency. During Drought Emergency, diversions shall be limited as shown in Table 1. The Montague and Trenton Equivalent Flow Objectives are shown in Tables 1 and 2.

New York City's diversions from the Delaware River Basin shall be in accordance with Table 1 (Interstate Operation Formula for Diversions and Flow Objectives). Minimum releases from the New York City Delaware Basin Reservoirs shall be in accordance with Table 3 (Schedule of Releases during Drought Operations).

New Jersey's maximum average monthly diversion from the Delaware River Basin via the Delaware and Raritan Canal shall be in accordance with Table 1, and shall not exceed 100 mgd, except when the Basin is in Drought Emergency, when said diversion shall not exceed a daily running average of 85 mgd commencing on the day such Drought Emergency becomes effective. Under all City Delaware Basin Reservoir combined storage conditions, New Jersey's diversion on any day shall not exceed 120 million gallons.

d. New Jersey Diversion Offset Bank

There is hereby established a Diversion Offset Bank, not to exceed 1.84 billion gallons (2,850 cfs-days) of water in the City Delaware Basin Reservoirs, for the purpose of offsetting the increased diversions by New Jersey as provided in Table 1 of this Agreement, during basinwide Drought Watch, Drought Warning, and Drought Emergency conditions. The additional increases are in increments, not to be exceeded on any day, as follows: 0 mgd during Normal conditions; up to 15 mgd during Drought Watch; up to 30 mgd during Drought Warning; and up to 20 mgd during Drought Emergency. The differences in New Jersey's diversion, computed on the basis of Table 1 of the Good Faith Agreement, and the corresponding rates in Table 1 of this Agreement, establish the additional increments for New Jersey's diversion as incorporated herein.

This Diversion Offset Bank shall be created by selective reduced levels of releases in the L2 storage zones from Cannonsville Reservoir, during the periods June 1 to August 31, 2014 and May 21 to May 31, 2015 as provided in Tables 4g (L2-a and L2-b) and 4f (L2-a). Water saved by these reductions shall be accumulated in the Diversion Offset Bank and shall be available to offset New Jersey's incremental increases in diversions through the Delaware and Raritan Canal during drought periods.

If the accumulated incremental increased diversions by New Jersey, at any time, exceed the available water in the Diversion Offset Bank, the Lower Basin Reservoirs in Pennsylvania will provide the additional water to offset New Jersey's increased diversions. At no time shall New Jersey's accumulated incremental increased diversions exceed 1.84 billion gallons (2,850 cfs-days).

Any portion of the ERQ/IERQ or uncompensated storage in the downbasin reservoirs in Pennsylvania or in the New York City Delaware Basin Reservoirs which may be used to offset the increased New Jersey drought diversions provided herein is for the term of this agreement only and shall not be cited as precedent of any intention to provide such in future agreements.

Releases from the Diversion Offset Bank shall be at the direction of New Jersey in consultation with DRBC, and will be implemented by the River Master. Releases from the Lower Basin Reservoirs for New Jersey's diversion, if necessary, shall be at the direction of DRBC, in consultation with and at the request of New Jersey.

Releases from the Diversion Offset Bank or the Lower Basin Reservoirs to offset New Jersey's incremental increases in diversions through the Delaware and Raritan Canal shall be in accordance with timing procedures agreed upon by DRBC, New Jersey, and the River Master. No offsetting or accounting for offsetting is required for New Jersey's increased diversions on any day when DRBC determines that no water is required from Lower Basin Reservoirs to meet the current Trenton flow objective.

The River Master's office will maintain the ongoing accounting for releases made from

this bank. At no time during the releases year commencing June 1, 2014 shall releases from the Diversion Offset Bank exceed the unused balance of the bank. The Diversion Offset Bank shall terminate automatically on June 1, 2015; provided that it may be terminated at an earlier date and the remaining balance added to the IERQ, by agreement of the Decree Parties.

Figure 1
New York City Delaware System Usable Combined Storage
(Cannonsville, Pepacton, and Neversink Reservoirs)

