REPORT OF THE RIVER MASTER

OF THE

DELAWARE RIVER

FOR THE PERIOD

DECEMBER 1, 1968 — NOVEMBER 30, 1969

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

WASHINGTON, D. C.

JUNE 1970

Official Copy

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Section I

RIVER MASTER LETTER OF TRANSMITTAL

and

SPECIAL REPORT

OFFICE OF THE DELAWARE RIVER MASTER
Milford, Pa.

The Chief Justice
Warren E. Burger
U.S. Supreme Court

March 27, 1970

The Honorable
Russell W. Peterson
Governor of Delaware

The Honorable
William T. Cahill
Governor of New Jersey

The Honorable
Nelson A. Rockefeller
Governor of New York

The Honorable
Raymond P. Shafer
Governor of Pennsylvania

The Honorable
John V. Lindsay
Mayor of the City of New York

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

Dear Sirs:

For the record and information of the United States Supreme Court, the States of Delaware, New Jersey, New York and Pennsylvania, and the City of New York, I am transmitting herewith the sixteenth Annual Report of the River Master of the Delaware River for the year December 1, 1968 to November 30, 1969, under the terms of the Amended Decree of the Supreme Court, dated June 7, 1954.

This letter of transmittal is a general summary of the operations and events of the report year and forms Section I of the sixteenth Annual Report.

The 1969 report year which began December 1, 1968 and ended November 30, 1969 was generally normal from a hydrologic standpoint in the Delaware River basin. Precipitation was average. Runoff of Delaware River at Montague, N. J., during the year was only about 4 percent below median for the period of record.

The combined storage in Pepacton, Cannonsville, and Neversink Reservoirs was 53 percent of their total capacity on December 1, 1968. There was a net increase in the storage of the three reservoirs during the year and on November 30, 1969 the combined storage was 59 percent of capacity. The maximum combined storage during the year was 101.0 percent of capacity (May 26). The minimum combined storage during the year was 44.6 percent of capacity (November 6).

Diversions for water supply of New York City and releases to maintain flow of Delaware River at Montague during the report year were made under the supervision of the River Master as provided in the terms of the Decree. During the report year the diversions to New York City from the Delaware River basin reservoirs did not exceed the limits specified by the Decree.

Diversions through the Delaware & Raritan Canal in New Jersey did not exceed the limits imposed in Section V of the Decree.

Representatives previously designated by the Governors and Mayor continued to function in a helpful and co-operative manner as members of the Delaware River Master Advisory Committee for the purpose of reviewing with the River Master the reports from his office and its operating plans and procedures. During the current report year, no formal meeting of the Advisory Committee and the River Master was held, but at various times he conferred informally with Committeemen to discuss reservoir status, hydrologic conditions, and operations of the reservoirs.

The Geological Survey continued the operation of its field office of the Delaware River Master at Milford, Pa. Robert E. Fish, Deputy Delaware River Master continued in charge of this office, assisted by George C. Gravlee, Jr. and Alice E. Lahey.

During the report year the Milford office continued the weekly distribution of summary river data. These weekly reports contained preliminary data of releases from the New York City reservoirs to the Delaware River, diversions to New York City water supply system,

reservoir contents, daily segregation of flow of Delaware River at the Montague gaging station, and diversions through the Delaware & Raritan Canal. The reports were made available to the State and City representatives on the Delaware River Master Advisory Committee and to certain other parties interested in the Delaware River operations. A special monthly summary of past hydrologic conditions supplemented during the low-flow season by an "outlook" of the river flow for the forthcoming month was made available to the representatives on the Advisory Committee. The River Master office continued to participate in an interagency committee chaired by the Delaware River Basin Commission to investigate yields of streams in the basin.

Section II of the accompanying report describes in detail Delaware River operations during the report year. As shown on page 18 of the accompanying report, the City of New York diverted a total of 221.253 billion gallons from the basin during the report year ending November 30, 1969 and released 117.398 billion gallons from Pepacton, Cannonsville and Neversink Reservoirs to the Delaware River during the same period. During the period June 1 to November 10, 1969 (Montague dates) there were several periods of low flows for which 102.290 billion gallons were released to the Delaware River from the three reservoirs. The color graphs on plate 1 show the effect of these releases on the flow at the Montague gaging station.

Section III of the report describing water quality of the Delaware River estuary was prepared upon request by Edward F. McCarren under supervision of Norman H. Beamer, District Chief, Water Resources Division, U.S. Geological Survey, Harrisburg, Pa., in collaboration with Mr. Fish. It contains data showing the extent of salinity invasion and other water-quality characteristics in the Delaware River estuary during the report year.

It is my pleasure to report the continued and excellent cooperation with the office of the Delaware River Master of all parties to the Decree. I am pleased to report that New York City complied with the terms of the decree regarding diversions, and with the directions of the River Master regarding releases from the reservoirs.

The accompanying report for the year ending November 30, 1969 has been reviewed voluntarily by the Delaware River Master Advisory Committee at the request of the Delaware River Master.

Sincerely yours,

J. V. B. Wells
Delaware River Master

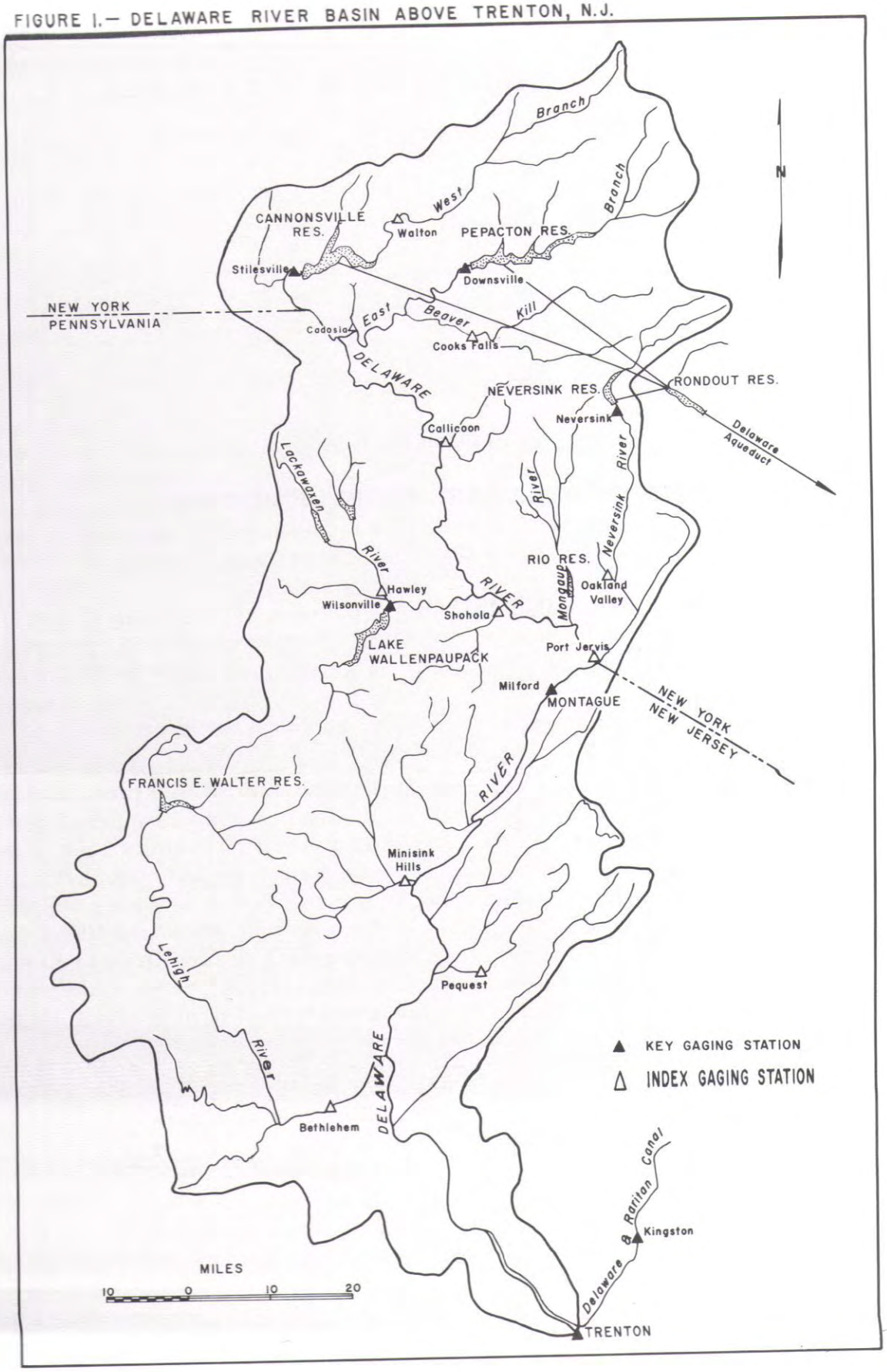
Section II

REPORT OF DELAWARE RIVER OPERATIONS

By

MILFORD OFFICE

FIGURE I.— DELAWARE RIVER BASIN ABOVE TRENTON, N.J.



OFFICE OF THE DELAWARE RIVER MASTER

Milford, Pa.

March 10, 1970

Mr. Joseph V. B. Wells
Delaware River Master
U. S. Geological Survey
Washington, D. C. 20242

Dear Sir:

Transmitted herewith is my report on the hydraulic and hydrologic phases of Delaware River basin operations conducted under your direction during the year ending November 30, 1969. This report covers the sixteenth year of operations since the inception of the Amended Decree of the United States Supreme Court, dated June 7, 1954.

Streamflow in the Delaware River basin was generally normal. Diversions from the basin were within limits authorized in the Decree. Releases from reservoirs were made as prescribed under the Decree. The hydrologic procedures used to guide operations in this office were developed in previous years.

The advice and cooperation of your office and of the members of the Delaware River Master Advisory Committee are greatly appreciated. Thanks are also due to personnel of the District and Field offices of the Geological Survey, U. S. Weather Bureau, New York City Department of Water Resources, Bureau of Water Supply and Board of Water Supply, Pennsylvania Power & Light Company, Orange and Rockland Utilities, Inc., gage readers, and others for supplying data needed in this report. Special credit is given to George C. Gravlee, Jr., Alice E. Lahey and Frances E. Gatzke for their capable assistance in preparing these reports.

Sincerely yours,

Robert E. Fish

Robert E. Fish
Deputy Delaware River Master

Section II

REPORT OF DELAWARE RIVER OPERATIONS
By
MILFORD OFFICE

Definitions of Terms and Procedures

The following definitions apply to various terms and procedures as used in operations of the Milford Office and in this report.

Time of day. - Time of day is expressed in 24-hour eastern standard time.

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

Rate of flow at Montague. - Daily mean discharge of Delaware River at Montague, N. J. on a midnight-to- midnight basis.

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

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

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

Time of observation. - Reservoir contents were observed at 0900.

Excess quantity and seasonal period for its release. - The excess quantity of water equals 83 percent of the amount by which the estimated consumption in New York City during the year is less than the City's estimate of continuous safe yield from all its sources of supply except that the excess quantity should not exceed 70 billion gallons. Each year the "seasonal period" for release of excess quantity begins on June 15. The design rate for that period becomes effective at Montague on that date and continues in effect until the following March 15, or until the cumulative total of excess-release credits becomes equal to the seasonal quantity, whichever occurs first - all as defined in the Decree.

Daily excess-release credits. - Daily credits and deficits during the seasonal period are equal to the algebraic difference in cubic feet per second of the daily mean discharge at Montague and 1,750; however, the daily credit cannot exceed the 24-hour period releases from Pepacton, Cannonsville, and Neversink Reservoirs routed to Montague and made in accordance with direction, with the following exception. During the seasonal period, credits are also made for part or all of other prior releases from Pepacton, Cannonsville and Neversink Reservoirs contributing to daily mean discharges at Montague between the excess-release rate and 1,750 cfs. An example of credits made for other releases is shown in table 8 on August 21 when 33 cfs from these reservoirs contributed to the discharge of 2,680 cfs at Montague a part of which was in the range of excess release (1,750 to 2,650 cfs).

Acknowledgements

A portion of the basic data is presented as records of the U. S. G. S. gaging stations. These records were collected, computed and furnished by the District Offices of the U. S. Geological Survey at Albany, N. Y., Harrisburg, Pa., and Trenton, N. J. in co-operation with the States of New York, New Jersey and Pennsylvania, and the City of New York and are found in tables 1 to 7.

The River Master daily operation records were prepared by the Milford office of the Delaware River Master from basic data collected principally on a day-to-day basis. Data for these records were collected and computed by the Milford office or were furnished by agencies as follows: Data from Pepacton and Neversink Reservoirs by the New York City Department of Water Resources, Bureau of Water Supply; from Cannonsville Reservoir by the New York City Board of Water Supply; from Lake Wallenpaupack by the Pennsylvania Power & Light Company; and from Rio Reservoir by Orange and Rockland Utilities, Inc.

Operations during the 1969 Report Year

Summary

The 1969 report year, December 1, 1968 to November 30, 1969 was a year of nearly average runoff in the Delaware River basin. The flow of Delaware River at Montague adjusted for change in reservoir storage and diversions, was about 4 percent below median for the period of record. Pepacton, Cannonsville and Neversink Reservoirs of the City of

New York spilled during the spring and early summer. Diversions and releases from the reservoirs of the City of New York were made within the terms of the Amended Decree. Diversions by New Jersey through the Delaware & Raritan Canal were within prescribed limits of the Amended Decree.

Precipitation

Precipitation observed on the basin above Montague for the 1969 report year was nearly normal. The monthly precipitation during the report year is shown in the following table:

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

	December 1940 to November 1968	December 1968 to November 1969	
	Average	Amount	Percent of average
December	3.26	3.98	122
January	2.84	1.91	67
February	2.68	1.57	59
March	3.21	1.91	60
April	3.64	4.26	117
May	4.06	2.90	71
June	3.63	5.62	155
July	4.06	6.23	153
August	3.85	3.75	97
September	3.59	1.69	47
October	3.15	2.30	73
November	3.64	5.10	140
12 months	41.61	41.22	99

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

The period December to May is generally considered the normal time of year when surface and ground water reservoirs fill. During this period in 1968-69 precipitation of 16.53 inches was observed, which was 84 percent of the 28-year average. During the period June to November precipitation of 24.69 inches was observed, which was 113 percent of the 28-year average.

Operations December to May

On December 1, 1968, Pepacton Reservoir contained 92.235 billion gallons of water in storage above the point of maximum depletion, or 65.8 percent of the reservoir's storage capacity of 140.190 billion gallons. On the same date Cannonsville Reservoir contained 31.369 billion gallons of water in storage above the point of maximum depletion, or 32.8 percent of the reservoir's storage capacity of 95.706 billion gallons. On the same date storage of water in Neversink Reservoir was 20.102 billion gallons above the point of maximum depletion, or 57.5 percent of the reservoir's storage capacity of 34.941 billion gallons. The combined available storage in the three reservoirs was 143.706 billion gallons, or 53.1 percent of their combined capacities.

During the winter and spring period a portion of the inflow to the three reservoirs was required for diversions and for releases. Diversions to Rondout Reservoir during the period December 1 to May 31 totalled 100.220 billion gallons. The equivalent diversion rate for the period of June 1, 1968 to May 31, 1969 was 578 mgd. Releases for conservation purposes were made from each reservoir by New York City during the period December 1, 1968 to May 31, 1969. Releases were also made on days during this period when the anticipated discharge at Montague, exclusive of water released from the City reservoirs, fell below the design rate.

In the previous seasonal period which began June 15, 1968, there had been a total excess quantity of water of 108,290 cfs-days (70,000 million gallons). During the period June 15 to November 30, 1968, 97,510 cfs-days (63,032 million gallons) of this quantity had been released from the reservoirs and credited at Montague. During the remainder of the seasonal period beginning December 1, 1968, the anticipated discharge at Montague, exclusive of water released from New York City's reservoirs, fell below the design rate of 2,650 cfs on 18 days by March 8, 1969 and releases from the City reservoirs were directed in amounts to provide the design rate at Montague for those days. For the design of March 9 it was anticipated that the excess quantity remaining would be expended by designing for a rate at Montague of 2,089 cfs and a release was directed to provide for that flow. Actually by March 9, the observed flows

at Montague indicated there still remained 402 cfs-days of the excess quantity. For the period March 10-14 it was anticipated daily that small releases would be required from the remaining excess quantity, and such were directed to be discharged. The additional releases brought the seasonal excess-release water credit to a total of 107,973 cfs-days (69,795 million gallons) for the seasonal period. On March 14, 1969 with 107,973 cfs-days (69,795 million gallons) of the initial 108,290 cfs-days (70,000 million gallons) credited as excess releases, the seasonal period ended and requirements for release of the remaining 317 cfs-days (205 million gallons) terminated.

During the period March 15 to May 31 the prescribed rate of flow to be maintained at Montague was 1,750 cfs, under the Decree, and the forecasted discharge exclusive of Pepacton, Cannonsville and Neversink releases was greater than 1,750 cfs each day, except for the period March 15-22 and releases from the City reservoirs were directed in amounts to provide the design rate at Montague on those days. During that period there were 4 days when the discharge at Montague was less than 1,750 cfs.

Inflow to the City's reservoirs for the period December 1 to May 31 normally exceeds demands and increases storage. The average inflow to the sites of Pepacton, Cannonsville and Neversink Reservoirs for these six months during the 28-year period December 1940 to May 1968 was 292.5 billion gallons. During the corresponding six months of the current report year inflow to the three reservoirs totalled 267.778 billion gallons. The excess of inflow over the demand increased the water storage in these three reservoirs in 1969 to 271.232 billion gallons by May 31.

During the year, maximum storage in Pepacton Reservoir was 141.802 billion gallons (101.0 percent of capacity) April 25, 26, maximum storage in Cannonsville Reservoir was 97.396 billion gallons (101.8 percent of capacity) May 26, and maximum storage in Neversink Reservoir was 35.249 billion gallons (100.9 percent of capacity) May 21. The maximum combined storage in the three reservoirs during the year was 273.668 billion gallons (101.0 percent of capacity May 26).

Operations June to November

During the period June 1-14 the flow required to be maintained in Delaware River at Montague was the minimum basic rate of 1,750 cfs. On the basis of advance estimates, releases from the reservoirs designed to maintain the 1,750-cfs rate at Montague were required June 1, 2, 8-14. During those 9 days there were 3 days when the discharge at Montague was less than 1,750 cfs.

On June 15 the seasonal period began for release of the excess quantity of water from the reservoirs and the design rate to be maintained at Montague became 2,650 cfs. This rate was composed of the basic rate of 1,750 cfs plus 900 cfs of excess release rate.

As defined in the Decree, the quantity of excess water in the aggregate was 83 percent of the amount by which the estimated consumption during 1969 (limited to an increase of $7\frac{1}{4}$ billion gallons over actual consumption in any previous year) was less than New York City's estimate of safe yield during 1969, obtainable from all its sources without pumping and not to be less than 1,665 mgd, except that the excess quantity should not exceed 70 billion gallons. Also, in releasing the excess quantity, the design rate at Montague should be the minimum basic rate plus the excess quantity divided by 120 days, but not greater than 2,650 cfs. And, the City should not be required to release at rates exceeding the capacity of the release works.

The New York City Department of Water Resources, Bureau of Water Supply furnished the River Master with the following advance data for the 1969 calendar year:

1. The estimated continuous safe yield from all the City's sources, obtainable without pumping, as specified in the decree is 1,665 mgd, or a total during the calendar year 1969 of 607.725 billion gallons (1,665 mgd x 365 days).

2. The estimated consumption which the City must provide from all its sources of supply during the calendar year 1969 is 490.425 billion gallons (483.175 + 7.250).

On the basis of the provisions of the Decree and those data the aggregate quantity of excess-release water was 70 billion gallons (108,290 cfs-days) in lieu of 83% of (607.725 - 490.425) or 97.359 billion gallons. The Montague design rate during the excess-release period beginning

June 15, 1969 was 2,650 cfs, the maximum prescribed by the Decree, instead of $1,750 \text{ cfs} + \frac{70 \text{ billion gallons} \times 1,547 \text{ cfs/bgd}}{120 \text{ days}} = 2,652 \text{ cfs}$.

Data on consumption of water by the City of New York for each calendar year beginning 1914 are shown in table 14.

On the basis of advance estimates, releases from the reservoirs designed to maintain a rate of 2,650 cfs at Montague were required 113 days in the period June 15 to November 10. During those 113 days there were 2 days when the discharge at Montague was less than 1,750 cfs; there were 55 days when the discharge was between 1,750 and 2,650 cfs inclusive; and there were 56 days when the discharge was above 2,650 cfs. On days when there were deficiencies or excesses in flow, such differences were attributable to the uncontrolled flow, weather adjustment or powerplant releases being other than those anticipated.

The hydrographs of plate 1 for the period June 1 to November 10 show the total discharge at Montague, the portion derived from uncontrolled runoff, the portion contributed by the power reservoirs, and the portion contributed by Pepacton, Cannonsville and Neversink Reservoirs. In analyzing the water budget at Montague, the uncontrolled runoff is the residual of observed flow, less releases from all reservoirs, and is subject to all the errors in observations and transit times. Because of these unavoidable errors the computed hydrograph of uncontrolled runoff is more ragged than would be the case if these errors were not present.

The period June 1 to November 10 (Montague dates) includes the low flows of the summer and fall seasons. However, the general recession of flows was interrupted at times by moderately high flows resulting from storms over the upper basin.

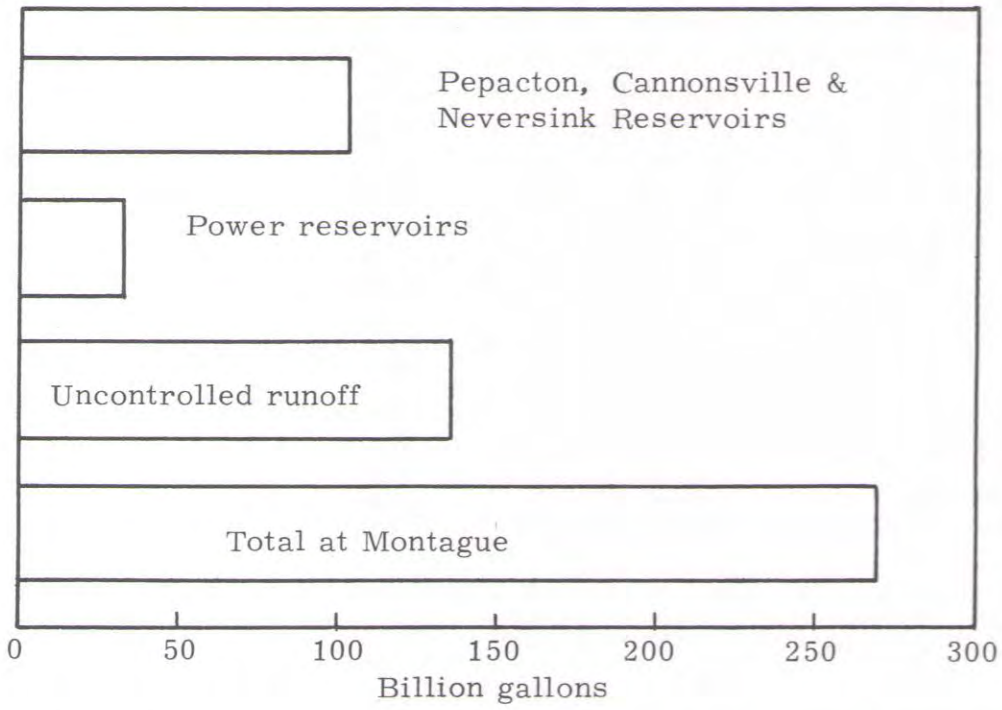
The following tabulation summarizes diversions and releases made under the provisions of the Montague Formula and other contributions to the flow of Delaware River at Montague for the days of directed releases within the period June 1 to November 10:

Diverted to Rondout Reservoir		130,321 Cfs-days

	Advance estimates	Observed operations
	Cfs-days	Cfs-days
New York City releases (Pepacton Cannonsville, Neversink) Directed	[a]157,800	[b]158,243
Wallenpaupack & Rio power releases	34,804	49,376
Runoff from uncontrolled area	129,510	208,811
Flow at Montague		416,430

a Directed release as designed
b Actual release

The contributions to flow of Delaware River at Montague for the days of directed releases within the period June 1 to November 10 are also shown in the graph below:



During the period November 11 - 30, it was anticipated that flows at Montague would be above 2,650 cfs.

Status at End of Year

In the year December 1, 1968 to November 30, 1969 (reservoir dates), diversions to Rondout Reservoir totalled 342,278 cfs-days (221.253 billion gallons) and all releases from New York City reservoirs to the Delaware River totalled 181,614 cfs-days (117.398 billion gallons).

On December 1, 1969, Pepacton Reservoir contained 102.995 billion gallons or 73.5 percent of capacity; Cannonsville Reservoir contained 42.573 billion gallons or 44.5 percent of capacity. Neversink Reservoir contained 15.450 billion gallons or 44.2 percent of capacity. Combined storage in the three reservoirs was 161.018 billion gallons or 59.5 percent of their combined capacity. During the year there was an increase in combined storage of 17.312 billion gallons or 6.4 percent of capacity.

Water Budget, Delaware River at Montague, N. J.

The data and computations of the water budget formed the basic operation records required to carry out the River Master's specific responsibilities with respect to the Montague Formula during the report year. The water budget consisted chiefly of two parts: (1) Segregation of the daily average flow at Montague among its various source components; and (2) advance estimates of the daily average flow at Montague, exclusive of controlled releases from New York City's reservoirs. In these water budget computations, the time intervals which were required for water to travel from the various sources to Montague, were taken into account.

Discharge of Delaware River at Montague was made up of the following source components;

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

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

Time of Transit

The following schedule of average times for transit of water from the various sources of controlled supply to Montague was used for discharge routing purposes during the 1969 report year, except for the period January 26 to March 22:

Source	Hours
Pepacton Reservoir	60
Cannonsville Reservoir	40
Neversink Reservoir	33
Lake Wallenpaupack	16
Rio Reservoir	8

This schedule was developed from reservoir and powerplant operations and river-stage recording charts of prior years. Observations during the year indicated that these average transit times were generally suitable, for open-river conditions. During the winter the cold weather and low streamflow caused the formation and growth of ice in the streams, which gradually increased the resistance to streamflow and lengthened the time of transit. No correction was applied for lengthened time for flows to reach Montague prior to January 25. It was anticipated that releases would be required at Montague beginning January 26 and that releases would have to be made earlier to accommodate the existing time of transit. Based upon the amount of ice believed to be in the streams and the experience during the winter in 1961, times of transit were lengthened for the period January 26 to March 22 to the following:

Source	Hours
Pepacton Reservoir	84
Cannonsville Reservoir	64
Neversink Reservoir	57

With melting of the river ice, transit times from these reservoirs to Montague lessened and transit times for average open-river conditions were resumed March 23.

Segregation of Flow at Key Gaging Stations

In the daily operations it was necessary that the River Master utilize: (1) Discharges computed from recorded or reported stream gage heights for various 24-hour periods without benefit of concurrent specific information that changes in stage-discharge relations might have occurred; (2) advance estimates of power demand converted to daily discharge; (3) actual powerplant operations converted to daily discharge; (4) advance estimates of anticipated uncontrolled runoff at Montague; (5) daily discharge obtained from venturi meter; and (6) rainfall reports for the previous 24 hours. Certain minor inaccuracies were inherent in such provisional data. Nevertheless, it was necessary that it be used on a day-to-day basis in the design and direction of releases from New York City reservoirs and in the determination of credits for excess releases.

The River Master daily operation record of reservoir releases and daily segregation of flow among the various source components contributing to the flow of Delaware River at Montague, is shown in table 8.

The arrangement of data conforms with the downstream movement of water from the various sources to Montague. A horizontal summation of data in the table is equivalent to routing the various contributions to Montague, using the schedule on page 19 for travel time of water.

The uncontrolled runoff was computed by subtracting the contributions of several other sources from the observed discharge at Montague.

The computation of the daily excess release credits was made as outlined in the definition of terms and procedures (page 11) and further explained in the footnotes at the bottom of the table 8.

Computation of Anticipated Flow at Montague

The time of transit of water from Pepacton Reservoir to Montague was greater than that from any other reservoir above Montague, therefore, the time of daily directed releases to maintain prescribed rates of flow at Montague was based on Pepacton Reservoir. Releases from Cannonsville and Neversink Reservoirs were timed to arrive at Montague concurrently with releases from Pepacton Reservoir. To allow for the actual difference in transit time, daily directed releases began at Pepacton at 1200, at Cannonsville and Neversink Reservoir at 0800 and 1500 respectively, the following day.

The determination of the amount of release required from the City's reservoirs to maintain specified rates of flow at Montague was based on estimates of releases from Lake Wallenpaupack and Rio Reservoir and an estimate of the uncontrolled runoff at Montague. Taking into account time of transit from these sources to Montague, this determination required that advance estimates of the following components be made on the morning of each day; (1) The expected release of water from Lake Wallenpaupack for power production for a 24-hour period beginning at 0800 two days later; (2) expected release of water from Rio Reservoir for a 24-hour period beginning at 1600 two days later; and (3) expected uncontrolled runoff at Montague three days later. The River Master daily operation record for computing daily directed release from the City's reservoirs during the period of low flow are shown in table 9.

The electric power companies cooperated fully in furnishing advance estimates of powerplant operation or release (table 9). As the hydroelectric plants were used chiefly for meeting peak-power demands of the system, these advance estimates were subject to many modifying factors, such as the influences of all the vagaries of weather upon peak-power

demand and unpredictable transmission and mechanical difficulties in electric-system operation. As a result, the actual use of water for power generation is rather frequently at considerable variance with the advance estimates that have to be used by the River Master's office in design computation. Furthermore, it was impractical for the companies to estimate their probable operation on any period other than on a daily basis. In the estimates for the Wallenpaupack plant this time factor was not a matter of concern as power operation during periods of low flow was usually during the hours between 0800 and 2400. In routing the Rio Reservoir release estimates, some error was introduced at times as the power operation during periods of low flow was usually between 0700 and 2200 which spans the daily 1600 routing period. At times, the estimates for the Wallenpaupack plant were modified upward by the office of the River Master for forecasts of high temperatures during expected hot, humid weather. The estimates for Rio releases were also increased by the office of the River Master by 30 percent on most days during the summer and fall seasons because the actual releases in the past usually ran some 30 percent above the forecasts.

For computation purposes during periods of low flows the estimate of uncontrolled runoff at Montague three days in advance was treated as two items: (1) Runoff from 2,133 square miles of uncontrolled drainage area above Montague, based on conditions existing over the drainage area as of 0800 on the morning the estimate was made and (2) estimated increase in runoff from precipitation forecasted to occur on the day the estimate was made and the two following days. Estimated quantities for these items are shown in table 9.

The advance estimate of uncontrolled runoff (present conditions) was based on discharges as of 0800 at the following gaging stations:

Station	Drainage area (square miles)
Beaver Kill at Cooks Falls, N. Y.	241
Cadosia Creek at Cadosia, N. Y.	17.1
Callicoon Creek at Callicoon, N. Y.	111
Lackawaxen River at Hawley, Pa.	290
Shohola Creek near Shohola, Pa.	83.6
Bush Kill at Oakland Valley, N. Y.	19.5

The procedure for computing the advance estimate combined a routing and recession (as applicable) of the 0800 discharges of the Beaver Kill, Callicoon Creek, Lackawaxen River and Shohola Creek gaging stations to Montague with a computed yield from the remaining ungaged, uncontrolled drainage area. The yield from this remaining uncontrolled

drainage area was estimated by using as indexes the 0800 discharges of Cadosia Creek, Callicoon Creek, Lackawaxen River, Shohola Creek (modified), and Bush Kill with routing and recession by individual gaging stations.

On Shohola Creek a dam was constructed during 1967-68 at a site above the falls upstream from the gaging station. The natural flow at the gage was modified at times when releases were made through the control valve. During those times natural runoff for Shohola Creek was estimated in part from nearby gaging stations.

The advance estimate of increase in runoff from precipitation is shown in Table 9 under the heading of "Weather adjustment". The U. S. Weather Bureau Office in Harrisburg, Pa., cooperated throughout the low-flow period by furnishing to the River Master's office each morning quantitative forecasts of average precipitation over the drainage area above Montague for each day of the three-day period. Runoff from the forecasted precipitation was estimated from previously established relationships.

The total anticipated flow at Montague, exclusive of release from the City's reservoirs (Table 9) was the sum of the forecasted releases from the power reservoirs, the estimated uncontrolled runoff under then current conditions, and the weather adjustment. The amount by which this computed flow was less than the prescribed Montague rate indicated the expected deficiency at Montague, which would have to be made up by corresponding releases from New York City reservoirs.

When the estimates of anticipated inflow, exclusive of New York City releases, are too high insufficient water is released and when too low more water is released than necessary. Such deviations in the estimating procedure over a period of time should be reduced or eliminated. To accomplish this in 1969, a balancing adjustment was applied to the indicated deficiency or excess in computing the directed release. This adjustment was based on the amount by which the cumulative directed releases were greater or less than the cumulative releases actually required to maintain the prescribed rates of flow at Montague.

In 1969 the cumulative difference between directed and actually required releases was arbitrarily divided by -10 to spread the balancing adjustment over 10 days. The mechanics of determining the balancing adjustment were accomplished in columns 9 to 14, table 9. As the cumulative difference could be determined only after the actual flow at Montague was computed, the balancing adjustment was entered in column 7 four days below its computation in column 14. In 1969 operations the balancing adjustment was applied on most days and was helpful in reducing cumulative errors and in conserving water.

Diversions to New York City Water Supply

Table 10 shows diversions from Pepacton, Cannonsville, and Neversink Reservoirs to the New York City water-supply system during the report year. The tabulation includes a running account of the equivalent rate of the combined diversions from the reservoirs computed as prescribed by the Decree and shows that the maximum equivalent diversion rate did not exceed at any time that permitted under the terms of the decree.

Storage in New York City Reservoirs

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

Reservoir level	Pepacton Res. Elev. (feet)	Pepacton Res. Contents (million gallons)	Cannonsville Res. Elev. (feet)	Cannonsville Res. Contents (million gallons)	Neversink Res. Elev. (feet)	Neversink Res. Contents (million gallons)
Full pool or spillway crest	1,280.00	*140,190	1,150.00	*95,706	1,440.00	*34,941
Point of maximum depletion	1,152.00	*3,511	1,040.00	*1,020	1,319.00	*525
Sill of diversion tunnel	1,143.00	*4,200	+1,035.00	*1,564	1,314.00	
Sill of river outlet tunnel	1,126.50		1,020.5		1,314.00	
Dead storage		1,800		326		1,680

* Contents shown are quantities stored between listed elevations

\+ Elevation at mouth of inlet channel of diversion works.

Tables 11, 12, and 13 show storage in Pepacton, Cannonsville and Neversink Reservoirs, respectively, above "point of maximum depletion" or minimum full-operating level.

Analysis of Forecasts

Forecasts of the flow at Montague based on the anticipated flow of the several components (exclusive of the release from the City's reservoirs) will be at variance with what is actually experienced on most days even under the most favorable conditions. The daily variations usually are largely compensating, but during this report year there were several brief periods of extreme variations. For example, the difference between the forecasts and observed flows at Montague for the period July 28 - 30 following 2 days of intense rains amounted to approximately 66,000 cfs-days.

Uncontrolled Runoff Forecasts

A comparison of the hydrographs on figure 2 of forecasted uncontrolled runoff and the actual uncontrolled runoff hydrograph indicated that the forecasting procedures were generally adequate. The forecasted uncontrolled runoff included anticipated uncontrolled runoff under then-existing conditions plus the weather adjustment based on forecasted precipitation. The total uncontrolled runoff for the days of directed releases within the period June 1 to November 10 (Montague dates) was 208,811 cfs-days. The forecast of uncontrolled runoff, including weather adjustment for those days was 129,510 cfs-days or 38 percent less than actual runoff.