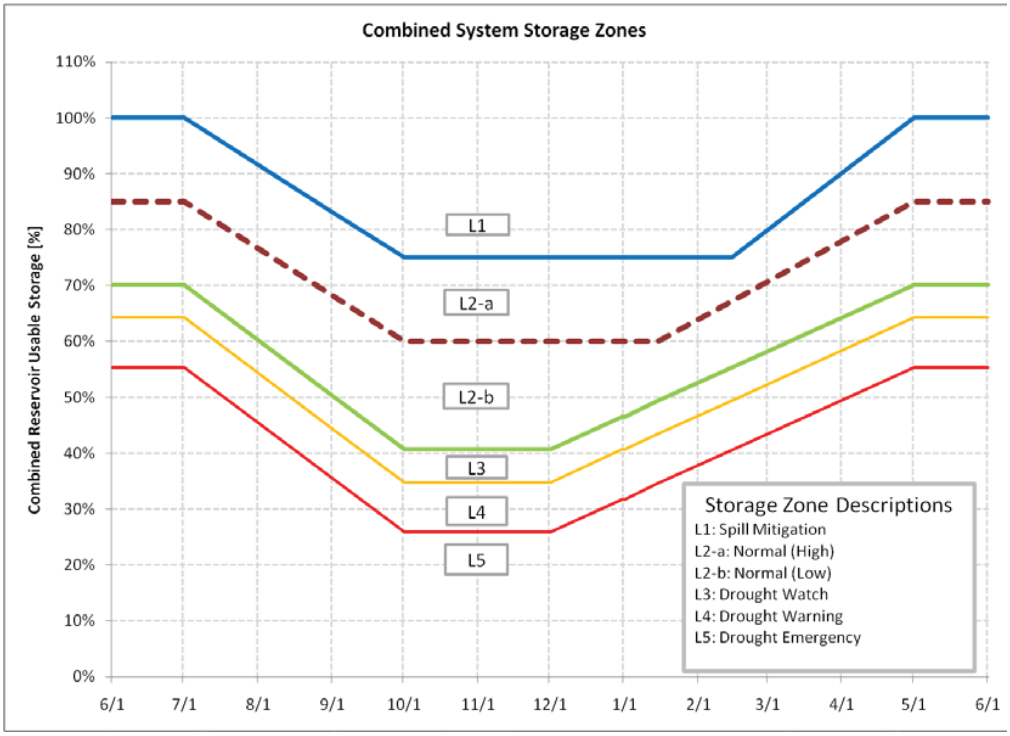


Table 1
Interstate Operation Formula for Diversions and Flow Objectives

NYC Storage Condition	*NYC Diversion (mgd)*	*NJ Diversion (mgd)*	*Montague Flow Objective (cfs)*	*Trenton Flow Objective (cfs)*
Normal (L1, L2)	800	100	1,750	3,000
Drought Watch (L3)	680	100	1,650	2,700
Drought Warning (L4)	560	100	1,550	2,700
Drought Emergency (L5)	520	85	1,100-1,650*	2,500-2,900*
Severe Drought	(to be negotiated depending upon conditions)			

* Varies with time of year and location of salt front, in accordance with Table 2.

Table 2
Interstate Operation Formula for Adjusting Montague and Trenton Flow Objectives during Drought Emergency (L5) Operations

	Flow objective, cubic feet per second at:					
	Montague, NJ			Trenton, NJ***		
7-day average location of Salt Front*, River Mile**	Dec-Apr.	May-Aug.	Sept-Nov.	Dec-Apr.	May-Aug.	Sept-Nov.
Upstream of R.M. 92.5	1,600	1,650	1,650	2,700	2,900	2,900
Between R.M. 87.0 and R.M. 92.5	1,350	1,600	1,500	2,700	2,700	2,700
Between R.M. 82.9 and R.M. 87.0	1,350	1,600	1,500	2,500	2,500	2,500
Downstream of R.M. 82.9	1,100	1,100	1,100	2,500	2,500	2,500

* Defined as the 250 milligrams per liter isochlor in the Delaware Estuary.

**Measured in statute miles along the navigation channel from the mouth of Delaware Bay.

*** The Trenton Equivalent Flow Objective is achieved if the sum of flows observed at the USGS Trenton gaging station, releases in excess of conservation releases from Blue Marsh Reservoir, and 70 cfs to account for bypass flows via Yardley and the Point Pleasant Pumping Station is greater than the Trenton Flow Objective listed above.

Table 3
Schedule of Releases (cfs) during Drought Operations

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L3	55	55	85	85	135	135	135	85	85	55
L4	50	50	60	60	100	100	100	50	50	50
L5	40	40	40	40	90	90	90	40	40	40

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L3	45	45	60	60	75	75	75	45	45	45
L4	40	40	50	50	65	65	65	40	40	40
L5	35	35	35	35	60	60	60	35	35	35

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L3	30	30	40	40	55	55	55	30	30	30
L4	25	25	30	30	45	45	45	25	25	25
L5	20	20	20	20	40	40	40	20	20	20

e. Entry and Exit Criteria

Criteria for entry into and exit from the various stages of drought operations shall be in accordance with Section 2.5.3.E. of the Water Code. Normal (L2 or higher) level releases will be restored when combined storage in the City Delaware Basin Reservoirs reaches 25 billion gallons above the L3 curve in Figure 1 and remains at or above that level for 15 consecutive days.

f. Balancing Adjustment

In order to conserve water, the River Master is requested to utilize a balancing adjustment, based upon procedures agreed upon by the Decree Parties, when calculating the releases to be directed to meet the Montague flow objectives in Tables 1 and 2. Additionally, during Drought Warning, the amount of the conservation releases (L4) from the City Delaware Basin Reservoirs that is greater than the basic conservation releases rates as set forth in Table 1 of Docket D-77-20 (Revised) shall be considered as directed releases for the purpose of calculating the balancing adjustment.

6. HABITAT PROTECTION PROGRAM

a. Applicability and Management Objectives

The overall management goal of the Habitat Protection Program (HPP) is to protect the cold water fishery while maintaining aquatic community diversity, structure, and function through improved ecological flow releases. A series of four categorical protection levels for describing cold water ecosystem management objectives for waters downstream of the City Delaware Basin Reservoirs was developed by New York and Pennsylvania fishery managers and is shown on Plate 1. These protection levels apply in non-drought years and are defined as follows:

Excellent: Excellent year-round cold water aquatic habitat protection. Summer water temperatures are routinely 68ºF or less and only very rarely exceed a daily maximum of 75ºF. Excellent protection level applies to the West Branch Delaware River from Cannonsville Reservoir to the junction with the East Branch Delaware River, the East Branch Delaware River from Pepacton Reservoir to the hamlet of East Branch, N.Y., and Neversink River from Neversink Reservoir to Bridgeville, N.Y.

Good: River section provides cold water aquatic habitat and thermal protection and maintains opportunities for a cold water fishery. Summer water temperatures will occasionally exceed a daily maximum of 75ºF for short periods and water temperatures greater than 68ºF occur

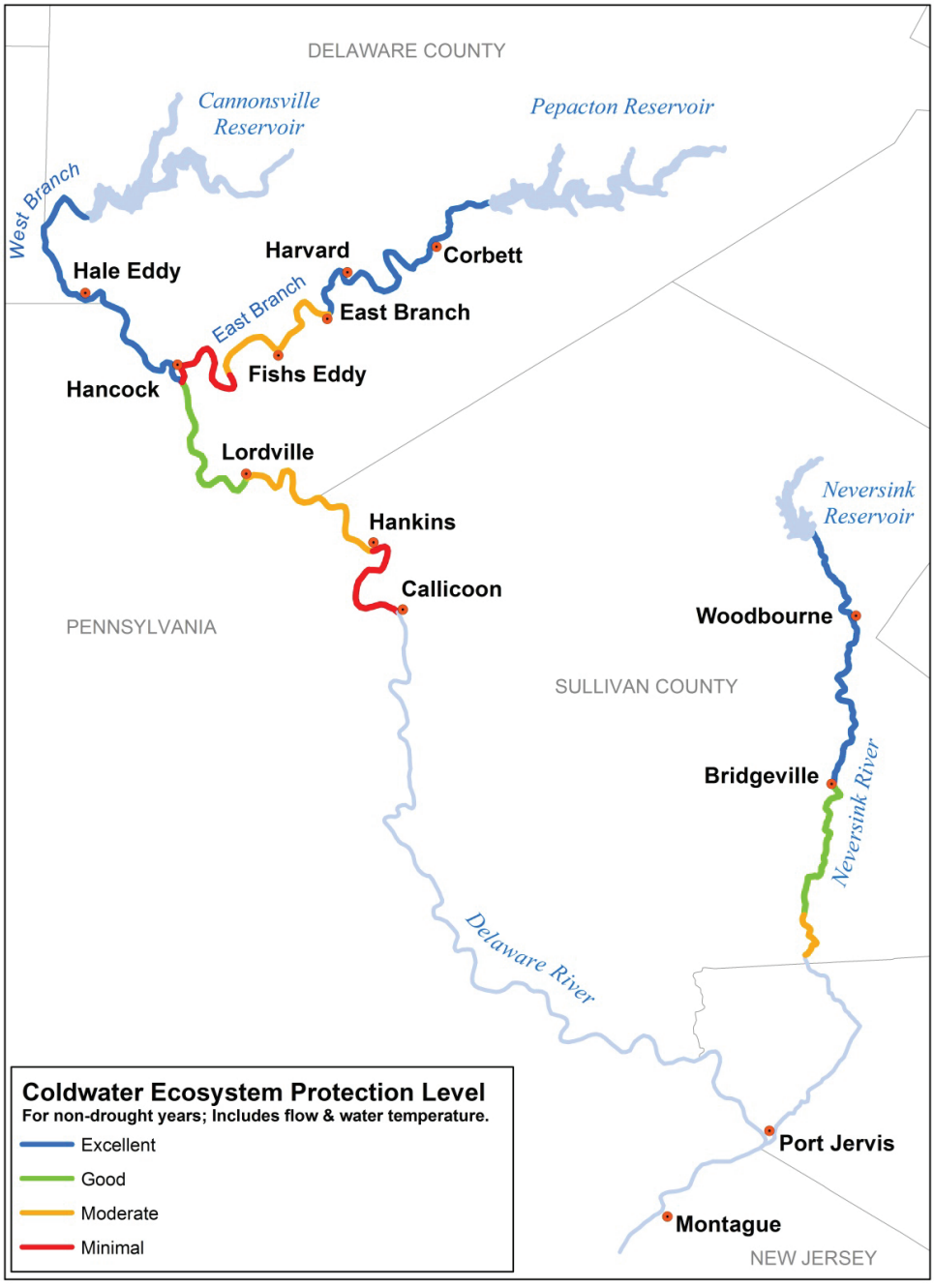
more frequently than with the Excellent protection level. Elevated temperatures will occasionally be an issue. Good protection level applies to the Delaware River main stem from the junction of the West and East Branches to Lordville, N.Y. and the Neversink River from Bridgeville, N.Y. to the mouth of Eden Brook near Oakland Valley, N.Y.

Moderate: River sections will experience adequate flow and some thermal protection for cold water species. Seasonal opportunities for a cold water fishery will occur, but thermal benefits will diminish. Moderate protection level applies to the East Branch Delaware River from East Branch, N.Y. to the mouth of Corn Creek near Peas Eddy, N.Y., the Neversink River from the mouth of Eden Brook near Oakland Valley, N.Y. to the Sullivan/Orange County, N.Y. boundary, and the Delaware River main stem from Lordville, N.Y. to Hankins, N.Y.

Minimal: River sections with this designation will experience adequate flow, but only limited thermal protection. The quality of the fishery will be generally seasonal and will vary from year to year. Flows should be adequate to allow trout to reach cold water refugia and to protect dwarf wedgemussel populations in the vicinity of Callicoon, N.Y. Minimal protection level applies to the East Branch Delaware River from the mouth of Corn Creek near Peas Eddy, N.Y. to the junction with the West Branch Delaware River, and the Delaware River main stem from Hankins, N.Y. to Callicoon, N.Y.

The Decree Parties recognize that the degree of protection in waters downstream of the City Delaware Basin Reservoirs will vary according to annual fluctuations in precipitation and temperature, reservoir releases rates, distance from the locations of reservoir releases, and tributary influences. Requirements for protection of the federally endangered dwarf wedgemussel are currently under study and are poorly defined.

Plate 1
Extent and Protection Level of the Cold Water Ecosystem



b. Controlled Releases for Habitat Protection Program

There is hereby established a Habitat Protection Program (HPP), which consists of conservation releases designed for the protection of the cold water fishery below the City Delaware Basin Reservoirs.

The HPP is designed to make enhanced releases, above the base releases given in Table 4a, when an assessment by New York City, using its Operations Support Tool (OST), determines that additional water is available for releases and that any risk to the City's water supply is at an acceptable level. The Base Releases table is designed for drought neutral minimum releases, i.e., no additional drought risk relative to DRBC Docket D-77-20 Revised (Rev. 1), which can be maintained under Normal conditions, independent of inflow or the City's demand.