Powerplant Release Forecasts

For the days of directed releases from the City's reservoirs within the period June 1 to November 10 (Montague dates), the total actual release from the powerplants was 49,376 cfs-days. The advance estimates of powerplant releases for those days were 34,804 cfs-days, or 30 percent less than actual releases.

Summary

The actual uncontrolled runoff plus actual powerplant releases for the days of directed releases from the City's reservoirs within the period June 1 to November 10 totalled 268,187 cfs-days. The advance estimate for those days was 164,314 cfs-days. The net cumulative difference between the estimate and actual was -36 percent.

On the basis of the observed discharges at Montague, exact forecasting of releases required from the City's reservoirs during the period June 1 to November 10 would have totalled 155,112 cfs-days. The releases as designed, including the computed balancing adjustments totalled 157,800 cfs-days, or 1.7 percent more than for exact forecasting.

Summary Comparisons of River Master Operation Data and Other Streamflow Records

It has been explained that River Master operations are, in effect, day-to day operations for which it is necessary to use preliminary records of streamflow. The following summaries show comparison of the River Master operations records and U. S. Geological Survey records. In the comparison of releases approximating conservation rates only, data was used in mgd units.

East Branch Delaware River at Downsville, N. Y.

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

The U. S. G. S. gaging station on the East Branch Delaware River at Downsville, N. Y. is located half a mile downstream from Pepacton Reservoir dam. The discharge shown in table 1 includes releases and spillage from Pepacton Reservoir, a small amount of seepage which enters the channel between the dam and gage site, and during storms a small amount of runoff which originated between the dam and gage site. The drainage area at the dam is 371 square miles.

Releases were made at conservation or higher rates by New York City during the year. In addition, the reservoir spilled on many days. There was good agreement in general between the venturi record and the U. S. G. S. record. For flows of approximately 7 cfs at the gaging station the venturi meter instruments indicated about 10 percent less water being released from the reservoir than was shown by the gaging-station records. For flows of approximately 19 cfs the venturi meter instruments indicated 1. 2 percent less water being released than was shown by the gaging-station records. At high rates of release the venturi meter instruments indicated 5. 5 percent more water being released than was shown by the gaging station records.

West Branch Delaware River at Stilesville, N. Y.

Similar data to those previously noted on releases from Pepacton Reservoir were collected for Cannonsville Reservoir.

The U. S. G. S. gaging station on the West Branch Delaware River at Stilesville, N. Y. is located $1\frac{1}{2}$ miles downstream from Cannonsville Dam. The discharge shown in table 2 includes releases and spillage from Cannonsville Reservoir and the runoff from 2 square miles of drainage area between the dam and the gage site. The drainage area at the dam is 454 square miles.

There was good agreement between the venturi record and the U. S. G. S. record except for low flows. In comparison of the two, the venturi meter instrument indicated 5. 1 percent more discharge during periods of directed releases June 29 to July 27, August 21 to November 5, than was shown by the gaging station records. Also, the venturi meter instrument indicated 41 percent less discharge at flows of approximately 14 cfs and 15 percent less discharge at flows of approximately 30 cfs than was shown by the gaging-station record.

The reservoir spilled on many days.

Wallenpaupack Creek at Wilsonville, Pa.

In the River Master daily operations December 1 to November 30, computed daily discharges through the Wallenpaupack powerplant were furnished by the Pennsylvania Power & Light Company.

The method used by the U. S. G. S. in computing daily mean discharge for Wallenpaupack Creek at Wilsonville, Pa. used detailed plant operation data. The computation was similar to that of former years. The discharge shown in table 3 is the flow through the turbines of the powerplant. No water was spilled from Lake Wallenpaupack during the report year, except for a small amount of controlled spill during a test of gates on September 11.

For the period December 1968 through November 1969 the River Master's record indicated 0. 4 percent less water than the U. S. G. S. record.

Neversink River at Neversink, N. Y.

Similar data to those previously noted on releases from Pepacton Reservoir were collected for Neversink Reservoir.

The U. S. G. S. gaging station on the Neversink River at Neversink, N. Y., is located about a quarter of a mile downstream from Neversink Dam. The discharge shown in table 4 includes releases and spillage from Neversink Reservoir, and during storms, a small amount of runoff which originates between the dam and gage site. The drainage area at the dam is 91. 8 square miles.

Releases were made chiefly at conservation or other low rates by New York City during the year. In addition, the reservoir spilled on many days. There was good agreement of the venturi record and the U. S. G. S. record. For flows of approximately 5 cfs at the gaging station, the venturi meter instruments indicated 11 percent less water being released from the reservoir than was shown by gaging-station records. For flows of approximately 19 cfs, the venturi meter instruments indicated 4.7 percent less water being released than was shown by gaging-station records. The valve from the conservation release line was removed May 14; discharge computed on basis of totalizer readings and at times on basis of gaging station records thereafter.

Delaware River at Montague, N. J.

The River Master's operation record indicated 1.2 percent less water for the year than did the U. S. G. S. record and daily records generally were in good agreement.

Diversion Tunnels

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

East Delaware Tunnel

The results of the comparative data during the report year showed that the venturi meter instruments indicated somewhat more water being diverted than current meter measurements indicated. The average difference between the two measurement methods showed the venturi meter instrument gave higher results by 11.6 percent for the manometer, 11.6 percent for the indicator needle, and 11.2 percent for the totalizer.

Some of this difference was offset by the non-registration of wicket gate leakage during times when the powerplant, which utilized the discharge through the tunnel, was not in operation. Results of a current meter measurement December 15, 1965 indicated the rate of leakage was 9.23 cfs. The leakage was not recorded on the totalizer instrument, which was used for reporting the quantity of water diverted. Because of these compensating factors it was concluded that the record of quantity of water diverted through the East Delaware Tunnel was substantially correct.

West Delaware Tunnel

Diversion data for West Delaware Tunnel was computed on a provisional basis by the City of New York from hydraulics of the 44-mile tunnel and from theoretical nozzle ratings as modified by color-velocity tests. Venturi instruments were operated during the year but were not completely calibrated. Comparisons of current meter measurements with daily computed diversions during the report year indicated the daily data to be higher by 4.5 percent. Inspections of channel downstream from outlet during times when valves were closed showed no leakage.

Neversink Tunnel

Results of the comparative data showed that the venturi meter instruments indicated somewhat more water being diverted than the current meter measurement indicated. In this case the average difference between the two measurement methods showed the venturi meter instruments gave higher results by 7.1 percent for the totalizer, 6.3 percent for the manometer, and 6.5 percent for the indicator needle.

The powerplant utilizing the water diverted through the Neversink Tunnel usually operated five days each week and for about 12 hours each day. Results of current meter measurements indicated the rates of leakage as follows:

January 15, 1969	11.4 cfs
February 26	11.3 cfs

The leakage was not recorded on the totalizer instrument which was used for reporting the quantity of water diverted. It was concluded that the reported record of the quantity of water diverted through the Neversink Tunnel was substantially correct.

Investigation of Ungaged Streams

In an effort to delineate yields of small streams in the ungaged area tributary to the Delaware River, a collaborative program was continued with the respective U. S. Geological Survey districts to develop discharge correlations between the small streams and the regularly gaged streams. These small stream stations were located on tributaries of the East and West Branches Delaware River, Neversink River and Delaware River. The increased knowledge of the yields of these streams is aiding in defining characteristics of the ungaged area.

Diversions by New Jersey

According to the terms of the Decree, the State of New Jersey may divert for use outside the Delaware River basin from the Delaware River or its tributaries in New Jersey without compensating releases, a quantity of water not to exceed 100 mgd (154.7 cfs) as a monthly average with the diversion on any day not to exceed 120 mgd (185.6 cfs). The diversion through the Delaware & Raritan Canal was recorded at the gaging station at Kingston, N.J. The gaging station is located 6.6 miles beyond the Delaware-Raritan divide and records include a slight amount of inflow from the Raritan River basin. The daily discharges in table 6 summarized in the table below show that the Decree limitations were not exceeded during the year December 1, 1968 to November 30, 1969.

Month	Monthly average discharge, cfs	Maximum daily discharge, cfs
December	107	125
January	97.9	119
February	103	114
March	96.4	100
April	97.7	106
May	85.6	99
June	101	108
July	107	125
August	95.0	100
September	103	111
October	104	105
November	104	107

Table 1. - Daily discharge in cubic feet per second of East Branch Delaware River at Downsville, N. Y. for the year ending November 30, 1969

(Preliminary U. S. G. S. gaging-station record)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	6.9	6.9	6.7	6.7	5.9	855	44	18	19	18	17	486
2	6.9	6.9	6.7	6.7	7.8	744	33	19	19	18	19	183
3	6.9	6.9	6.8	6.7	7.4	657	29	19	19	19	18	308
4	6.9	6.9	6.7	6.7	7.4	599	20	19	19	19	18	600
5	7.1	6.9	6.7	6.7	8.8	524	20	19	19	19	18	600
6	6.9	6.8	6.8	6.7	8.4	393	19	19	19	19	18	235
7	6.9	6.7	6.9	6.7	11	230	19	19	19	19	18	15
8	6.9	6.7	6.9	6.7	19	90	19	19	19	19	18	15
9	6.9	6.7	6.9	6.7	19	245	19	19	19	19	18	7.1
10	6.9	6.5	6.9	6.7	19	383	19	19	19	18	18	6.9
11	6.9	6.4	6.9	6.7	19	329	19	19	19	18	18	6.9
12	6.9	6.4	6.9	6.7	19	271	19	19	19	19	18	7.0
13	6.9	6.4	6.8	6.7	19	213	19	19	19	18	19	6.9
14	7.4	6.4	6.7	6.7	19	157	19	19	19	18	61	6.9
15	7.4	6.3	6.7	6.7	19	102	19	19	19	19	166	6.9
16	7.1	5.3	6.7	6.7	19	50	19	19	19	19	240	6.9
17	7.1	7.9	6.7	6.8	19	24	19	19	19	19	277	6.9
18	6.9	8.1	6.7	6.9	19	20	19	19	19	19	229	6.9
19	6.9	8.1	6.7	7.0	19	19	19	19	19	19	170	7.1
20	6.9	7.6	6.7	7.1	19	211	19	19	19	19	202	7.4
21	6.9	6.6	6.7	7.3	19	775	19	19	19	19	129	6.9
22	7.0	6.6	6.7	7.1	56	801	19	19	19	19	336	6.9
23	7.0	6.6	6.7	7.1	1,110	959	19	19	17	19	665	6.9
24	6.9	7.1	6.7	7.3	1,790	976	19	19	18	19	643	6.9
25	6.9	6.7	7.7	8.5	1,770	893	19	19	18	37	643	6.9
26	6.9	6.7	5.3	8.1	1,670	807	19	19	18	37	632	6.9
27	6.9	7.4	6.7	8.0	1,430	693	19	19	18	18	643	6.9
28	7.7	5.3	6.7	7.9	1,240	517	19	19	18	18	665	7.9
29	7.4	6.4	-	7.8	1,150	242	19	19	18	18	632	5.4
30	8.1	6.9	-	7.6	987	159	20	19	18	19	621	6.9
31	5.4	6.9	-	8.6	--	73	-	19	18	-	632	-
Total	216.7	210.0	188.7	220.3	11,525.7	13,011	622	588	579	597	7,821	2,594.3
Mean	6.99	6.77	6.74	7.11	384	420	20.7	19.0	18.7	19.9	252	86.5

Year total - 38,173.7 cfs-days

Mean - 105 cfs

Table 2. - Daily discharge in cubic feet per second of West Branch Delaware River at Stilesville, N. Y. for the year ending November 30, 1969

(Preliminary U. S. G. S. gaging-station record)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	22	13	15	751	14	355	43	72	31	1,330	1,910	841
2	15	13	14	729	16	478	35	216	31	1,170	1,020	364
3	14	12	13	824	14	550	38	573	31	1,040	896	824
4	17	12	13	913	15	580	33	1,000	33	995	1,350	1,430
5	15	11	13	851	30	572	29	567	33	1,260	1,560	1,120
6	15	12	13	595	27	544	144	737	31	1,290	1,580	277
7	14	13	13	295	19	480	206	1,380	31	863	1,580	38
8	14	13	12	109	17	350	112	1,390	32	883	1,620	36
9	13	13	12	76	16	471	239	1,500	33	1,160	1,720	32
10	14	12	13	28	16	606	272	1,500	37	1,190	1,810	30
11	13	12	12	270	16	561	232	1,840	31	1,160	1,880	29
12	14	12	12	379	15	499	527	1,910	28	1,280	1,950	29
13	14	13	12	413	15	428	616	1,670	28	1,270	1,940	29
14	14	13	12	390	15	353	346	1,520	28	1,340	1,940	29
15	13	12	12	305	17	280	40	1,410	139	1,450	1,940	29
16	14	12	12	289	30	203	31	1,380	192	1,390	1,920	28
17	14	12	12	301	29	143	30	1,080	63	1,490	1,910	28
18	14	13	138	340	29	106	30	843	29	1,620	1,900	28
19	13	13	353	38	31	65	30	957	28	1,810	1,900	30
20	14	12	398	18	30	70	31	672	27	1,750	1,880	35
21	14	12	447	19	29	351	29	413	85	1,730	1,630	31
22	14	12	357	17	32	456	29	526	354	1,810	1,670	30
23	14	116	360	16	36	627	32	286	612	1,850	1,510	30
24	13	238	492	18	34	757	30	471	494	1,820	1,330	31
25	14	25	445	52	33	804	30	828	498	1,950	1,280	30
26	13	13	512	28	32	792	30	982	552	2,000	1,270	30
27	13	12	626	19	32	640	30	907	561	2,020	1,270	30
28	18	23	697	16	32	406	30	367	804	1,910	1,320	30
29	18	18	-	15	32	237	81	43	1,060	1,900	1,330	30
30	15	88	-	15	123	189	122	32	1,260	1,950	1,240	30
31	13	35	-	14	-	94	-	31	1,550	- -	1,300	-
Total	449	840	5,040	8,143	826	13,047	3,507	27,103	8,746	44,681	49,356	5,588
Mean	14.5	27.1	180	263	27.5	421	117	874	282	1,489	1,592	186

Year total - 167,326 cfs-days
Mean - 458 cfs

Table 3. - Daily discharge in cubic feet per second of Wallenpaupack Creek at Wilsonville, Pa. for the year ending November 30, 1969

(Preliminary U. S. G. S. gaging-station record)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	0	0	0	0	0	0	0	571	1,830	81	1.6	0
2	0	313	0	0	128	0	899	0	1,880	1,020	0	0
3	74	363	843	318	0	0	0	0	1,880	946	438	0
4	0	168	1,090	167	0	0	0	0	1,880	954	0	0
5	120	265	940	195	0	3.4	0	0	1,900	921	0	0
6	0	1,170	13	164	0	242	100	0	1,900	186	0	360
7	0	1,100	0	720	0	270	0	0	1,900	595	0	0
8	0	691	0	136	1.6	167	0	0	1,870	199	0	23
9	736	381	0	0	3.4	782	0	0	1,030	0	339	0
10	769	688	0	699	168	331	4.3	0	995	0	6.3	39
11	628	657	0	425	0	0	0	0	1,040	0	0	0
12	0	21	284	548	0	0	788	0	646	0	0	170
13	0	953	584	166	0	0	820	0	886	0	0	36
14	205	842	532	111	0	0	44	0	918	0	0	134
15	318	470	1.6	0	71	0	0	640	1,140	0	0	0
16	764	784	0	0	0	320	0	1,010	605	0	0	0
17	934	640	0	0	0	0	1.6	1,220	848	632	0	20
18	1,110	443	0	0	0	0	707	1,070	1,590	0	0	0
19	839	0	0	0	34	271	0	146	948	0	0	42
20	923	923	0	0	0	433	978	0	23	0	0	42
21	90	927	0	0	0	478	0	49	0	0	6.3	42
22	77	817	0	5.9	0	0	0	13	281	0	9.3	0
23	49	851	0	0	0	108	0	0	266	0	198	0
24	2.5	836	0	0	0	0	8.8	0	384	0	8.4	0
25	0	102	0	0	0	0	0	0	1,110	0	53	0
26	939	109	0	0	1.6	0	0	0	673	0	0	0
27	787	1,090	0	0	0	12	368	291	370	0	362	0
28	40	1,050	170	0	0	0	612	1,020	527	0	0	0
29	0	796	-	5.2	13	1,060	0	1,860	940	0	0	0
30	103	749	-	0	0	0	808	1,880	545	1.6	176	0
31	0	268	-	0	-	1.6	-	1,880	54	-	28	-
Total	9,507.5	18,467	4,457.6	3,660.1	420.6	4,479.0	6,138.7	11,650	30,859	5,535.6	1,625.9	908
Mean	307	596	159	118	14.0	144	205	376	995	185	52.4	30.3

Year total - 97,709.0 cfs-days

Mean 268 cfs

Table 4. - Daily discharge in cubic feet per second of Neversink River at Neversink, N. Y. for the year ending November 30, 1969

(Preliminary U. S. G. S. gaging-station record)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	4.6	4.4	6.3	6.3	4.7	281	33	19	17	19	18	17
2	4.7	4.3	6.3	6.3	4.8	249	85	19	17	19	18	17
3	4.6	4.4	6.3	6.3	4.7	239	176	19	17	19	18	60
4	4.7	4.4	6.2	6.3	4.7	209	120	19	18	19	18	17
5	4.5	4.4	6.1	6.3	5.5	198	39	19	18	19	18	18
6	4.5	4.4	6.2	6.3	4.9	124	20	19	20	18	18	21
7	4.5	4.4	6.2	6.3	8.1	51	33	19	21	18	18	19
8	4.4	4.3	6.2	6.3	15	30	29	19	19	20	20	25
9	4.3	4.4	6.3	6.3	15	104	21	20	19	21	20	26
10	4.4	4.4	6.2	6.3	15	167	21	21	19	18	19	21
11	4.5	4.4	6.2	6.2	14	81	21	20	19	17	19	17
12	4.5	4.4	6.2	6.3	15	38	22	20	19	23	19	17
13	4.6	4.4	6.2	6.3	15	30	21	20	19	21	19	17
14	4.9	4.4	6.1	4.7	15	16	20	20	19	22	18	17
15	4.4	4.4	6.2	4.6	15	17	21	19	19	36	17	17
16	4.4	5.4	6.2	4.6	16	21	50	19	19	16	19	17
17	4.4	5.8	6.2	4.6	13	20	72	19	19	16	20	16
18	4.5	5.9	6.2	4.7	15	20	20	19	19	16	21	15
19	4.5	5.9	6.4	4.6	15	20	20	20	18	18	21	15
20	4.5	6.0	6.3	4.7	15	350	19	20	19	22	19	15
21	4.4	5.9	6.3	4.7	15	746	19	20	18	23	21	15
22	4.5	7.0	6.3	4.6	16	367	19	18	19	21	19	16
23	4.6	6.2	6.3	4.6	16	351	19	18	19	21	21	15
24	4.4	7.0	6.3	4.7	15	326	19	21	19	21	22	15
25	4.3	6.3	6.2	5.4	26	291	19	18	19	21	21	16
26	4.4	6.2	6.2	4.7	58	249	19	15	19	21	22	16
27	4.4	6.2	6.3	4.7	292	174	19	16	19	18	20	16
28	4.5	6.2	6.3	4.7	376	82	19	21	19	17	19	16
29	4.4	6.2	-	4.7	374	72	19	17	19	18	22	16
30	4.4	6.5	-	4.7	322	62	19	17	19	19	21	16
31	4.4	6.4	-	4.7	-	41	-	17	19	-	18	-
Total	139.1	164.9	174.7	166.5	1,740.4	5,026	1,053	587	582	597	603	561
Mean	4.49	5.32	6.24	5.37	58.0	162	35.1	18.9	18.8	19.9	19.5	18.7

Year total 11,394.6 cfs-days
Mean 31.2 cfs

Table 5. - Daily discharge in cubic feet per second of the Delaware River at Montague, N. J. for the year ending November 30, 1969

(Preliminary U. S. G. S. gaging-station record)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	5,350	4,600	8,400	2,300	6,260	6,280	2,110	3,140	10,100	2,650	2,700	2,530
2	5,080	4,500	6,600	2,400	5,590	5,700	1,900	2,590	9,510	2,860	2,990	2,580
3	5,220	4,800	5,600	2,600	6,380	5,320	2,900	1,850	8,850	3,560	3,290	2,120
4	5,600	4,100	5,900	2,700	6,430	4,890	2,370	1,680	10,200	3,360	2,650	1,830
5	7,850	3,300	5,500	2,630	7,550	4,500	2,370	1,990	12,100	3,140	2,170	2,660
6	7,290	3,400	4,600	2,660	26,600	4,180	1,840	2,420	10,200	3,020	2,670	4,290
7	5,710	4,200	3,500	2,690	19,100	3,980	1,980	1,760	8,400	2,800	2,670	5,780
8	4,950	4,100	3,000	2,710	13,000	3,960	1,880	2,100	7,080	3,230	2,500	6,280
9	4,560	3,800	3,200	1,860	10,000	4,240	2,080	2,470	5,640	2,750	2,340	11,800
10	4,400	3,400	2,800	1,540	8,730	8,510	1,600	2,560	5,690	2,630	2,840	10,100
11	3,910	3,400	2,900	2,190	8,340	7,280	1,560	2,730	6,040	2,690	2,520	8,240
12	3,700	3,100	2,500	1,850	8,090	6,160	1,540	3,100	5,250	2,500	2,510	6,630
13	3,100	2,400	2,900	2,000	6,480	5,300	2,270	3,330	4,330	2,270	2,570	5,530
14	4,300	3,400	3,000	1,820	5,650	4,490	4,800	3,210	3,980	2,270	2,810	4,660
15	6,590	3,100	2,800	1,670	5,000	3,860	5,390	2,780	3,710	2,320	2,630	4,110
16	4,900	2,700	2,000	1,540	5,030	3,530	15,100	3,360	4,120	2,180	2,530	3,970
17	5,600	3,100	2,200	1,510	5,970	3,390	11,700	3,690	5,290	2,280	2,620	3,660
18	5,400	2,700	2,300	1,710	6,130	2,770	7,200	4,100	5,370	2,880	2,700	3,290
19	4,900	2,300	2,200	2,940	6,470	2,490	6,000	3,370	4,870	2,300	2,700	3,050
20	4,600	2,100	2,300	4,870	7,600	3,420	4,460	2,560	4,250	2,410	2,680	4,810
21	4,500	3,400	2,300	8,010	6,690	7,340	6,310	2,790	2,660	2,460	2,810	7,580
22	3,470	3,300	2,300	11,500	6,490	7,780	4,900	2,330	2,300	2,390	3,040	5,630
23	3,470	3,200	2,400	9,750	13,500	5,970	4,120	2,190	2,280	2,410	2,620	4,600
24	3,620	3,600	2,400	8,740	16,200	5,450	4,680	2,350	2,490	2,650	3,010	4,530
25	3,300	5,700	2,400	20,100	13,700	5,210	4,440	1,970	2,820	2,730	2,710	4,520
26	3,100	6,300	2,400	30,500	11,300	5,190	3,730	1,580	3,160	2,650	2,670	4,160
27	4,600	5,900	2,200	19,700	9,700	4,500	3,150	2,050	2,390	2,700	2,610	3,570
28	4,500	5,500	2,200	13,300	8,710	4,090	3,220	12,700	2,100	2,810	2,930	3,340
29	3,200	4,600	- -	10,100	8,100	3,800	2,880	38,400	2,170	2,840	2,720	3,160
30	6,600	4,100	- -	8,670	7,560	3,880	2,090	23,000	3,020	2,810	2,740	2,890
31	6,300	6,800	- -	7,480	- -	2,370	- -	13,600	2,930	- -	2,870	- -
Total	149,670	120,900	92,800	194,040	276,350	149,830	120,570	157,750	163,300	80,550	83,820	141,900
Mean	4,828	3,900	3,314	6,259	9,212	4,833	4,019	5,089	5,268	2,685	2,704	4,730

Year total - 1,731,480 cfs-days Mean - 4,744 cfs

Table 6. - Daily discharge in cubic feet per second of the Delaware & Raritan Canal at Kingston, N. J. for the year ending November 30, 1969

(Preliminary U. S. G. S. gaging-station record)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	103	107	104	98	93	63	97	106	97	97	103	103
2	104	98	103	98	97	59	97	104	91	97	103	103
3	104	97	102	99	100	58	97	106	87	100	104	103
4	117	97	102	99	98	58	97	106	87	111	104	103
5	125	95	102	100	98	57	97	106	100	107	104	103
6	115	93	101	99	99	57	97	106	97	102	104	105
7	111	92	101	99	98	57	97	108	92	101	104	104
8	109	91	102	99	98	57	97	109	90	101	102	104
9	108	90	102	98	97	80	100	106	91	103	105	106
10	104	91	102	98	97	99	100	104	94	105	104	106
11	102	91	102	97	97	99	100	104	95	105	104	106
12	103	92	102	97	98	98	98	108	95	104	104	106
13	103	91	103	96	98	98	98	109	94	104	104	106
14	104	91	102	93	98	97	98	108	94	103	104	106
15	106	92	101	96	98	97	103	108	94	103	103	106
16	103	92	101	98	99	95	100	106	97	103	103	104
17	102	92	100	99	101	95	100	104	97	103	103	104
18	101	93	100	98	101	95	100	104	97	104	104	102
19	102	95	102	98	106	95	101	103	95	104	104	100
20	104	96	102	97	106	98	101	100	95	103	103	91
21	105	97	105	97	103	98	101	101	94	103	104	97
22	106	97	109	97	102	95	100	106	97	103	104	107
23	110	99	110	96	103	94	104	108	97	103	104	107
24	116	119	114	96	102	94	106	106	97	103	104	106
25	112	118	109	95	101	92	108	106	95	103	104	106
26	105	110	101	87	100	94	108	108	97	103	104	106
27	103	108	100	79	100	94	106	109	98	103	104	105
28	103	105	99	97	95	92	106	121	98	103	104	105
29	107	102	-	96	76	95	104	125	98	103	103	104
30	108	102	-	96	71	97	104	118	98	104	103	104
31	108	103	-	95	-	97	-	108	97	-	103	-
Total	3,313	3,036	2,883	2,987	2,930	2,654	3,022	3,331	2,945	3,091	3,214	3,118
Mean	107	97.9	103	96.4	97.7	85.6	101	107	95	103	104	104

Year total - 36,524 cfs-days
Mean - 100 cfs

Table 7. - Daily discharge in cubic feet per second of the Delaware River at Trenton, N. J. for the year ending November 30, 1969

(Preliminary U. S. G. S. gaging-station record)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	9,980	10,700	12,700	5,170	14,300	13,900	5,630	4,890	31,300	5,150	4,730	4,640
2	10,300	6,800	13,100	5,260	12,600	12,400	4,890	4,500	30,800	5,060	4,420	4,560
3	10,100	7,100	11,900	5,170	11,600	11,100	4,900	4,950	30,900	5,480	5,050	4,710
4	12,500	7,300	11,400	4,990	11,600	11,500	5,900	4,240	28,600	8,790	6,770	5,510
5	18,200	6,700	9,750	5,700	12,000	9,810	5,720	3,570	45,200	8,670	6,480	4,750
6	17,900	6,200	8,730	5,400	16,200	9,030	5,190	3,320	36,200	7,250	4,710	4,860
7	16,000	6,400	7,800	5,340	37,300	8,410	5,010	3,870	29,300	7,310	4,280	8,500
8	13,000	7,130	6,930	5,290	27,700	8,140	4,310	4,570	24,000	6,360	4,810	10,700
9	11,500	6,830	6,420	5,140	20,800	8,510	4,460	3,780	20,300	8,560	4,800	11,300
10	9,840	6,360	6,110	4,830	17,200	10,500	4,290	3,860	17,700	7,120	4,440	16,800
11	9,010	6,080	5,380	4,410	15,800	14,200	4,180	4,170	15,900	5,840	4,680	16,000
12	7,350	5,330	5,260	4,150	14,900	13,300	3,590	4,750	14,500	5,390	5,090	13,400
13	7,240	5,390	5,600	3,990	14,100	11,300	3,390	5,760	13,100	5,190	5,090	11,300
14	7,770	5,220	5,130	4,390	12,100	10,200	3,770	6,600	11,500	5,110	4,600	9,980
15	12,300	4,710	5,080	4,860	10,800	9,040	5,720	6,250	10,700	4,940	4,640	8,750
16	13,400	5,500	5,090	5,050	10,400	8,240	17,300	5,470	10,800	4,740	4,820	8,640
17	11,700	5,030	4,830	5,310	13,600	7,500	24,900	5,110	11,700	4,660	4,710	7,790
18	11,400	4,790	4,320	5,970	13,200	7,230	20,400	5,280	11,100	4,750	4,490	7,300
19	10,300	5,400	4,490	6,660	14,600	6,520	15,600	5,840	11,100	5,420	4,560	6,920
20	10,300	5,620	4,590	7,440	16,000	7,690	14,100	5,640	10,400	5,000	4,560	7,880
21	9,870	5,020	4,710	9,970	15,500	10,600	11,200	5,070	9,150	4,400	4,710	12,400
22	9,470	4,870	4,660	13,600	14,900	12,200	10,400	5,390	7,480	4,370	4,790	14,200
23	9,140	5,940	4,920	17,100	18,600	13,300	9,480	6,420	6,380	4,330	4,940	12,200
24	10,100	6,850	4,970	15,500	26,600	10,800	8,260	7,160	5,700	4,260	4,900	10,400
25	8,980	8,710	5,290	25,200	27,100	9,810	8,260	6,540	5,510	4,250	4,600	9,490
26	7,070	8,970	5,920	47,700	23,200	9,280	8,260	5,750	5,610	4,500	4,790	9,320
27	11,000	9,200	5,600	45,900	19,700	8,900	7,190	6,080	5,840	4,400	4,530	8,840
28	10,400	8,970	5,380	31,100	17,200	8,240	6,440	16,200	5,390	4,560	4,530	8,230
29	8,590	7,780	- -	22,900	15,700	7,470	6,160	73,800	4,730	4,870	4,560	7,470
30	9,180	7,460	- -	18,800	15,000	7,050	5,560	70,700	4,520	4,710	4,600	7,320
31	8,860	10,200	- -	16,300	- -	7,090	- -	46,100	4,900	- -	4,530	- -
Total	332,750	208,560	186,060	368,590	510,300	302,260	244,460	345,630	480,310	165,440	149,210	274,160
Mean	10,730	6,728	6,645	11,890	17,010	9,750	8,149	11,150	15,490	5,515	4,813	9,139

Year total - 3,567,730 cfs-days

Mean - 9,775 cfs

Table 8. - Reservoir releases and segregation of flow at Montague, N. J.

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases N.Y.C. reservoirs		Power plants	Computed uncontrolled	Total	Daily	Cumulative
Date	Amount									Directed	Other					
1968	1	2	3	4		5		6		7	8	9	10	11	12	13
Nov. 28	0	6	28	5	Nov. 30	0	Dec. 1	0	Dec. 1	0	39	0	5,281	5,320	0	97,510
29	0	6	28	5	Dec. 1	0	2	273	2	0	39	273	4,718	5,030	0	97,510
30	0	6	9	5	2	0	3	524	3	0	20	524	4,586	5,130	0	97,510
Dec. 1	0	6	9	5	3	76	4	511	4	0	20	587	4,863	5,470	0	97,510
2	0	6	9	5	4	0	5	563	5	0	20	563	7,057	7,640	0	97,510
3	0	6	9	5	5	117	6	472	6	0	20	589	6,491	7,100	0	97,510
4	0	6	9	5	6	0	7	228	7	0	20	228	5,392	5,640	0	97,510
5	0	6	9	5	7	0	8	285	8	0	20	285	4,595	4,900	0	97,510
6	0	6	9	5	8	0	9	346	9	0	20	346	4,114	4,480	0	97,510
7	0	6	9	5	9	740	10	285	10	0	20	1,025	3,335	4,380	0	97,510
8	0	6	9	5	10	770	11	176	11	0	20	946	2,934	3,900	0	97,510
9	0	6	9	5	11	636	12	214	12	0	20	850	2,830	3,700	0	97,510
10	0	6	9	5	12	0	13	256	13	0	20	256	2,724	3,000	0	97,510
11	0	6	9	6	13	0	14	358	14	0	21	358	3,821	4,200	0	97,510
12	0	6	9	5	14	207	15	184	15	0	20	391	5,969	6,380	0	97,510
13	0	6	9	5	15	319	16	393	16	0	20	712	4,168	4,900	0	97,510
14	0	6	9	5	16	753	17	312	17	0	20	1,065	4,415	5,500	0	97,510
15	0	6	9	5	17	932	18	285	18	0	20	1,217	4,063	5,300	0	97,510
16	0	6	9	5	18	1,115	19	330	19	0	20	1,445	3,435	4,900	0	97,510
17	0	6	9	5	19	836	20	460	20	0	20	1,296	3,284	4,600	0	97,510
18	0	6	9	5	20	914	21	512	21	0	20	1,426	3,054	4,500	0	97,510
19	0	6	9	5	21	88	22	353	22	0	20	441	2,949	3,410	0	97,510
20	0	6	9	5	22	77	23	358	23	0	20	435	2,975	3,430	0	97,510
21	0	6	9	5	23	49	24	364	24	0	20	413	3,147	3,580	0	97,510
22	0	6	9	5	24	3	25	163	25	0	20	166	3,114	3,300	0	97,510
23	0	6	9	5	25	0	26	221	26	0	20	221	2,859	3,100	0	97,510
24	0	6	9	5	26	935	27	582	27	0	20	1,517	3,063	4,600	0	97,510
25	0	6	9	5	27	788	28	342	28	0	20	1,130	3,350	4,500	0	97,510
26	0	6	9	5	28	40	29	63	29	0	20	103	3,077	3,200	0	97,510
27	0	6	9	5	29	0	30	208	30	0	20	208	6,372	6,600	0	97,510
28	0	6	9	5	30	104	31	323	31	0	20	427	5,853	6,300	0	97,510
Total	0	186	317	156		9,499		9,944		0	659	19,443	127,888	147,990	0	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 = 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 = 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750, computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit beginning June 15, 1968 = 108,290 cfs-days.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - Continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases N.Y.C. reservoirs		Power-plants	Computed uncon-trolled	Total		
Date	Amount									Directed	Other				Daily	Cumulative
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
Dec. 29	0	6	8	5	Dec. 31	0	Jan. 1	134	Jan. 1	0	19	134	4,447	4,600	0	97,510
30	0	6	8	5	Jan. 1	0	2	347	2	0	19	347	4,034	4,400	0	97,510
31	0	6	8	5	2	311	3	412	3	0	19	723	4,058	4,800	0	97,510
Jan. 1	0	6	8	5	3	361	4	218	4	0	19	579	3,502	4,100	0	97,510
2	0	6	8	5	4	165	5	124	5	0	19	289	2,992	3,300	0	97,510
3	0	6	8	5	5	264	6	272	6	0	19	536	2,745	3,300	0	97,510
4	0	6	8	5	6	1,184	7	270	7	0	19	1,454	2,727	4,200	0	97,510
5	0	6	8	5	7	1,089	8	279	8	0	19	1,368	2,713	4,100	0	97,510
6	0	6	8	5	8	690	9	302	9	0	19	992	2,789	3,800	0	97,510
7	0	6	8	5	9	381	10	395	10	0	19	776	2,605	3,400	0	97,510
8	0	6	8	5	10	689	11	285	11	0	19	974	2,407	3,400	0	97,510
9	0	6	8	5	11	652	12	159	12	0	19	811	2,270	3,100	0	97,510
10	0	6	8	5	12	22	13	91	13	0	19	113	2,268	2,400	19	97,529
11	0	6	8	5	13	951	14	329	14	0	19	1,280	2,501	3,800	0	97,529
12	0	6	8	5	14	847	15	244	15	0	19	1,091	2,390	3,500	0	97,529
13	0	6	8	5	15	464	16	254	16	0	19	718	2,263	3,000	0	97,529
14	0	6	8	6	16	786	17	425	17	0	20	1,211	2,369	3,600	0	97,529
15	0	6	8	5	17	635	18	176	18	0	19	811	1,870	2,700	0	97,529
16	0	8	8	5	18	446	19	122	19	0	21	568	1,711	2,300	21	97,550
17	0	8	8	5	19	0	20	198	20	0	21	198	1,881	2,100	21	97,571
18	0	8	8	5	20	931	21	316	21	0	21	1,247	2,132	3,400	0	97,571
19	0	8	8	5	21	930	22	291	22	0	21	1,221	2,058	3,300	0	97,571
20	0	6	8	6	22	820	23	385	23	0	20	1,205	1,975	3,200	0	97,571
21	0	6	8	5	23	859	24	493	24	0	19	1,352	2,129	3,500	0	97,571
					24	838	25	212	25			1,050	4,650	5,700	0	97,571
22	324	6	311	5	25	101	26	405	26	322	0	506	5,472	6,300	322	97,893
23	61	6	50	5	26	110	27	488	27	61	0	598	5,241	5,900	61	97,954
24	0	6	8	5	27	1,091	28	478	28	0	19	1,569	3,912	5,500	0	97,954
25	0	6	8	5	28	1,042	29	400	29	0	19	1,442	3,139	4,600	0	97,954
26	0	6	8	5	29	799	30	424	30	0	19	1,223	2,858	4,100	0	97,954
27	0	6	19	5	30	733	31	636	31	0	30	1,369	5,401	6,800	0	97,954
Total	385	188	596	152		18,191		9,564		383	553	27,755	93,509	122,200	444	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 = 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 = 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750 computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit beginning June 15, 1968 = 108,290 cfs-days.