The City is using OST, a state-of-the-art forecast-driven analysis and decision support tool that will provides the City with probabilistic predictions of future system status. In addition to its principal objective of improving operational decision making in providing a reliable supply of high quality drinking water for 9 million people, OST also provides assurance that the actions taken to support downstream objectives, such as fish habitat, stream ecosystems, and better discharge mitigation, will not adversely impact water supply reliability. It allows the City to compare different sets of operating scenarios using real-time system information (e.g., reservoir levels, water quality, streamflows) and forecasts (e.g., streamflows, meteorological drivers) to evaluate the impacts on water supply reliability so that objective risk-based decisions can be made quickly and efficiently.

Under this agreement the City will voluntarily make enhanced stream releases using the Forecast-based Available Water (FAW) as determined by an OST assessment and in accordance with Figures 1 and 2 and the appropriate FAW or the base releases shown in Table 4a. When the assessment indicates that no additional water is available, the City shall make releases in accordance with the currently sustainable base releases shown in Table 4a. The City is under no obligation to make enhanced releases beyond the base releases, when the risk to water supply, as determined by the City using its OST assessment, is unacceptable. Tables 4b through 4g present the releases tables under Normal conditions for pre-determined amounts of FAW.

The City will make available to the Decree Parties the inputs to the OST model, the outputs from the model, and the releases table selection guidelines, including the forecasted probabilistic inflows, the status of the City Delaware Reservoirs, and the operational assumptions applicable to OST-based decisions. OST assessments shall be performed as frequently as necessary to confirm confidence in the selected FAW table but generally not less than monthly. Prior to making a releases table change, the City will provide notification, along with a general description of the rationale of such change to the Decree Parties, the River Master, and DRBC. The City shall provide the OST Summary Data, described above through the River Master's website.

As shown in Tables 4a through 4g, each reservoir has a schedule of seasonal releases based on the quantity of combined reservoir usable storage, and the quantity of water available for the HPP.

Figure 2
New York City Delaware System Usable Individual Storage
(Cannonsville, Pepacton, and Neversink Reservoirs)

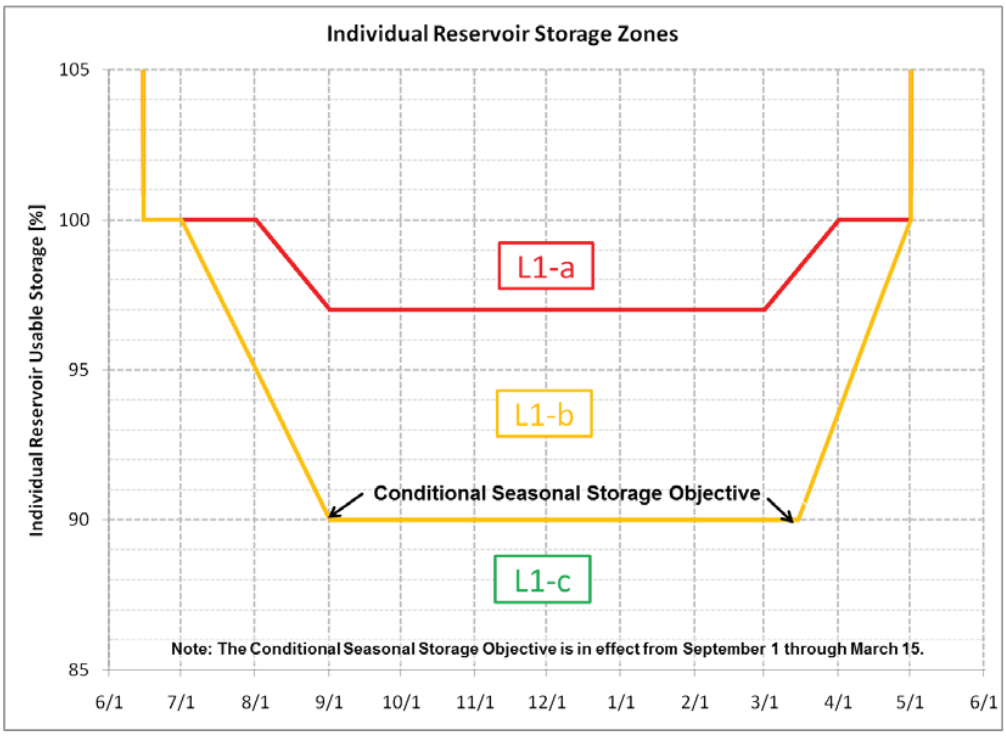


Table 4a
Schedule of Releases (cfs) during Normal Conditions
Base Releases with no Forecast-based Available Water (FAW)

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	1500	1500	*	*	*	1500	1500	1500	1500	1500
L1-b	400	400	*	*	*	*	400	400	400	400
L1-c	110	110	200	250	275	275	275	275	175	110
L2-a	75	75	150	200	225	225	225	225	150	75
L2-b	60	60	135	175	190	190	190	190	135	60

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	700	700	*	*	*	700	700	700	700	700
L1-b	300	300	*	*	*	*	300	300	300	300
L1-c	85	85	110	130	150	150	150	150	100	85
L2	50	50	75	90	100	100	100	100	60	50

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	190	190	*	*	*	190	190	190	190	190
L1-b	125	110	*	*	*	*	150	150	150	125
L1-c	65	65	85	100	110	110	110	100	75	65
L2	35	35	55	65	75	75	75	65	50	35

* Indicates storage zone not present at this time period; release is entry in cell below.