Note: Computational time of transit from New York City reservoirs to Montague was increased 24 hours beginning Jan. 25 (Montague date); some data adjusted to preserve budget balance.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - Continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink						Controlled releases			Computed			
Date	Amount				Date	Controlled release	Date	Controlled release	Date	N.Y.C. reservoirs		Power-plants	uncon-trolled	Total	Daily	Cumulative
										Directed	Other					
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
Jan. 28	0	6	15	5	Jan. 31	269	Feb. 1	428	Feb. 1	0	26	697	7,677	8,400	0	97,954
29	0	6	107	5	Feb. 1	0	2	171	2	0	118	171	6,311	6,600	0	97,954
30	0	6	8	6	2	0	3	289	3	0	20	289	5,191	5,500	0	97,954
31	0	6	8	6	3	834	4	285	4	0	20	1,119	4,761	5,900	0	97,954
Feb. 1	0	6	8	5	4	1,084	5	344	5	0	19	1,428	3,953	5,400	0	97,954
2	0	6	8	5	5	936	6	245	6	0	19	1,181	3,400	4,600	0	97,954
3	0	6	8	5	6	13	7	280	7	0	19	293	3,188	3,500	0	97,954
4	0	6	8	5	7	0	8	168	8	0	19	168	2,813	3,000	0	97,954
5	0	6	8	5	8	0	9	456	9	0	19	456	2,725	3,200	0	97,954
6	0	6	8	5	9	0	10	304	10	0	19	304	2,477	2,800	0	97,954
7	0	6	8	5	10	0	11	294	11	0	19	294	2,587	2,900	0	97,954
8	0	6	8	5	11	0	12	271	12	0	19	271	2,210	2,500	19	97,973
9	0	6	8	5	12	285	13	398	13	0	19	683	2,298	3,000	0	97,973
10	0	6	8	5	13	585	14	322	14	0	19	907	2,374	3,300	0	97,973
11	0	6	8	5	14	525	15	184	15	0	19	709	2,572	3,300	0	97,973
12	0	6	8	5	15	2	16	0	16	0	19	2	2,079	2,100	19	97,992
13	0	6	8	5	16	0	17	262	17	0	19	262	1,919	2,200	19	98,011
14	0	6	8	5	17	0	18	473	18	0	19	473	1,808	2,300	19	98,030
15	0	6	8	5	18	0	19	501	19	0	19	501	1,780	2,300	19	98,049
16	0	6	8	5	19	0	20	530	20	0	19	530	1,751	2,300	19	98,068
17	310	6	300	5	20	0	21	237	21	311	0	237	1,752	2,300	311	98,379
18	387	6	377	5	21	0	22	227	22	388	0	227	1,685	2,300	388	98,767
19	494	6	484	5	22	0	23	182	23	495	0	182	1,723	2,400	495	99,262
20	561	6	554	5	23	0	24	357	24	565	0	357	1,478	2,400	565	99,827
21	288	6	275	5	24	0	25	272	25	286	0	272	1,742	2,300	286	100,113
22	403	6	394	5	25	0	26	250	26	405	0	250	1,645	2,300	405	100,518
23	588	6	580	5	26	0	27	72	27	591	0	72	1,437	2,100	350	100,868
24	498	6	489	5	27	0	28	115	28	500	0	115	1,585	2,200	450	101,318
	3,529	168	3,719	142		4,533		7,917		3,541	488	12,450	76,921	93,400	3,364	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 = 0)
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 = 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750, computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit beginning June 15, 1968 = 108,290 cfs-days.

Table 8. - Reservoir releases and segregation of flow at Montague, N.J. - Continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague								
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases			Computed uncontrolled	Total	Daily	Cumulative
Date	Amount									N.Y C. reservoirs Directed	N.Y C. reservoirs Other	Powerplants				
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
Feb. 25	659	6	650	5	Feb. 28	169	Mar. 1	53	Mar. 1	661	0	222	1,417	2,300	550	101,868
26	754	6	741	5	Mar. 1	0	2	10	2	752	0	10	1,638	2,400	650	102,518
27	789	6	780	5	2	0	3	157	3	791	0	157	1,652	2,600	791	103,309
28	844	6	834	5	3	314	4	85	4	845	0	399	1,456	2,700	845	104,154
Mar. 1	819	6	808	5	4	169	5	170	5	819	0	339	1,482	2,640	819	104,973
2	1,025	6	1,013	5	5	194	6	125	6	1,024	0	319	1,317	2,660	910	105,883
3	1,019	6	1,012	5	6	166	7	140	7	1,023	0	306	1,371	2,700	950	106,833
4	934	6	924	5	7	717	8	123	8	935	0	840	955	2,730	935	107,768
5	489	6	478	5	8	132	9	40	9	489	0	172	1,209	1,870	120	107,888
6	150	6	139	5	9	0	10	19	10	150	0	19	1,391	1,560	-190	107,698
7	115	6	105	5	10	684	11	180	11	116	0	864	1,200	2,180	116	107,814
8	69	6	59	5	11	417	12	196	12	70	0	613	1,177	1,860	70	107,884
9	0	6	8	5	12	550	13	72	13	0	19	622	1,349	1,990	19	107,903
10	518	6	507	5	13	165	14	26	14	518	0	191	1,111	1,820	70	107,973
11	415	6	401	5	14	112	15	0	15	412	0	112	1,136	1,660	-	-
12	475	6	464	5	15	0	16	0	16	475	0	0	1,065	1,540	-	-
13	420	6	410	5	16	0	17	0	17	421	0	0	1,099	1,520	-	-
14	295	6	283	5	17	0	18	5	18	294	0	5	1,421	1,720	-	-
15	325	6	316	5	18	0	19	41	19	327	0	41	2,552	2,920	-	-
16	345	6	334	5	19	0	20	59	20	345	0	59	4,376	4,780	-	-
17	229	6	218	5	20	0	21	152	21	229	0	152	7,439	7,820	-	-
18	20	6	9	5	21	0	22	50	22	20	0	50	11,130	11,200	-	-
19, 20	0	12	18	10	22	6	23	0	23	0	40	6	9,474	9,520	-	-
21	0	6	9	5	23	0	24	334	24	0	20	334	8,186	8,540	-	-
22	0	6	9	5	24	0	25	422	25	0	20	422	18,958	19,400	-	-
23	0	6	11	5	25	0	26	648	26	0	22	648	30,030	30,700	-	-
24	0	6	11	5	26	0	27	649	27	0	22	649	19,129	19,800	-	-
25	0	6	8	5	27	0	28	453	28	0	19	453	12,628	13,100	-	-
26	0	6	8	5	28	0	29	182	29	0	19	182	9,759	9,960	-	-
27	0	6	8	5	29	5	30	55	30	0	19	60	8,401	8,480	-	-
28	0	6	8	5	30	0	31	276	31	0	19	276	7,045	7,340	-	-
Total	10,708	192	10,583	160		3,800		4,722		10,716	219	8,522	172,553	192,010	6,655	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 = 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750 cfs, computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit June 15, 1968 to March 14, 1969 = 108,290 cfs-days.

Note: Computational time of transit from New York City reservoirs to Montague was decreased 24 hours on Mar. 23 (Montague date); some data adjusted to preserved budget balance.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - Continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases N.Y.C. reservoirs		Power-plants	Computed uncontrolled	Total	Daily	Cumulative
Date	Amount									Directed	Other					
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
Mar. 29	0	6	8	5	Mar. 31	0	Apr. 1	215	Apr. 1	0	19	215	5,896	6,130		
30	0	6	8	5	Apr. 1	0	2	225	2	0	19	225	5,226	5,470		
31	0	6	8	5	2	126	3	246	3	0	19	372	5,789	6,180		
Apr. 1	0	6	8	5	3	0	4	291	4	0	19	291	5,990	6,300		
2	0	6	8	5	4	0	5	329	5	0	19	329	6,902	7,250		
3	0	6	8	5	5	0	6	773	6	0	19	773	24,008	24,800		
4	0	6	8	5	6	0	7	761	7	0	19	761	18,320	19,100		
5	0	6	8	5	7	0	8	758	8	0	19	758	11,923	12,700		
6	0	6	8	15	8	2	9	720	9	0	29	722	9,109	9,860		
7	0	15	9	15	9	3	10	677	10	0	39	680	7,791	8,510		
8	0	19	8	15	10	167	11	642	11	0	42	809	7,219	8,070		
9	0	19	8	15	11	0	12	517	12	0	42	517	7,261	7,820		
10	0	19	8	15	12	0	13	357	13	0	42	357	5,981	6,380		
11	0	19	8	15	13	0	14	367	14	0	42	367	5,171	5,580		
12	0	19	8	15	14	0	15	307	15	0	42	307	4,601	4,950		
13	0	19	9	15	15	74	16	421	16	0	43	495	4,412	4,950		
14	0	19	20	15	16	0	17	549	17	0	54	549	5,277	5,880		
15	0	19	25	17	17	0	18	642	18	0	61	642	5,367	6,070		
16	0	19	25	15	18	0	19	727	19	0	59	727	5,564	6,350		
17	0	19	25	15	19	34	20	770	20	0	59	804	6,627	7,490		
18	0	19	25	15	20	0	21	440	21	0	59	440	6,081	6,580		
19	0	19	25	15	21	0	22	619	22	0	59	619	5,642	6,320		
20	0	19	26	15	22	0	23	751	23	0	60	751	12,189	13,000		
21	0	19	25	17	23	0	24	767	24	0	61	767	15,072	15,900		
22	0	19	25	17	24	0	25	773	25	0	61	773	12,566	13,400		
23	0	19	25	17	25	0	26	762	26	0	61	762	10,277	11,100		
24	0	19	25	17	26	2	27	792	27	0	61	794	8,735	9,590		
25	0	19	25	15	27	0	28	726	28	0	59	726	7,755	8,540		
26	0	17	25	17	28	0	29	725	29	0	59	725	7,166	7,950		
27	0	19	25	17	29	10	30	752	30	0	61	762	6,607	7,430		
		447	476	384		418		17,401		0	1,307	17,819	250,524	269,650		

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 = 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours calendar day shown.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - Continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
										Controlled releases						
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	N. Y. C. reservoirs		Power-plants	Computed uncontrolled	Total	Daily	Cumulative
Date	Amount									Directed	Other					
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
Apr. 28	0	19	26	17	Apr. 30	0	May 1	370	May 1	0	62	370	5,748	6,180		
29	0	19	26	17	May 1	0	2	106	2	0	62	106	5,442	5,610		
30	0	19	26	17	2	0	3	5	3	0	62	5	5,173	5,240		
May 1	0	19	26	17	3	0	4	11	4	0	62	11	4,747	4,820		
2	0	19	26	17	4	0	5	0	5	0	62	0	4,418	4,480		
3	0	19	26	17	5	3	6	0	6	0	62	3	4,075	4,140		
4	0	19	26	17	6	244	7	11	7	0	62	255	3,663	3,980		
5	0	19	26	17	7	273	8	270	8	0	62	543	3,345	3,950		
6	0	19	26	17	8	168	9	405	9	0	62	573	3,475	4,110		
7	0	19	25	17	9	796	10	573	10	0	61	1,369	6,770	8,200		
8	0	19	25	17	10	334	11	476	11	0	61	810	6,379	7,250		
9	0	19	25	17	11	0	12	528	12	0	61	528	5,481	6,070		
10	0	19	25	17	12	0	13	366	13	0	61	366	4,833	5,260		
11	0	19	26	15	13	0	14	161	14	0	60	161	4,229	4,450		
12	0	19	26	15	14	0	15	0	15	0	60	0	3,800	3,860		
13	0	19	26	14	15	0	16	109	16	0	59	109	3,392	3,560		
14	0	19	26	22	16	315	17	28	17	0	67	343	2,970	3,380		
15	0	19	26	20	17	0	18	30	18	0	65	30	2,685	2,780		
16	0	19	26	20	18	0	19	33	19	0	65	33	2,372	2,470		
17	0	19	26	20	19	275	20	354	20	0	65	629	2,646	3,340		
18	0	19	26	20	20	446	21	640	21	0	65	1,086	5,969	7,120		
19	0	19	26	20	21	484	22	554	22	0	65	1,038	6,417	7,520		
20	0	19	26	20	22	0	23	312	23	0	65	312	5,423	5,800		
21	0	19	26	20	23	111	24	192	24	0	65	303	4,922	5,290		
22	0	19	26	20	24	0	25	56	25	0	65	56	4,959	5,080		
23	0	19	26	20	25	0	26	370	26	0	65	370	4,625	5,060		
24	0	19	26	20	26	0	27	62	27	0	65	62	4,273	4,400		
25	0	19	26	20	27	12	28	120	28	0	65	132	3,823	4,020		
26	0	19	26	20	28	0	29	373	29	0	65	373	3,272	3,710		
27	0	19	25	20	29	1,052	30	134	30	0	64	1,186	2,570	3,820		
28	0	19	25	20	30	0	31	0	31	0	64	0	2,276	2,340		
Total	0	589	800	567		4,513		6,649		0	1,956	11,162	134,172	147,290		

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later.
Col. 4 - 24 hours beginning 1500 one day later
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.

Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 = 0
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours calendar day shown.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - Continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases			Computed uncontrolled	Total		
Date	Amount									N.Y.C. reservoirs		Powerplants			Daily	Cumulative
1968	1	2	3	4		5		6		Directed 7	Other 8	9	10	11	12	13
May 29	126	19	87	20	May 31	2	June 1	0	June 1	126	0	2	1,952	2,080		
30	64	19	25	20	June 1	0	2	127	2	64	0	127	1,679	1,870		
31	0	19	25	20	2	894	3	147	3	0	64	1,041	1,695	2,800		
June 1	0	19	25	20	3	0	4	76	4	0	64	76	2,170	2,310		
2	0	19	25	19	4	0	5	205	5	0	63	205	2,062	2,330		
3	0	19	26	15	5	0	6	112	6	0	60	112	1,628	1,800		
4	0	19	25	19	6	102	7	53	7	0	63	155	1,702	1,920		
5	204	19	172	19	7	0	8	0	8	210	0	0	1,630	1,840		
6	248	19	210	19	8	0	9	247	9	248	0	247	1,545	2,040		
7	126	19	93	19	9	0	10	32	10	131	0	32	1,447	1,610		
8	274	19	241	20	10	5	11	48	11	280	0	53	1,227	1,560		
9	335	19	303	20	11	0	12	112	12	342	0	112	1,066	1,520		
10	427	19	394	22	12	807	13	233	13	435	0	1,040	765	2,240		
11	595	19	562	22	13	841	14	758	14	603	0	1,599	2,528	4,730		
12	806	19	774	20	14	46	15	775	15	813	0	821	3,576	5,210	813	813
13	111	19	73	19	15	0	16	757	16	111	0	757	13,832	14,700	111	924
14	0	19	25	19	16	0	17	774	17	0	63	774	10,563	11,400	0	924
15	0	19	25	19	17	2	18	785	18	0	63	787	6,190	7,040	0	924
16	0	19	25	19	18	715	19	781	19	0	63	1,496	4,291	5,850	0	924
17	0	19	25	19	19	0	20	566	20	0	63	566	3,721	4,350	0	924
18	0	19	25	19	20	993	21	671	21	0	63	1,664	4,433	6,160	0	924
19	0	19	26	19	21	0	22	428	22	0	64	428	4,328	4,820	0	924
20	0	19	26	19	22	0	23	625	23	0	64	625	3,381	4,070	0	924
21	0	19	26	19	23	0	24	759	24	0	64	759	3,757	4,580	0	924
22	0	19	25	19	24	8	25	567	25	0	63	575	3,712	4,350	0	924
23	0	19	25	19	25	0	26	526	26	0	63	526	3,121	3,710	0	924
24	0	19	26	19	26	0	27	394	27	0	64	394	2,692	3,150	0	924
25	0	19	26	19	27	379	28	452	28	0	64	831	2,285	3,180	0	924
26	0	19	26	19	28	624	29	43	29	0	64	667	2,149	2,880	0	924
27	0	19	26	19	29	0	30	138	30	0	64	138	1,878	2,080	64	988
	3,316	570	3,417	579		5,418		11,191		3,363	1,203	16,609	97,005	118,180	988	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 = 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750 cfs, computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 - Seasonal limit of cumulative credit June 15, 1969 to March 14, 1970 = 108,290 cfs.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague								
									Segregation of flow							Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases			Computed uncontrolled	Total		Daily	Cumulative
										N.Y.C. reservoirs		Power-plants					
Date	Amount									Directed	Other						
1969	1	2	3	4		5		6		7	8	9	10	11		12	13
June 28	118	19	84	19	June 30	827	July 1	660	July 1	122	0	1,487	1,481	3,090		122	1,110
29	173	19	135	19	July 1	575	2	312	2	173	0	887	1,520	2,580		173	1,283
30	81	19	46	19	2	0	3	0	3	84	0	0	1,786	1,870		84	1,367
July 1	271	19	237	19	3	0	4	0	4	275	0	0	1,415	1,690		-60	1,307
2	1,027	19	995	19	4	0	5	87	5	1,033	0	87	890	2,010		260	1,567
3	1,150	19	1,111	19	5	0	6	116	6	1,149	0	116	1,165	2,430		680	2,247
4	168	19	130	19	6	0	7	0	7	168	0	0	1,602	1,770		20	2,267
5	1,380	19	1,341	19	7	0	8	99	8	1,379	0	99	582	2,060		310	2,577
6	1,478	19	1,442	19	8	0	9	61	9	1,480	0	61	929	2,470		720	3,297
7	1,508	19	1,471	20	9	0	10	164	10	1,510	0	164	856	2,530		780	4,077
8	1,607	19	1,578	20	10	0	11	343	11	1,617	0	343	780	2,740		990	5,067
9	1,771	19	1,740	19	11	0	12	435	12	1,778	0	435	877	3,090		1,340	6,407
10	2,007	19	1,976	19	12	0	13	150	13	2,014	0	150	1,156	3,320		1,570	7,977
11	2,068	19	2,030	19	13	0	14	171	14	2,068	0	171	981	3,220		1,470	9,447
12	1,681	19	1,643	19	14	0	15	150	15	1,681	0	150	969	2,800		1,050	10,497
13	1,657	19	1,620	19	15	648	16	278	16	1,658	0	926	736	3,320		1,570	12,067
14	1,433	19	1,403	19	16	1,021	17	455	17	1,441	0	1,476	683	3,600		1,441	13,508
15	1,490	19	1,457	19	17	1,220	18	409	18	1,495	0	1,629	876	4,000		1,495	15,003
16	1,016	19	978	19	18	1,080	19	434	19	1,016	0	1,514	810	3,340		1,016	16,019
17	877	19	838	19	19	154	20	358	20	876	0	512	1,142	2,530		780	16,799
18	1,127	19	1,092	19	20	0	21	229	21	1,130	0	229	1,361	2,720		970	17,769
19	527	19	495	19	21	59	22	194	22	533	0	253	1,544	2,330		533	18,302
20	411	19	377	17	22	13	23	102	23	413	0	115	1,622	2,150		400	18,702
21	634	19	603	17	23	0	24	294	24	639	0	294	1,397	2,330		580	19,282
22	108	19	70	19	24	0	25	293	25	108	0	293	1,559	1,960		108	19,390
23	860	19	832	17	25	0	26	107	26	868	0	107	575	1,550		-200	19,190
24	979	19	942	15	26	0	27	0	27	976	0	0	1,014	1,990		240	19,430
25	1,117	19	1,105	17	27	289	28	359	28	1,141	0	648	10,711	12,500		1,141	20,571
26	883	19	848	17	28	1,010	29	414	29	884	0	1,424	36,192	38,500		884	21,455
27	68	19	32	17	29	1,867	30	415	30	68	0	2,282	20,650	23,000		68	21,523
28	0	19	25	17	30	1,888	31	414	31	0	61	2,302	11,037	13,400		0	21,523
	29,675	589	28,676	573		10,651		7,503		29,777	61	18,154	108,898	156,890		20,535	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750 computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit beginning June 15, 1969 = 108,290 cfs-days.

Table 8. - Reservoir releases and segregation of flow at Montague, N.J. - continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases		Power-plants	Computed uncontrolled	Total		
Date	Amount									N.Y.C. reservoirs					Daily	Cumulative
										Directed	Other					
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
July 29	0	19	25	17	July 31	1,888	Aug. 1	412	Aug. 1	0	61	2,300	7,529	9,890	0	21,523
30	0	19	25	17	Aug. 1	1,860	2	414	2	0	61	2,274	7,025	9,360	0	21,523
31	0	19	25	17	2	1,894	3	407	3	0	61	2,301	6,378	8,740	0	21,523
Aug. 1	0	19	25	17	3	1,890	4	442	4	0	61	2,332	7,607	10,000	0	21,523
2	0	19	25	17	4	1,890	5	468	5	0	61	2,358	9,481	11,900	0	21,523
3	0	19	25	17	5	1,886	6	680	6	0	61	2,566	7,473	10,100	0	21,523
4	0	19	25	19	6	1,885	7	801	7	0	63	2,686	5,511	8,260	0	21,523
5	0	19	25	20	7	1,881	8	729	8	0	64	2,610	4,256	6,930	0	21,523
6	0	19	25	19	8	1,871	9	181	9	0	63	2,052	3,335	5,450	0	21,523
7	0	19	25	17	9	1,025	10	107	10	0	61	1,132	4,387	5,580	0	21,523
8	0	19	25	19	10	996	11	317	11	0	63	1,313	4,534	5,910	0	21,523
9	0	19	25	19	11	1,025	12	371	12	0	63	1,396	3,721	5,180	0	21,523
10	0	19	25	19	12	635	13	380	13	0	63	1,015	3,182	4,260	0	21,523
11	0	19	25	19	13	880	14	328	14	0	63	1,208	2,669	3,940	0	21,523
12	0	19	25	19	14	914	15	304	15	0	63	1,218	2,409	3,690	0	21,523
13	0	19	25	19	15	1,126	16	468	16	0	63	1,594	2,403	4,060	0	21,523
14	204	19	170	19	16	600	17	380	17	208	0	980	4,022	5,210	208	21,731
15	234	19	200	19	17	838	18	412	18	238	0	1,250	3,802	5,290	238	21,969
16	0	19	25	19	18	1,556	19	450	19	0	63	2,006	2,731	4,800	0	21,969
17	0	19	25	19	19	937	20	709	20	0	63	1,646	2,501	4,210	0	21,969
18	0	19	25	19	20	21	21	405	21	0	63	426	2,191	2,680	33	22,002
19	0	19	25	19	21	0	22	450	22	0	63	450	1,777	2,290	63	22,065
20	148	19	114	19	22	274	23	315	23	152	0	589	1,529	2,270	152	22,217
21	612	19	583	19	23	254	24	445	24	621	0	699	1,170	2,490	621	22,838
22	761	19	729	19	24	381	25	422	25	767	0	803	1,250	2,820	767	23,605
23	446	19	412	19	25	1,038	26	409	26	450	0	1,447	1,303	3,200	450	24,055
24	618	19	585	19	26	656	27	145	27	623	0	801	1,016	2,440	623	24,678
25	626	19	593	19	27	362	28	30	28	631	0	392	1,077	2,100	350	25,028
26	696	19	664	19	28	514	29	13	29	702	0	527	931	2,160	410	25,438
27	1,021	19	989	19	29	893	30	291	30	1,027	0	1,184	829	3,040	1,027	26,465
28	1,245	19	1,213	19	30	526	31	292	31	1,251	0	818	921	2,990	1,240	27,705
	6,611	589	6,752	576		32,396		11,977		6,670	1,247	44,373	108,950	161,240	6,182	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later.
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9.
Col. 11 - 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750 computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit beginning June 15, 1969 = 108,290 cfs-days.

Table 8. - Reservoir releases and segregation of flow at Montague, N.J. - continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague								
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases N. Y. C. reservoirs		Power Plants	Computed uncontrolled	Total	Daily	Cumulative
Date	Amount									Directed	Other					
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
Aug 29	1,412	19	1,377	19	Aug 31	55	Sept 1	283	Sept 1	1,415	0	338	887	2,640	890	28,595
30	1,780	19	1,747	19	Sept. 1	77	2	292	2	1,785	0	369	646	2,800	1,050	29,645
31	1,279	19	1,245	19	2	968	3	405	3	1,283	0	1,373	774	3,430	1,283	30,928
Sept. 1	1,231	19	1,196	19	3	922	4	327	4	1,234	0	1,249	777	3,260	1,234	32,162
2	1,103	19	1,067	19	4	934	5	268	5	1,105	0	1,202	763	3,070	1,105	33,267
3	1,097	19	1,064	19	5	877	6	136	6	1,102	0	1,013	815	2,930	1,102	34,369
4	1,556	19	1,521	19	6	177	7	264	7	1,559	0	441	700	2,700	950	35,319
5	1,286	19	1,253	19	7	568	8	408	8	1,291	0	976	883	3,150	1,291	36,610
6	772	19	739	19	8	189	9	226	9	777	0	415	1,488	2,680	777	37,387
7	1,064	19	1,030	20	9	0	10	200	10	1,069	0	200	1,311	2,580	830	38,217
8	1,367	19	1,334	19	10	0	11	332	11	1,372	0	332	936	2,640	890	39,107
9	1,228	19	1,194	17	11	0	12	456	12	1,230	0	456	744	2,430	680	39,787
10	1,287	19	1,255	20	12	0	13	213	13	1,294	0	213	673	2,180	430	40,217
11	1,401	19	1,366	19	13	0	14	203	14	1,404	0	203	593	2,200	450	40,667
12	1,348	19	1,310	20	14	0	15	330	15	1,349	0	330	631	2,310	560	41,227
13	1,426	19	1,383	34	15	0	16	124	16	1,436	0	124	620	2,180	430	41,657
14	1,512	19	1,479	15	16	0	17	158	17	1,513	0	158	599	2,270	520	42,177
15	1,489	19	1,456	15	17	591	18	128	18	1,490	0	719	631	2,840	1,090	43,267
16	1,565	19	1,532	15	18	0	19	59	19	1,566	0	59	625	2,250	500	43,767
17	1,730	19	1,696	17	19	0	20	53	20	1,732	0	53	575	2,360	610	44,377
18	1,981	19	1,946	20	20	0	21	0	21	1,985	0	0	435	2,420	670	45,047
19	1,777	19	1,742	22	21	0	22	52	22	1,783	0	52	495	2,330	580	45,627
20	1,802	19	1,768	20	22	0	23	69	23	1,807	0	69	484	2,360	610	46,237
21	1,934	19	1,897	19	23	0	24	186	24	1,935	0	186	519	2,640	890	47,127
22	1,937	19	1,904	19	24	0	25	328	25	1,942	0	328	470	2,740	990	48,117
23	1,905	19	1,870	19	25	0	26	157	26	1,908	0	157	535	2,600	850	48,967
24	2,107	19	2,071	19	26	0	27	82	27	2,109	0	82	489	2,680	930	49,897
25	2,226	54	2,160	17	27	0	28	0	28	2,231	0	0	549	2,780	1,030	50,927
26	2,051	19	2,019	15	28	0	29	230	29	2,053	0	230	517	2,800	1,050	51,977
27	2,019	19	1,985	15	29	0	30	322	30	2,019	0	322	439	2,780	1,030	53,007
	46,672	605	45,606	567		5,358		6,291		46,778	0	11,649	20,603	79,030	25,302	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is 0).
Col. 9 = Col. 5 + Col. 6.

Col. 10= Col. 11 - Col. 7 - Col. 8 - Col. 9
Col. 11 - 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750 computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit beginning June 15, 1969 = 108,290 cfs-days.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases N.Y.C. reservoirs		Power-plants	Computed uncontrolled	Total		
Date	Amount									Directed	Other				Daily	Cumulative
1969	1	2	3	4		5		6		7	8	9	10	11	12	13
Sept. 28	2,022	19	1,986	17	Sept. 30	2	Oct. 1	242	Oct. 1	2,022	0	244	434	2,700	950	53,957
29	2,090	19	2,056	17	Oct. 1	2	2	298	2	2,092	0	300	548	2,940	1,190	55,147
30	2,017	19	1,985	17	2	0	3	470	3	2,021	0	470	749	3,240	1,490	56,637
Oct. 1	696	19	664	17	3	434	4	313	4	700	0	747	1,193	2,640	700	57,337
2	1,002	19	972	15	4	0	5	134	5	1,006	0	134	1,010	2,150	400	57,737
3	1,729	19	1,694	15	5	0	6	246	6	1,728	0	246	666	2,640	890	58,627
4	1,667	19	1,634	15	6	0	7	369	7	1,668	0	369	583	2,620	870	59,497
5	1,679	19	1,644	15	7	0	8	181	8	1,678	0	181	611	2,470	720	60,217
6	1,684	19	1,651	17	8	0	9	45	9	1,687	0	45	558	2,290	540	60,757
7	1,766	19	1,733	17	9	345	10	147	10	1,769	0	492	539	2,800	1,050	61,807
8	1,836	19	1,802	17	10	6	11	109	11	1,838	0	115	517	2,470	720	62,527
9	2,026	19	1,993	17	11	0	12	0	12	2,029	0	0	441	2,470	720	63,247
10	2,071	19	2,037	17	12	0	13	9	13	2,073	0	9	468	2,550	800	64,047
11	2,085	19	2,051	17	13	0	14	294	14	2,087	0	294	399	2,780	1,030	65,077
12	2,077	19	2,044	17	14	0	15	66	15	2,080	0	66	454	2,600	850	65,927
13	2,076	19	2,045	15	15	0	16	29	16	2,079	0	29	402	2,510	760	66,687
14	2,160	102	2,039	17	16	0	17	30	17	2,158	0	30	412	2,600	850	67,537
15	2,234	207	2,014	19	17	0	18	32	18	2,240	0	32	388	2,660	910	68,447
16	2,317	299	2,005	19	18	0	19	0	19	2,323	0	0	357	2,680	930	69,377
17	2,292	282	1,997	19	19	0	20	17	20	2,298	0	17	325	2,640	890	70,267
18	2,192	195	1,985	17	20	0	21	50	21	2,197	0	50	533	2,780	1,030	71,297
19	2,125	152	1,954	17	21	6	22	128	22	2,123	0	134	773	3,030	1,280	72,577
20	1,774	257	1,505	19	22	9	23	99	23	1,781	0	108	691	2,580	830	73,407
21	1,976	19	1,940	19	23	193	24	50	24	1,978	0	243	809	3,030	1,280	74,687
22	2,088	692	1,385	20	24	8	25	60	25	2,097	0	68	515	2,680	930	75,617
23	2,122	702	1,403	20	25	63	26	0	26	2,125	0	63	452	2,640	890	76,507
24	2,092	692	1,385	20	26	0	27	82	27	2,097	0	82	421	2,600	850	77,357
25	1,959	678	1,296	19	27	377	28	98	28	1,993	0	475	452	2,920	1,170	78,527
26	2,026	665	1,340	19	28	0	29	210	29	2,024	0	210	466	2,700	950	79,477
27	2,079	687	1,377	20	29	0	30	208	30	2,084	0	208	448	2,740	990	80,467
28	2,097	695	1,386	19	30	169	31	231	31	2,100	0	400	320	2,820	1,070	81,537
	60,056	6,628	53,002	545		1,614		4,247		60,175	0	5,861	16,934	82,970	28,530	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later
Col. 4 - 24 hours beginning 1500 one day later.
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is 0).
Col. 9 = Col. 5 + Col. 6.
Col. 10 = Col. 11 - Col. 7 - Col. 8 - Col. 9
Col. 11 - 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750 computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750.
Col. 13 = Seasonal limit of cumulative credit beginning June 15, 1969 = 108,290 cfs-days.

Table 8. - Reservoir releases and segregation of flow at Montague, N. J. - continued

(River Master daily operation record)

Mean cubic feet per second for 24 hours

Controlled releases from New York City reservoirs					Lake Wallenpaupack		Rio Reservoir		Delaware River at Montague							
									Segregation of flow						Excess Release credits	
Directed		Pepacton	Cannonsville	Neversink	Date	Controlled release	Date	Controlled release	Date	Controlled releases			Computed uncontrolled	Total		
										N. Y. C. reservoirs		Power-plants			Daily	Cumulative
Date	Amount									Directed	Other					
1969	1	2	3	4	5	5		6		7	8	9	10	11	12	13
Oct. 29	1,895	627	1,258	15	Oct. 31	29	Nov. 1	73	Nov. 1	1,900	0	102	488	2,490	740	82,277
30	2,071	685	1,371	15	Nov. 1	0	2	0	2	2,071	0	0	479	2,550	800	83,077
31	1,250	650	585	15	2	0	3	179	3	1,250	0	179	631	2,060	310	83,387
Nov. 1	540	374	104	62	3	0	4	101	4	540	0	101	1,159	1,800	50	83,437
2	1,658	45	1,598	15	4	0	5	265	5	1,658	0	265	787	2,710	960	84,397
3	1,919	631	1,278	15	5	0	6	371	6	1,924	0	371	2,025	4,320	1,924	86,321
4	1,425	644	761	20	6	364	7	271	7	1,425	0	635	3,520	5,580	1,425	87,746
5	642	560	67	15	7	0	8	44	8	642	0	44	5,514	6,200	642	88,388
6	0	6	25	22	8	24	9	229	9	0	53	253	11,194	11,500	0	88,388
7	70	22	25	23	9	0	10	37	10	70	0	37	9,713	9,820	70	88,458
8	0	6	26	22	10	40	11	126	11	0	54	166	7,670	7,890	0	88,458
9	0	6	26	15	11	0	12	306	12	0	47	306	6,027	6,380	0	88,458
10	0	6	26	15	12	174	13	301	13	0	47	475	4,848	5,370	0	88,458
11	0	6	26	15	13	37	14	358	14	0	47	395	4,078	4,520	0	88,458
12	0	6	26	15	14	138	15	151	15	0	47	289	3,704	4,040	0	88,458
13	0	6	26	15	15	0	16	161	16	0	47	161	3,682	3,890	0	88,458
14	0	6	26	15	16	0	17	367	17	0	47	367	3,206	3,620	0	88,458
15	0	6	26	15	17	18	18	425	18	0	47	443	2,790	3,280	0	88,458
16	0	6	28	15	18	0	19	329	19	0	49	329	2,652	3,030	0	88,458
17	0	6	28	15	19	42	20	339	20	0	49	381	4,220	4,650	0	88,458
18	0	6	28	15	20	44	21	642	21	0	49	686	6,635	7,370	0	88,458
19	0	6	28	15	21	44	22	208	22	0	49	252	5,229	5,530	0	88,458
20	0	6	28	15	22	0	23	0	23	0	49	0	4,501	4,550	0	88,458
21	0	6	28	15	23	0	24	314	24	0	49	314	4,057	4,420	0	88,458
22	0	6	28	15	24	0	25	348	25	0	49	348	4,023	4,420	0	88,458
23	0	6	28	15	25	0	26	362	26	0	49	362	3,679	4,090	0	88,458
24	0	6	28	15	26	0	27	172	27	0	49	172	3,339	3,560	0	88,458
25	0	6	28	15	27	0	28	138	28	0	49	138	3,133	3,320	0	88,458
26	0	6	28	15	28	0	29	203	29	0	49	203	2,928	3,180	0	88,458
27	0	6	28	15	29	0	30	81	30	0	49	81	2,770	2,900	0	88,458
Total	11,470	4,364	7,616	524		954		6,901		11,480	1,024	7,855	118,681	139,040	6,921	

Col. 2 - 24 hours beginning 1200 of date shown.
Col. 3 - 24 hours beginning 0800 one day later
Col. 4 - 24 hours beginning 1500 one day later
Col. 5 - 24 hours calendar day shown.
Col. 6 - 24 hours ending 1600 of date shown.
Col. 7 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is greater than 0).
Col. 8 = Col. 2 + Col. 3 + Col. 4 (when Col. 1 is 0).
Col. 9 = Col. 5 + Col. 6.

Col. 10 = Col. 11 - Col. 7 - Co. 8 - Col. 9.
Col. 11 = 24 hours calendar day shown.
Col. 12 = Col. 11 - 1,750, computed algebraically, but in no case greater than Col. 7 except during seasonal period that part or all of Col. 8 contributing to Col. 11 for quantities less than 2,650 and greater than 1,750
Col. 13 - Seasonal limit of cumulative credit beginning June 15, 1969 = 108,290 cfs-days.

Table 9. - New York City Reservoir release design data

(River Master daily operation record)

Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases							Indicated deficiency	Balancing adjustment	Directed release	Computations for balancing adjustment					
	Powerplant release forecasts		Uncontrolled runoff							Directed release		Actual deficiency		Cumulative difference Col. 10 - Col. 12	Balancing adjustment
Date of advance estimate	Lake Wallenpaupack	Rio Reservoir	Present conditions	Weather adjustment	Date	Discharge				Daily	Cumulative	Daily	Cumulative		
	cfs	cfs	cfs	cfs		cfs	cfs	cfs	cfs	cfs	cfs-days	cfs	cfs-days	cfs-days	cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
DECEMBER 1, 1968 to MARCH 8, 1969 MONTAGUE DESIGN RATE = 2,650 CFS December 1, 1968 to February 20, 1969 (except January 26 & 27) estimated Montague discharge greater than 2,650 cfs.															
Jan. 22	320	100	1,620	211	Jan. 26	2,251	399	- 75	324	324	174,155	0	173,083	1,072	- 107
23	0	300	1,580	634	27	2,514	136	- 75	61	61	174,216	0	173,083	1,133	- 113
Total	320	400	3,200	845		4,765	535	- 150	385	385		0			
Feb. 17	0	250	2,010	40	Feb. 21	2,300	350	- 40	310	310	174,526	661	176,058	- 1,532	153
18	0	300	1,870	100	22	2,270	380	7	387	387	174,913	738	176,796	- 1,883	188
19	0	300	1,800	100	23	2,200	450	44	494	494	175,407	745	177,541	- 2,134	213
20	0	200	1,720	250	24	2,170	480	81	561	561	175,968	815	178,356	- 2,388	239
21	0	300	1,680	500	25	2,480	170	118	288	288	176,256	636	178,992	- 2,736	274
22	0	150	1,650	600	26	2,400	250	153	403	403	176,659	755	179,747	- 3,088	309
23	0	150	1,600	500	27	2,250	400	188	588	588	177,247	1,141	180,888	- 3,641	364
24	0	300	1,665	400	28	2,365	285	213	498	498	177,745	950	181,838	- 4,093	409
Total	0	1,950	13,995	2,490		18,435	2,765	764	3,529	3,529		6,441			

Col. 1 - Furnished by Power Co., modified on some days
Col. 2 - Furnished by Power Co., modified on most days
Col. 3 - Computed from Index stations
Col. 4 - Computed increase in runoff based on precipitation and temperature forecasts

Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4
Col. 6 = 2,650 - Col. 5
Col. 7 = Col. 14 (5 days earlier)
Col. 8 = Col. 6 + Col. 7
Col. 9 = Col. 8

Col. 10 = Summation of Col. 9
Col. 11 = 2,650 - (Col. 9 + Col. 10 from Table 8)
Col. 12 = Summation of Col. 11
Col. 14 = Col. 13 divided by minus 10

Table 9. - New York City Reservoir release design data - Continued

(River Master daily operation record)

Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases							Indicated deficiency	Balancing adjustment	Directed release	Computations for balancing adjustment					
	Powerplant release forecasts		Uncontrolled runoff							Directed release		Actual deficiency		Cumulative difference Col. 10- Col. 12	Balancing Adjustment
Date of advance estimate	Lake Wallenpaupack	Rio Reservoir	Present conditions	Weather adjustment	Date	Discharge				Daily	Cumulative	Daily	Cumulative		
	cfs	cfs	cfs	cfs		cfs	cfs	cfs	cfs	cfs	cfs-days	cfs	cfs-days	cfs-days	cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
Feb. 26	0	200	1,530	500	Mar. 1	2,230	420	239	659	659	178,404	1,011	182,849	-4,445	445
27	0	100	1,570	500	2	2,170	480	274	754	754	179,158	1,002	183,151	-4,693	469
28	0	250	1,570	350	3	2,170	480	309	789	789	179,947	841	184,692	-4,745	474
Mar. 1	100	250	1,520	300	4	2,170	480	364	844	-	- -	-	- -	-	-
2	170	250	1,520	300	5	2,240	410	409	819	-	- -	-	- -	-	-
3	170	100	1,500	300	6	2,070	580	445	1,025	-	- -	-	- -	-	-
4	170	100	1,530	300	7	2,100	550	469	1,019	-	- -	-	- -	-	-
5	170	50	1,570	400	8	2,190	460	474	934	-	- -	-	- -	-	-
MARCH 9 TO MARCH 14, 1969 MONTAGUE DESIGN RATE = 1,750 CFS PLUS THE UNUSED QUANTITY OF EXCESS RELEASE															
6	0	50	1,550	0	9	1,600	489	-	489	-	- -	-	- -	-	-
7	0	100	1,500	0	10	1,600	150	-	150	-	- -	-	- -	-	-
8	170	100	1,480	0	11	1,750	115	-	115	-	- -	-	- -	-	-
9	170	130	1,470	0	12	1,770	69	-	69	-	- -	-	- -	-	-
10	170	160	1,460	0	13	1,790	0	-	0	-	- -	-	- -	-	-
11	0	130	1,320	0	14	1,450	518	-	518	-	- -	-	- -	-	-
MARCH 15 TO JUNE 14, 1969 MONTAGUE DESIGN RATE = 1,750 CFS															
12	0	65	1,270	0	15	1,335	415	-	415						
13	0	25	1,250	0	16	1,275	475	-	475						
14	0	100	1,230	0	17	1,330	420	-	420						
15	0	130	1,250	75	18	1,455	295	-	295						
16	0	130	1,220	75	19	1,425	325	-	325						
17	0	130	1,200	75	20	1,405	345	-	345						
18	0	65	1,100	356	21	1,521	229	-	229						
19	0	25	1,090	615	22	1,730	20	-	20						
March 23 to May 31, 1969 estimated Montague discharge greater than 1,750 cfs															
Total	1,290	2,640	30,700	4,146		38,776	7,725	2,983	10,708	2,202		2,854			

Col. 1 - Furnished by Power Co., modified on some days
Col. 2 - Furnished by Power Co., modified on most days
Col. 3 - Computed from Index stations
Col. 4 - Computed increase in runoff based on precipitation and temperature forecasts
Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4

Col. 6 = 2,650 - Col. 5 (to March 8)
= 1,750 - Col. 5 + remaining quantity of excess release (from March 9 to March 14)
= 1,750 - Col. 5 (from March 15)
Col. 7 = Col. 14 (5 days earlier)
Col. 8 = Col. 6 + Col. 7

Col. 9 = Col. 8
Col. 10 = Summation of Col. 9
Col. 11 = 2,650 - (Col. 9 + Col.10 from Table 8)
Col. 12 = Summation of Col. 11
Col. 14 = Col. 13 divided by minus 10

Table 9. - New York City Reservoir release design data - Continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases						Indicated deficiency	Balancing adjustment	Directed release	Computations for balancing adjustment					
	Powerplant release forecasts		Uncontrolled runoff							Directed release		Actual deficiency		Cumulative difference Col. 10- Col. 12	Balancing adjustment
	Lake Wallenpaupack cfs	Rio Reservoir cfs	Present conditions cfs	Weather adjustment cfs	Date	Discharge cfs	cfs	cfs	cfs	Daily cfs	Cumulative cfs-days	Daily cfs	Cumulative cfs-days	cfs-days	cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
May 29	0	0	1,580	44	June 1	1,624	126	-	126	-	-	-	-	-	-
30	0	100	1,586	0	2	1,686	64	-	64	-	-	-	-	-	-
					June 3 to June 7 estimated Montague discharge greater than 1,750 cfs.										
June 5	0	0	1,391	155	June 8	1,546	204	-	204	-	-	-	-	-	-
6	0	50	1,232	220	9	1,502	248	-	248	-	-	-	-	-	-
7	100	50	1,356	118	10	1,624	126	-	126	-	-	-	-	-	-
8	75	100	1,263	38	11	1,476	274	-	274	-	-	-	-	-	-
9	75	100	1,227	13	12	1,415	335	-	335	-	-	-	-	-	-
10	100	100	1,106	17	13	1,323	427	-	427	-	-	-	-	-	-
11	100	50	962	43	14	1,155	595	-	595	-	-	-	-	-	-
					JUNE 15 TO NOVEMBER 30, 1969 MONTAGUE DESIGN RATE = 2,650 CFS.										
12	0	25	913	906	15	1,844	806	-	806	806	806	0	0	806	-81
13	0	100	867	1,572	16	2,539	111	-	111	111	917	0	0	917	-92
					June 17 to June 30, 1969 estimated Montague discharge greater than 2,650 cfs.										
	450	675	13,483	3,126		17,734	3,316	-	3,316	917		0			

Col. 1 - Furnished by Power Co., modified on some days
Col. 2 - Furnished by Power Co., modified on most days
Col. 3 - Computed from Index stations
Col. 4 - Computed increase in runoff based on precipitation forecasts

Col. 5 = Col. 1 + Col. 2 + Col. 3 + Col. 4
Col. 6 = 1,750 - Col. 5 (to June 14)
= 2,650 - Col. 5 (from June 15)
Col. 7 = Col. 14 (4 days earlier)
Col. 8. = Col. 6 + Col. 7

Col. 9 = Col. 8
Col. 10 = Summation of Col. 9
Col. 11 = 2,650 -(Col. 9 + Col. 10 from Table 8)
Col. 12 = Summation of Col. 11
Col. 14 = Col. 13 divided by minus 10

Table 9. - New York City Reservoir release design data - Continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack	Powerplant release forecasts: Rio Reservoir	Uncontrolled runoff: Present conditions	Uncontrolled runoff: Weather adjustment	Date	Discharge	Indicated deficiency	Balancing adjustment	Directed release	Computations for balancing adjustment: Directed release: Daily	Directed release: Cumulative	Actual deficiency: Daily	Actual deficiency: Cumulative	Cumulative difference Col. 10 - Col. 12	Balancing adjustment
	cfs	cfs	cfs	cfs		cfs	cfs	cfs	cfs	cfs	cfs-days	cfs	cfs-days	cfs-days	cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
June 28	0	400	2,040	0	July 1	2,440	210	- 92	118	118	1,035	0	634	401	- 40
29	195	350	1,774	66	2	2,385	265	- 92	173	173	1,208	243	877	331	- 33
30	489	350	1,521	117	3	2,477	173	- 92	81	81	1,289	864	1,741	- 452	- 45
July 1	326	200	1,825	0	4	2,351	299	- 28	271	271	1,560	1,235	2,976	-1,416	142
2	0	100	1,457	26	5	1,583	1,067	- 40	1,027	1,027	2,587	1,673	4,649	-2,052	205
3	0	150	1,292	25	6	1,467	1,183	- 33	1,150	1,150	3,737	1,369	6,018	-2,271	227
4	0	100	1,207	1,220	7	2,527	123	45	168	168	3,905	1,048	7,066	-3,161	316
5	0	200	1,212	0	8	1,412	1,238	142	1,380	1,380	5,285	1,969	9,035	-3,750	375
6	0	200	1,158	19	9	1,377	1,273	205	1,478	1,478	6,763	1,660	10,695	-3,932	393
7	0	200	1,018	151	10	1,369	1,281	227	1,508	1,508	8,271	1,630	12,325	-4,054	405
8	100	50	1,023	186	11	1,359	1,291	316	1,607	1,607	9,878	1,527	13,852	-3,974	397
9	100	25	863	266	12	1,254	1,396	375	1,771	1,771	11,649	1,338	15,190	-3,541	354
10	100	50	814	72	13	1,036	1,614	393	2,007	2,007	13,656	1,344	16,534	-2,878	288
11	0	150	836	1	14	987	1,663	405	2,068	2,068	15,724	1,498	18,032	-2,308	231
12	100	150	841	275	15	1,366	1,284	397	1,681	1,681	17,405	1,531	19,563	-2,158	216
13	100	150	1,045	52	16	1,347	1,303	354	1,657	1,657	19,062	988	20,551	-1,489	149
14	400	195	907	3	17	1,505	1,145	288	1,433	1,433	20,495	491	21,042	- 547	55
15	400	195	795	1	18	1,391	1,259	231	1,490	1,490	21,985	145	21,187	798	- 80
16	980	130	739	1	19	1,850	800	216	1,016	1,016	23,001	326	21,513	1,488	-149
17	680	130	675	437	20	1,922	728	149	877	877	23,878	996	22,509	1,369	-137
18	170	195	724	489	21	1,578	1,072	55	1,127	1,127	25,005	1,060	23,569	1,436	-144
19	750	195	707	391	22	2,043	607	- 80	527	527	25,532	853	24,422	1,110	-111
20	300	260	844	686	23	2,090	560	-149	411	411	25,943	913	25,335	608	- 61
21	455	260	1,110	54	24	1,879	771	-137	634	634	26,577	959	26,294	283	- 28
22	540	130	1,409	319	25	2,398	252	- 144	108	108	26,685	798	27,092	- 407	41
23	0	260	1,263	156	26	1,679	971	-111	860	860	27,545	1,968	29,060	-1,515	152
24	0	260	1,175	175	27	1,610	1,040	- 61	979	979	28,524	1,636	30,696	-2,172	217
25	0	260	1,170	75	28	1,505	1,145	- 28	1,117	1,117	29,641	0	30,696	-1,055	106
26	495	260	1,042	11	29	1,808	842	41	883	883	30,524	0	30,696	- 172	17
27	495	260	1,125	854	30	2,734	0	152	68	68	30,592	0	30,696	- 104	10
28	710	260	6,050	1,385	31	8,405	0	217	0	0	30,592	0	30,696	- 104	10
	7,885	6,075	39,661	7,513		61,134	26,855	3,121	29,675	29,675		30,062			

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Table 9. - New York City Reservoir release design data - Continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack cfs	Powerplant release forecasts: Rio Reservoir cfs	Uncontrolled runoff: Present conditions cfs	Uncontrolled runoff: Weather adjustment cfs	Date	Discharge cfs	Indicated deficiency cfs	Balancing adjustment cfs	Directed release cfs	Computations for balancing adjustment: Directed release: Daily cfs	Directed release: Cumulative cfs-days	Actual deficiency: Daily cfs	Actual deficiency: Cumulative cfs-days	Cumulative difference Col. 10 - Col. 12 cfs-days	Balancing adjustment cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
					August 1, to 16, 1969 estimated Montague discharge greater than 2,650 cfs.										
Aug. 14	0	130	2,317	9	Aug.17	2,456	194	10	204	204	30,796	0	30,696	100	- 10
15	0	350	2,058	18	18	2,426	224	10	234	234	31,030	0	30,696	334	- 33
16	660	300	2,215	257	19	3,432	0	10	0	0	31,030	0	30,696	334	- 33
17	660	400	2,544	224	20	3,828	0	10	0	0	31,030	0	30,696	334	- 33
18	495	600	2,877	249	21	4,221	0	- 10	0	0	31,030	33	30,729	301	- 30
19	495	350	2,559	177	22	3,581	0	- 33	0	0	31,030	360	31,089	- 59	6
20	0	200	2,269	0	23	2,469	181	- 33	148	148	31,178	532	31,621	- 443	44
21	0	100	1,905	0	24	2,005	645	- 33	612	612	31,790	781	32,402	- 612	61
22	0	300	1,559	0	25	1,859	791	- 30	761	761	32,551	597	32,999	- 448	45
23	500	300	1,410	0	26	2,210	440	6	446	446	32,997	0	32,999	- 2	0
24	500	300	1,276	0	27	2,076	574	44	618	618	33,615	833	33,832	- 217	22
25	500	400	1,185	0	28	2,085	565	61	626	626	34,241	1,181	35,013	- 772	77
26	600	300	1,099	0	29	1,999	651	45	696	696	34,937	1,192	36,205	-1,268	127
27	450	150	1,029	0	30	1,629	1,021	0	1,021	1,021	35,958	637	36,842	- 884	88
28	330	100	997	0	31	1,427	1,223	22	1,245	1,245	37,203	911	37,753	- 550	55
	5,190	4,280	27,299	934		37,703	6,509	79	6,611	6,611		7,057			