Table 4b
Schedule of Releases (cfs) during Normal Conditions
Releases with 10 mgd Forecast-based Available Water (FAW)

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	1500	1500	*	*	*	1500	1500	1500	1500	1500
L1-b	400	400	*	*	*	*	400	400	400	400
L1-c	125	125	225	300	300	300	300	300	200	125
L2-a	85	85	160	235	245	245	245	235	160	85
L2-b	70	70	140	200	210	210	210	200	140	70

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	700	700	*	*	*	700	700	700	700	700
L1-b	300	300	*	*	*	*	300	300	300	300
L1-c	85	85	110	130	150	150	150	150	110	85
L2	55	55	75	100	110	110	110	100	75	55

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	190	190	*	*	*	190	190	190	190	190
L1-b	125	110	*	*	*	*	150	150	150	125
L1-c	70	70	85	100	110	110	110	100	85	70
L2	40	40	60	75	80	80	80	75	60	40

* Indicates storage zone not present at this time period; release is entry in cell below.

Table 4c
Schedule of Releases (cfs) during Normal Conditions
Releases with 20 mgd Forecast-based Available Water (FAW)

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	1500	1500	*	*	*	1500	1500	1500	1500	1500
L1-b	500	500	*	*	*	*	500	500	500	500
L1-c	150	200	250	300	325	325	325	325	225	150
L2-a	90	140	175	260	275	275	275	260	170	90
L2-b	80	90	150	220	240	240	240	220	145	80

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	700	700	*	*	*	700	700	700	700	700
L1-b	300	300	*	*	*	*	300	300	300	300
L1-c	100	100	110	130	150	150	150	150	125	100
L2	60	60	85	110	125	125	125	110	85	60

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	190	190	*	*	*	190	190	190	190	190
L1-b	125	110	*	*	*	*	150	150	150	125
L1-c	70	70	85	100	110	110	110	100	85	70
L2	45	45	65	80	90	90	90	80	65	45

* Indicates storage zone not present at this time period; release is entry in cell below.

Table 4d
Schedule of Releases (cfs) during Normal Conditions
Releases with 35 mgd Forecast-based Available Water (FAW)

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	1500	1500	*	*	*	1500	1500	1500	1500	1500
L1-b	600	600	*	*	*	*	600	600	600	600
L1-c	175	250	300	375	400	400	400	375	275	175
L2-a	110	175	225	300	325	325	325	300	210	110
L2-b	90	115	175	250	275	275	275	250	150	90

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	700	700	*	*	*	700	700	700	700	700
L1-b	300	300	*	*	*	*	300	300	300	300
L1-c	100	100	110	130	150	150	150	150	125	100
L2	70	70	90	125	140	140	140	125	90	70

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	190	190	*	*	*	190	190	190	190	190
L1-b	125	110	*	*	*	*	150	150	150	125
L1-c	75	75	100	100	125	125	125	100	100	75
L2	50	50	70	90	100	100	100	90	75	50

* Indicates storage zone not present at this time period; release is entry in cell below.

Table 4e
Schedule of Releases (cfs) during Normal Conditions
Releases with 50 mgd Forecast-based Available Water (FAW)

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	1500	1500	*	*	*	1500	1500	1500	1500	1500
L1-b	700	700	*	*	*	*	700	700	700	700
L1-c	200	325	400	400	500	500	500	400	325	200
L2-a	125	200	250	325	400	400	400	325	250	125
L2-b	100	150	200	275	300	300	300	275	150	100

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	700	700	*	*	*	700	700	700	700	700
L1-b	500	500	*	*	*	*	500	500	500	500
L1-c	150	150	150	150	150	150	150	150	150	150
L2	80	80	100	125	140	140	140	140	100	80

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	190	190	*	*	*	190	190	190	190	190
L1-b	125	110	*	*	*	*	150	150	150	125
L1-c	75	75	100	100	140	140	140	100	100	75
L2	50	50	75	90	100	100	100	90	75	50

* Indicates storage zone not present at this time period; release is entry in cell below.

Table 4f
Schedule of Releases (cfs) during Normal Conditions
Releases with 75 mgd Forecast-based Available Water (FAW)

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	1500	1500	*	*	*	1500	1500	1500	1500	1500
L1-b	700	700	*	*	*	*	700	700	700	700
L1-c	225	475	475	525	600	600	600	475	375	225
L2-a	150	400	400	400/450+	500/525+	500/525+	500/525+	400	300	150
L2-b	100	150	200	275	300	300	300	275	200	100

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	700	700	*	*	*	700	700	700	700	700
L1-b	500	500	*	*	*	*	500	500	500	500
L1-c	150	150	150	150	150	150	150	150	150	150
L2	100	100	100	125	140	140	140	140	100	100

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	190	190	*	*	*	190	190	190	190	190
L1-b	125	110	*	*	*	*	150	150	150	125
L1-c	75	75	100	100	140	140	140	100	100	75
L2	55	55	90	90	110	110	110	90	90	55

* Indicates storage zone not present at this time period; release is entry in cell below.
\+ Second entry after slash indicates reduction in release rate for New Jersey Diversion Offset Bank.

Table 4g
Schedule of Releases (cfs) during Normal Conditions
Releases with 100 mgd Forecast-based Available Water (FAW)

	Winter		Spring		Summer			Fall		
Cannonsville Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	1500	1500	*	*	*	1500	1500	1500	1500	1500
L1-b	700	700	*	*	*	*	700	700	700	700
L1-c	225	475	475	525	600	600	600	475	375	225
L2-a	150	400	400	400/450+	500/525+	500/525+	500/525+	400	300	150
L2-b	150	400	400	400/450+	500/525+	500/525+	500/525+	400	300	150

	Winter		Spring		Summer			Fall		
Pepacton Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	700	700	*	*	*	700	700	700	700	700
L1-b	500	500	*	*	*	*	500	500	500	500
L1-c	150	150	150	150	150	150	150	150	150	150
L2	100	100	100	140	140	140	140	140	100	100

	Winter		Spring		Summer			Fall		
Neversink Storage Zone	Dec 1 - 31-Mar	Apr 1 - 30-Apr	May 1 - 20-May	May 21 - 31-May	Jun 1 - 15-Jun	Jun 16 - 30-Jun	Jul 1 - 31-Aug	Sep 1 - 15-Sep	Sep 16 - 30-Sep	Oct 1 - 30-Nov
L1-a	190	190	*	*	*	190	190	190	190	190
L1-b	125	110	*	*	*	*	150	150	150	125
L1-c	75	75	100	100	140	140	140	100	100	75
L2	55	55	90	90	110	110	110	90	90	55

* Indicates storage zone not present at this time period; release is entry in cell below.
\+ Second entry after slash indicates reduction in release rate for New Jersey Diversion Offset Bank.

7. DISCHARGE MITIGATION PROGRAM

In order to enhance flood mitigation provided by the City Delaware Basin Reservoirs, NYC agrees to establish a Conditional Seasonal Storage Objective (CSSO) rule curve in Figure 2. Consistent with good practices for water supply reservoirs, and in order to ensure that sufficient resources are available during an extended dry period to support both lower basin and NYC needs, it is essential to ensure that the City Delaware Basin Reservoirs are filled on or around June 1st every year. To accomplish this, the CSSO (boundary between the L1-b and L1-c storage zones in Figure 2) must be limited and ramped. For the duration of the current program NYC shall endeavor, to the maximum extent possible without impacting water supply reliability, to maintain reservoir levels at the CSSO, thus creating a high probability of maintaining ten (10) percent void spaces from September 1, 2014 through March 15, 2015 to help mitigate flooding events. In determining the releases needed to maintain the CSSO, the following parameters are considered in the OST evaluation: forecasted inflows over the next seven (7) days, FAW table releases in effect over the next seven (7) days, anticipated diversions over the next seven (7) days, snow water equivalent in the watershed ranging from 50 percent to 100 percent as appropriate, and the current usable reservoir storage. Based on any projected seven (7) day storage surplus, new release rates, above the FAW table releases in effect, are calculated and spread over the upcoming 7-day period, within the limitations of the release works for each reservoir.

Discharge Mitigation Program releases are designed to help mitigate the effects of flooding immediately below the City Delaware Basin Reservoirs. When the combined reservoir usable storage in Figure 1 is in Zone L1, the spill mitigation zone, Figure 2 defines three zones of reservoir-specific storage (L1-a, L1-b and L1-c) relative to two rule curves for each reservoir. Tables 4a through 4g further define spill mitigation releases based on reservoir-specific storage when combined storage is in Zone L1. When combined usable reservoir storage is below Zone L1, reservoir-specific storage zones as defined in Figure 2 are not applicable, and the releases to be made, as set forth in the tables, are for conservation purposes only.

The City shall make discharge mitigation releases from the City Delaware Basin Reservoirs in accordance with the following:

i. For the period June 16 through April 30, if combined reservoir usable storage is in Zone L1 in accordance with Figure 1, discharge mitigation releases shall be made based upon individual reservoir usable storage in accordance with Zones L1-a, L1-b and L1-c as provided in Figure 2 and Tables 4a through 4g. During the period October 1 through April 30:

    a. Fifty percent (50%) of the water equivalent of snow pack in the watersheds above the reservoirs shall be included in the determination of combined and individual reservoir usable storage in relation to Figures 1 and 2.

    b. If, as a result of the combination of current snow pack and predicted meteorological conditions, in the opinion of the New York City Department of Environmental Protection (NYCDEP) any reservoir is anticipated to spill within a period of seven (7) days, then upon notification by NYCDEP to the Decree Parties, the River Master, and DRBC, NYCDEP may, in consideration of possible downstream impacts and the stage and discharge thresholds given in Section 6.a. and Table 5, herein, include up to one hundred percent (100%) of the water equivalent of snow pack in the watersheds above the reservoirs in the determination of combined and individual reservoir usable storage in relation to Figures 1 and 2, unless and until any Decree Party shall notify the NYCDEP, the River Master, and DRBC of its objection to such inclusion. As soon as practicable, NYCDEP shall transition back to the fifty percent (50%) snow pack water equivalent criterion with notification to the Decree Parties, the River Master, and DRBC.

ii. For the period May 1 through June 15, Zones L1-a and L1-b shall not be applicable in accordance with Figure 2, and discharge mitigation releases shall be made in accordance with Zone L1-c as provided in Figure 2 and Tables 4a through 4g.

iii. The NYCDEP and the New York State Department of Environmental

Conservation (NYSDEC) reservoir releases managers, upon mutual agreement, may transfer spills to bottom releases to the extent possible at any reservoir.

iv. The current National Weather Service (NWS) flood stage for the West Branch Delaware River at Hale Eddy is 11.0 feet. Accordingly, Zone L1discharge mitigation releases will not be made from Cannonsville Reservoir when the river stage for the West Branch Delaware River at Hale Eddy is above 9.0 feet, or is forecasted to be above 9.0 feet within 48 hours of planned discharge mitigation releases, and releases shall be made in accordance with Zone L2 through L5 as provided in Tables 4a through 4g. This guidance may be modified at any time upon unanimous consent by the Decree Parties, if additional information demonstrates that a different cautionary stage should be used to limit the discharge mitigation releases.

v. The current NWS flood stage for the East Branch Delaware River at Fishs Eddy is 13.0 ft. Accordingly, Zone L1 discharge mitigation releases will not be made from Pepacton Reservoir when the river stage for the East Branch Delaware River at Fishs Eddy is above 11.0 ft. or is forecast to be above 11.0 ft. within 48 hours of planned discharge mitigation releases, and releases shall be made in accordance with Zone L2 through L5 as provided in Tables 4a through 4g. This guidance may be modified at any time upon unanimous consent by the Decree Parties, if additional information demonstrates that a different cautionary stage should be used to limit the discharge mitigation releases.

vi. The current NWS flood stage for the Neversink River at Bridgeville is 13.0 feet. Accordingly, Zone L1 discharge mitigation releases will not be made from Neversink Reservoir when the river stage for the Neversink River at Bridgeville is above 12.0 feet, or is forecast to be above 12.0 feet within 48 hours of planned discharge mitigation releases, and releases shall be made in accordance with Zone L2 through L5 as provided in Tables 4a through 4g. This guidance may be modified at any time upon unanimous consent by the Decree Parties, if additional information demonstrates that a different cautionary stage should be used to limit the discharge mitigation releases.

vii. Discharge mitigation releases may be suspended from the respective reservoir if NYCDEP and NYSDEC, in consultation with the NWS, determine that ice conditions threaten flood prone areas of the West Branch Delaware River below Cannonsville Reservoir, East Branch Delaware River below Pepacton Reservoir, or Neversink River below Neversink Reservoir.

viii. Discharge mitigation releases will be designed so that the combined discharge from each reservoir's controlled release works and spillway does not exceed the maximum rate given in Table 5 below. Respective controlled releases will be reduced to L2 releases in Tables 4a through 4g, or lower.

ix. To more naturally effect downward or upward transitions between discharge mitigation releases rates identified in Tables 4a through 4g, discharge mitigation releases rates may be ramped, in cooperation with NYSDEC, generally over a period of three days at Cannonsville and Pepacton Reservoirs, and two days at Neversink Reservoir.

x. Modifications to the program necessary to accommodate emergencies, maintenance and repair operations or short-term needs are addressed herein in Section 17, Temporary Suspension or Modification.

Table 5
Maximum Combined Discharge Rates

Reservoir	*Maximum Combined Discharge Rate (cfs)*
Neversink	3,400
Pepacton	2,400
Cannonsville	4,200

8. SALINITY REPULSION

New York City will provide releases to protect the lower basin water supply from salt water movement up the Delaware River in accordance with Table 2 of the Interstate Water Management Recommendations of the Parties to the U.S. Supreme Court Decree of 1954 to the Delaware River Basin Commission pursuant to Delaware River Basin Commission Resolution 78-20 (Good Faith Agreement). As stipulated in the Good Faith Agreement and in accordance with Table 2, herein (Interstate Operation Formula For Adjusting Montague And Trenton Flow Objectives During Drought Emergency (L5) Operations), the City shall make releases to meet the Montague flow objectives according to the location of the salt front.

9. DWARF WEDGEMUSSELS

The Decree Parties will consider any modifications to the current program that may be necessary to avoid taking, harming, or adversely affecting dwarf wedgemussels based upon information from the U.S. Fish and Wildlife Service (USFWS). Studies currently underway by the USFWS and the USGS may inform such modifications, as new information becomes available. These studies will attempt to quantify any relationship between surface water discharge and groundwater flow and temperature at known dwarf wedgemussel sites in the upper Delaware during low flow conditions.

10. LAKE WALLENPAUPACK

The Decree Parties and the DRBC will consider any modifications to the Lake Wallenpaupack operations plan (DRBC Resolution 2002-33) proposed by the operators of Lake Wallenpaupack, if deemed feasible.

11. RECREATIONAL BOATING

The Decree Parties and the DRBC will review and evaluate proposed reservoir releases programs for supporting recreational boating activities in the upper basin, if deemed feasible.

12. ESTUARY AND BAY ECOLOGICAL HEALTH

The Decree Parties and the DRBC will review and evaluate available data during the implementation of the current program and will consider any modifications that may be necessary to maintain the ecological health of the Delaware Estuary and Bay including that of oysters, shellfish and endangered species. The focus of this FFMP element includes the upper Delaware Estuary, lower Delaware Estuary, and Delaware Bay, and such modifications shall be considered in accordance with the criteria described in Section 1.c.

13. WARM WATER AND MIGRATORY FISH

The Decree Parties and the DRBC will review and evaluate available information on the effects of implementation of the current program on warm water fishes that are found in the Delaware River and will consider any modifications to conserve native species of special concern and migratory species.

14. MONITORING AND REPORTING

During the term of this Agreement, temperature monitoring and accounting of IERQ use will be conducted as follows:

a. Temperature:
During the one-year term of the current Agreement, NYSDEC shall monitor water temperatures within the stream reaches defined and categorized in Section 6. NYSDEC will submit to the Decree Parties and to the DRBC, by April 30, 2015, a scientific report summarizing the observed temperatures and assessing biological implications with respect to the stated management goal and defined protection levels of the HPP.

b. IERQ:
In order to assess the extent to which the downbasin parties' rights in the IERQ are preserved under this Agreement, the River Master shall maintain an accounting of the quantity of daily releases from the NYC reservoirs in accordance with Tables 4a through 4g which are attributable to the 3.91 billion gallons (6,045 cfs-days) IERQ component of the tables.

15. REASSESSMENT STUDY

Decisions on the conduct of a water resources reassessment study will be informed by experience gained during the operation of the current program.

16. PERIODIC EVALUATION AND REVISION

The Decree Parties agree that during the entire effective period of this Agreement, as monitoring, reporting, and evaluation may show to be appropriate, the provisions of this Agreement specifying triggers for, and quantities of, releases may be revised through an adaptive management process to further enhance the overall natural resource and economic benefits derived from the releases from the City Delaware Basin Reservoirs. Any resultant action taken shall be subject to the unanimous approval of the Decree Parties.

New York City will continue to collaborate with the Decree Parties in the development of the OST as a flow management tool.

17. TEMPORARY SUSPENSION OR MODIFICATION

From time to time, the Decree Parties and the DRBC may agree that emergencies, maintenance and repair operations, short-term needs, or unanticipated effects of the FFMP may require temporary suspension or modification of one or more of the provisions herein. In considering such temporary suspensions or modifications, the Decree Parties and the DRBC may estimate probabilities and risks associated with such temporary suspensions or modifications. Any resultant action taken, other than modifications to the releases as provided below, shall require the unanimous approval of the Decree Parties.

The City shall provide reasonable advance notification to the Decree Parties, River Master and DRBC of any planned long-term cessation of diversions and/or changes in releases due to emergencies, maintenance and repair operations including possible tunnel shut downs. The City shall establish the scope of work and the work schedule for maintenance and repair operations and shall inform the Decree Parties and the DRBC of such plans as early as practicable. In the absence of unanimous approval of a modified releases schedule as may be required for purposes of necessary maintenance and repair, the City, acting in cooperation with the NYSDEC, will make releases to the best of its ability for the duration of the maintenance or repair work, provided, however, that releases shall be sufficient to meet the Montague flow objective in effect at the time.

Modifications to releases not to exceed seven (7) consecutive days for purposes of maintenance or repair of immediate necessity, or to avoid unreasonable fluctuations in

releases, shall not require Decree Party approval, but shall be done in cooperation with NYSDEC, provided, however, that releases shall be sufficient to meet the Montague flow objective in effect at the time.

18. RESERVATIONS

Nothing contained herein shall be deemed to constitute a waiver or modification of, or limitation on, the Decree Parties rights under the Decree. This Agreement shall not be cited as precedent of any intention to waive or modify or limit such rights.

The Decree Parties have authorized certain actions, including but not limited to discharge mitigation releases, in this Agreement to assist in mitigating the impacts of flooding immediately below the NYC Delaware Basin Reservoirs. By incorporating flood mitigation as an objective and taking the actions provided herein, the Decree Parties do not create or assume any duties or obligations regarding flood mitigation or in any way modify any such duties or obligations that may be otherwise prescribed by law.

19. EFFECTIVE DATE

This Agreement shall take effect upon unanimous approval of the Decree Parties and shall expire on May 31, 2015, unless renewed as provided for in Section 20, or if the expiration date is revised.

20. RENEWAL AND REVISION

This Agreement may be revised only through the unanimous written agreement of the Decree Parties. This Agreement, and any unanimously agreed to revisions, may be renewed for an additional one-year period beginning June 1, 2015 by unanimous written agreement of the Decree Parties. If this Agreement is not renewed for an additional one-year period, prior to May 31, 2015, the Decree Parties agree to enter into good faith negotiations to determine a course of action in the absence of such renewal, as provided in Section 21, below.

21. REVERSION

Upon any failure by all Decree Parties to continue this Agreement, and any revisions to this Agreement, in accordance with Section 20, operations shall revert to those provided in DRBC Docket D-77-20 CP (Revised).

Agreement of the Parties to the 1954 U.S. Supreme Court Decree Effective June 1, 2014

STATE OF DELAWARE

The State of Delaware hereby approves this Agreement of the Parties to the U.S. Supreme Court Decree of 1954 for a Flexible Flow Management Program with Operations Support Tool integration and recommends that this Agreement be submitted to the Delaware River Basin Commission for implementation as appropriate through rules, dockets and/ or resolutions, subject in each instance to the further agreement of the Parties as required by Section 3.3(a) of the Delaware River Basin Compact.

_____

Agreement of the Parties to the 1954 U.S. Supreme Court Decree Effective June 1, 2014

STATE OF NEW JERSEY

The State of New Jersey hereby approves this Agreement of the Parties to the U.S. Supreme Court Decree of 1954 for a Flexible Flow Management Program with Operations Support Tool integration and recommends that this Agreement be submitted to the Delaware River Basin Commission for implementation as appropriate through rules, dockets and/ or resolutions, subject in each instance to the further agreement of the Parties as required by Section 3.3(a) of the Delaware River Basin Compact.

_____

Agreement of the Parties to the 1954 U.S. Supreme Court Decree Effective June 1, 2014

CITY OF NEW YORK

The City of New York hereby approves this Agreement of the Parties to the U.S. Supreme Court Decree of 1954 for a Flexible Flow Management Program with Operations Support Tool integration and recommends that this Agreement be submitted to the Delaware River Basin Commission for implementation as appropriate through rules, dockets and/ or resolutions, subject in each instance to the further agreement of the Parties as required by Section 3.3(a) of the Delaware River Basin Compact.

_____

Agreement of the Parties to the 1954 U.S. Supreme Court Decree Effective June 1, 2014

STATE OF NEW YORK

The State of New York hereby approves this Agreement of the Parties to the U.S. Supreme Court Decree of 1954 for a Flexible Flow Management Program with Operations Support Tool integration and recommends that this Agreement be submitted to the Delaware River Basin Commission for implementation as appropriate through rules, dockets and/ or resolutions, subject in each instance to the further agreement of the Parties as required by Section 3.3(a) of the Delaware River Basin Compact.

_____

Agreement of the Parties to the 1954 U.S. Supreme Court Decree Effective June 1, 2014

COMMONWEALTH OF PENNSYLVANIA

The Commonwealth of Pennsylvania hereby approves this Agreement of the Parties to the U.S. Supreme Court Decree of 1954 for a Flexible Flow Management Program with Operations Support Tool integration and recommends that this Agreement be submitted to the Delaware River Basin Commission for implementation as appropriate through rules, dockets and/ or resolutions, subject in each instance to the further agreement of the Parties as required by Section 3.3(a) of the Delaware River Basin Compact.

_____

For more information about this report, contact:
Delaware River Master
Office of the Delaware River Master
U.S. Geological Survey
120 Route 209 South
Milford, PA 18337
Or visit our website at:
https://webapps.usgs.gov/odrm/
Publishing support provided by the Reston Publishing Service Center

ISBN 978-1-4113-4543-0

ISSN 0196-1497 (print)
ISSN 2331-1258 (online)
https://doi.org/10.3133/ofr20231084