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Table 9. - New York City Reservoir release design data - Continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack cfs	Powerplant release forecasts: Rio Reservoir cfs	Uncontrolled runoff: Present conditions cfs	Uncontrolled runoff: Weather adjustment cfs	Date	Discharge cfs	Indicated deficiency cfs	Balancing adjustment cfs	Directed release cfs	Computations for balancing adjustment: Directed release: Daily cfs	Directed release: Cumulative cfs-days	Actual deficiency: Daily cfs	Actual deficiency: Cumulative cfs-days	Cumulative difference Col. 10 - Col. 12 cfs-days	Balancing adjustment cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
Aug. 29	280	100	935	0	Sept. 1	1,315	1,335	77	1,412	1,412	38,615	1,425	39,178	- 563	56
30	0	100	897	0	2	997	1,653	127	1,780	1,780	40,395	1,635	40,813	- 418	42
31	315	200	944	0	3	1,459	1,191	88	1,279	1,279	41,674	503	41,316	358	- 36
Sept. 1	315	200	908	51	4	1,474	1,176	55	1,231	1,231	42,905	624	41,940	965	- 96
2	232	300	862	209	5	1,603	1,047	56	1,103	1,103	44,008	685	42,625	1,383	- 138
3	232	65	901	397	6	1,595	1,055	42	1,097	1,097	45,105	822	43,447	1,658	- 166
4	125	25	880	28	7	1,058	1,592	- 36	1,556	1,556	46,661	1,509	44,956	1,705	- 170
5	50	200	894	124	8	1,268	1,382	- 96	1,286	1,286	47,947	791	45,747	2,200	- 220
6	400	260	887	193	9	1,740	910	-138	772	772	48,719	747	46,494	2,225	- 222
7	310	200	881	29	10	1,420	1,230	-166	1,064	1,064	49,783	1,139	47,633	2,150	- 215
8	50	200	833	30	11	1,113	1,537	-170	1,367	1,367	51,150	1,382	49,015	2,135	- 214
9	50	200	952	0	12	1,202	1,448	-220	1,228	1,228	52,378	1,450	50,465	1,913	- 191
10	50	150	941	0	13	1,141	1,509	-222	1,287	1,287	53,665	1,764	52,229	1,436	- 144
11	0	100	923	11	14	1,034	1,616	-215	1,401	1,401	55,066	1,854	54,083	983	- 98
12	0	260	828	0	15	1,088	1,562	-214	1,348	1,348	56,414	1,689	55,772	642	- 64
13	50	260	723	0	16	1,033	1,617	-191	1,426	1,426	57,840	1,906	57,678	162	- 16
14	50	260	684	0	17	994	1,656	-144	1,512	1,512	59,352	1,893	59,571	- 219	22
15	100	260	626	77	18	1,063	1,587	- 98	1,489	1,489	60,841	1,300	60,871	- 30	3
16	100	260	603	58	19	1,021	1,629	- 64	1,565	1,565	62,406	1,966	62,837	- 431	43
17	0	65	593	246	20	904	1,746	- 16	1,730	1,730	64,136	2,022	64,859	- 723	72
18	0	50	641	0	21	691	1,959	22	1,981	1,981	66,117	2,215	67,074	- 957	96
19	0	260	616	0	22	876	1,774	3	1,777	1,777	67,894	2,103	69,177	- 1,283	128
20	50	260	581	0	23	891	1,759	43	1,802	1,802	69,696	2,097	71,274	- 1,578	158
21	50	175	563	0	24	788	1,862	72	1,934	1,934	71,630	1,945	73,219	- 1,589	159
22	50	200	559	0	25	809	1,841	96	1,937	1,937	73,567	1,852	75,071	- 1,504	150
23	100	200	562	11	26	873	1,777	128	1,905	1,905	75,472	1,958	77,029	- 1,557	156
24	50	100	551	0	27	701	1,949	158	2,107	2,107	77,579	2,079	79,108	- 1,529	153
25	0	65	518	0	28	583	2,067	159	2,226	2,226	79,805	2,101	81,209	- 1,404	140
26	0	200	533	16	29	749	1,901	150	2,051	2,051	81,856	1,903	83,112	- 1,256	126
27	50	195	501	41	30	787	1,863	156	2,019	2,019	83,875	1,889	85,001	- 1,126	113
	3,059	5,370	22,320	1,521		32,270	47,230	-558	46,672	46,672		47,248			

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Table 9. - New York City Reservoir release design data - Continued

(River Master daily operation record)

Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases							Indicated deficiency	Balancing adjustment	Directed release	Computations for balancing adjustment					
Date of advance estimate	Powerplant release forecasts		Uncontrolled runoff		Date	Discharge				Directed release		Actual deficiency		Cumulative difference Col. 10- Col. 12	Balancing adjustment
	Lake Wallenpaupack	Rio Reservoir	Present conditions	Weather adjustment						Daily	Cumulative	Daily	Cumulative		
	cfs	cfs	cfs	cfs		cfs	cfs	cfs	cfs	cfs	cfs-days	cfs	cfs-days	cfs-days	cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
Sept. 28	50	200	531	0	Oct. 1	781	1,869	153	2,022	2,022	85,897	1,972	86,973	- 1,076	108
29	50	130	507	13	2	700	1,950	140	2,090	2,090	87,987	1,802	88,775	- 788	79
30	50	200	507	2	3	759	1,891	126	2,017	2,017	90,004	1,431	90,206	- 202	20
Oct. 1	100	130	483	1,354	4	2,067	583	113	696	696	90,700	710	90,916	- 216	22
2	0	50	458	1,248	5	1,756	894	108	1,002	1,002	91,702	1,506	92,422	- 720	72
3	0	260	732	8	6	1,000	1,650	79	1,729	1,729	93,431	1,738	94,160	- 729	73
4	50	325	628	0	7	1,003	1,647	20	1,667	1,667	95,098	1,698	95,858	- 760	76
5	50	325	618	0	8	993	1,657	22	1,679	1,679	96,777	1,858	97,716	- 939	94
6	50	325	650	13	9	1,038	1,612	72	1,684	1,684	98,461	2,047	99,763	- 1,302	130
7	50	260	582	65	10	957	1,693	73	1,766	1,766	100,227	1,619	101,382	- 1,155	116
8	50	260	580	0	11	890	1,760	76	1,836	1,836	102,063	2,018	103,400	- 1,337	134
9	0	130	588	0	12	718	1,932	94	2,026	2,026	104,089	2,209	105,609	- 1,520	152
10	0	130	546	33	13	709	1,941	130	2,071	2,071	106,160	2,173	107,782	- 1,622	162
11	0	130	504	47	14	681	1,969	116	2,085	2,085	108,245	1,957	109,739	- 1,494	149
12	50	130	478	49	15	707	1,943	134	2,077	2,077	110,322	2,130	111,869	- 1,547	155
13	50	130	458	88	16	726	1,924	152	2,076	2,076	112,398	2,219	114,088	- 1,690	169
14	50	130	472	0	17	652	1,998	162	2,160	2,160	114,558	2,208	116,296	- 1,738	174
15	50	65	450	0	18	565	2,085	149	2,234	2,234	116,792	2,230	118,526	- 1,734	173
16	0	25	444	19	19	488	2,162	155	2,317	2,317	119,109	2,293	120,819	- 1,710	171
17	0	100	427	0	20	527	2,123	169	2,292	2,292	121,401	2,308	123,127	- 1,726	173
18	50	65	411	106	21	632	2,018	174	2,192	2,192	123,593	2,067	125,194	- 1,601	160
19	50	65	410	173	22	698	1,952	173	2,125	2,125	125,718	1,743	126,937	- 1,219	122
20	50	65	407	525	23	1,047	1,603	171	1,774	1,774	127,492	1,851	128,788	- 1,296	130
21	50	65	639	93	24	847	1,803	173	1,976	1,976	129,468	1,598	130,386	- 918	92
22	50	65	602	5	25	722	1,928	160	2,088	2,088	131,556	2,067	132,453	- 897	90
23	0	25	625	0	26	650	2,000	122	2,122	2,122	133,678	2,135	134,588	- 910	91
24	0	65	604	19	27	688	1,962	130	2,092	2,092	135,770	2,147	136,733	- 965	96
25	50	65	563	105	28	783	1,867	92	1,959	1,959	137,729	1,723	138,457	- 729	73
26	50	65	539	60	29	714	1,936	90	2,026	2,026	139,755	1,974	140,432	- 677	68
27	50	65	523	24	30	662	1,988	91	2,079	2,079	141,834	1,994	142,426	- 592	59
28	45	65	539	0	31	649	2,001	96	2,097	2,097	143,931	1,930	144,356	- 425	42
	1,145	4,110	16,505	4,049		25,809	56,341	3,715	60,056	60,056		59,355			

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Table 9. - New York City Reservoir release design data - Continued

(River Master daily operation record)

Date of advance estimate	Advance estimate of discharge of Delaware River at Montague exclusive of New York City reservoir releases: Powerplant release forecasts: Lake Wallenpaupack cfs	Powerplant release forecasts: Rio Reservoir cfs	Uncontrolled runoff: Present conditions cfs	Uncontrolled runoff: Weather adjustment cfs	Date	Discharge cfs	Indicated deficiency cfs	Balancing adjustment cfs	Directed release cfs	Computations for balancing adjustment: Directed release: Daily cfs	Directed release: Cumulative cfs-days	Actual deficiency: Daily cfs	Actual deficiency: Cumulative cfs-days	Cumulative difference Col. 10 - Col. 12 cfs-days	Balancing adjustment cfs
1969	1	2	3	4		5	6	7	8	9	10	11	12	13	14
Oct. 29	50	65	521	192	Nov. 1	828	1,822	73	1,895	1,895	145,826	2,060	146,416	-590	59
30	0	25	507	115	2	647	2,003	68	2,071	2,071	147,897	2,171	148,587	-690	69
31	0	130	502	827	3	1,459	1,191	59	1,250	1,250	149,147	1,840	150,427	-1,280	128
Nov. 1	50	195	486	1,421	4	2,152	498	42	540	540	149,687	1,390	151,817	-2,130	213
2	50	130	522	349	5	1,051	1,599	59	1,658	1,658	151,345	1,598	153,415	-2,070	207
3	50	130	620	0	6	800	1,850	69	1,919	1,919	153,264	254	153,669	405	40
4	50	130	630	543	7	1,353	1,297	128	1,425	1,425	154,689	0	153,669	1,020	-102
5	50	130	758	1,283	8	2,221	429	213	642	642	155,331	0	153,669	1,662	-166
6	0	25	1,303	1,927	9	3,255	0	207	0	0	155,331	0	153,669	1,662	-166
7	0	260	2,256	104	10	2,620	30	40	70	70	155,401	0	153,669	1,732	-173
						November 11 to November 30, 1969 estimated discharge greater than 2,650 cfs.									
Total	300	1,220	8,105	6,761		16,386	10,719	958	11,470	11,470		9,313			

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Table 10. - Diversions to New York City Water Supply

Million gallons per day for 24-hour period beginning 0900 local time

(River Master daily operation record)

Date 1968	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1968 to date	Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1968 to date
Dec. 1	428	0	68	604	Jan. 1	0	0	106	605
2	428	0	184	604	2	154	461	91	606
3	433	2	170	604	3	182	471	60	606
4	425	160	213	605	4	224	471	56	607
5	428	234	196	606	5	190	471	36	607
6	429	13	93	606	6	171	471	56	608
7	429	0	193	606	7	195	471	74	608
8	430	0	176	606	8	181	471	74	609
9	428	168	173	607	9	122	471	87	609
10	426	352	193	609	10	185	137	123	608
11	426	425	196	611	11	86	0	49	606
12	425	214	182	612	12	0	0	26	609
13	425	0	148	612	13	186	431	70	604
14	426	0	203	612	14	162	472	69	605
15	427	0	121	612	15	186	472	68	605
16	426	0	203	612	16	185	472	68	606
17	427	0	199	612	17	185	471	69	606
18	377	0	185	612	18	119	471	113	607
19	380	0	174	611	19	0	471	45	606
20	380	0	225	611	20	184	471	68	607
21	379	0	225	611	21	187	470	88	607
22	379	0	104	611	22	185	470	66	608
23	376	0	187	610	23	186	470	58	608
24	376	0	165	610	24	185	470	84	609
25	375	0	156	610	25	125	472	70	609
26	376	0	177	609	26	47	472	52	609
27	379	0	194	609	27	186	472	162	610
28	378	0	183	609	28	184	472	160	611
29	378	0	191	609	29	187	472	34	611
30	378	0	181	609	30	184	472	46	611
31	235	0	177	608	31	185	473	49	612
Total	12,412	1,568	5,435		Total	4,738	12,811	2,277	

Table 10. - Diversions to New York City Water Supply

Million gallons per day for 24-hour period beginning 0900 local time

(River Master daily operation record)

Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1968 to date	Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1968 to date
Feb. 1	109	474	34	612	Mar. 1	101	466	93	620
2	0	474	8	611	2	0	466	45	619
3	186	474	45	612	3	185	466	69	620
4	186	474	60	612	4	183	465	62	620
5	187	474	40	612	5	186	464	70	620
6	187	474	48	613	6	188	463	123	621
7	185	474	58	613	7	185	463	67	621
8	78	474	62	613	8	102	463	74	621
9	43	474	169	613	9	0	462	29	621
10	185	474	104	614	10	185	462	63	621
11	139	474	139	615	11	185	461	70	621
12	185	474	54	615	12	185	461	71	622
13	187	473	57	615	13	185	455	78	622
14	187	473	72	616	14	382	0	113	622
15	117	473	35	616	15	382	0	158	621
16	0	473	26	615	16	382	0	190	621
17	187	472	68	616	17	379	0	148	621
18	187	472	70	616	18	379	0	155	621
19	168	472	64	617	19	381	0	147	620
20	186	472	69	617	20	381	0	148	620
21	187	471	45	617	21	381	0	151	620
22	118	470	89	618	22	381	0	150	619
23	68	470	81	618	23	381	0	146	619
24	185	470	68	618	24	381	0	149	619
25	185	469	70	618	25	379	0	148	618
26	185	468	86	619	26	379	0	147	618
27	184	468	69	619	27	380	0	146	618
28	184	466	69	620	28	381	0	153	618
					29	381	0	148	617
					30	382	0	154	617
					31	383	0	158	617
Total	4, 185	13, 220	1, 859			8, 725	6, 017	3, 623	

Table 10. - Diversions to New York City Water Supply

Million gallons per day for 24-hour period beginning 0900 local time

(River Master daily operation record)

Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1968 to date	Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1968 to date
Apr. 1	380	0	148	616	May 1	0	0	0	568
2	378	0	154	616	2	0	0	0	567
3	378	0	47	616	3	0	0	0	565
4	233	0	46	614	4	0	0	0	563
5	0	0	49	613	5	0	0	0	562
6	0	0	47	611	6	246	1	103	561
7	374	0	48	610	7	400	299	106	562
8	234	0	35	609	8	399	299	100	562
9	0	7	0	607	9	448	443	148	564
10	0	62	0	605	10	450	458	150	565
11	0	0	0	604	11	451	458	150	567
12	0	0	0	602	12	448	458	149	568
13	0	0	0	600	13	448	458	136	569
14	0	0	0	598	14	450	458	146	571
15	0	0	0	596	15	447	458	148	572
16	0	0	0	594	16	448	458	146	574
17	0	0	0	592	17	448	457	151	575
18	0	0	0	590	18	447	457	153	576
19	0	0	0	589	19	448	457	145	578
20	0	0	0	587	20	449	458	151	579
21	0	0	0	585	21	451	458	151	580
22	0	0	0	583	22	111	111	62	579
23	0	0	0	581	23	0	0	0	578
24	246	0	0	580	24	0	0	0	576
25	0	0	0	579	25	0	0	0	575
26	0	0	0	577	26	0	158	0	573
27	0	0	0	575	27	0	425	96	573
28	0	0	0	573	28	402	501	104	574
29	0	0	0	572	29	400	501	107	576
30	0	0	0	570	30	397	501	101	577
					31	264	500	97	578
Total	2,223	69	574			8,452	9,232	2,800	

Table 10. - Diversions to New York City Water Supply

Millions gallons per day for 24-hour period beginning 0900 local time

(River Master daily operation record)

Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1969 to date	Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1969 to date
June 1	283	390	0	673	July 1	403	234	247	729
2	295	390	0	679	2	403	233	256	734
3	298	390	0	682	3	403	25	253	733
4	415	304	94	715	4	404	0	252	730
5	356	298	104	723	5	404	0	260	729
6	352	298	101	728	6	406	0	251	727
7	352	298	99	731	7	404	0	255	725
8	352	298	98	733	8	404	0	243	723
9	395	204	94	729	9	404	0	254	721
10	380	185	151	727	10	405	0	251	719
11	411	185	149	729	11	405	0	253	718
12	353	177	145	724	12	405	0	244	716
13	405	0	150	711	13	407	0	244	715
14	414	0	146	701	14	405	0	253	714
15	422	0	150	692	15	403	0	252	712
16	407	0	195	686	16	429	0	248	711
17	407	0	237	684	17	444	0	244	711
18	404	0	242	682	18	444	0	246	710
19	405	0	250	680	19	418	0	247	710
20	407	0	252	679	20	390	0	112	705
21	406	0	247	678	21	426	0	195	704
22	402	0	249	677	22	405	0	291	704
23	404	171	248	683	23	402	0	299	704
24	404	234	244	692	24	402	0	299	704
25	400	56	248	692	25	401	0	298	703
26	400	173	247	697	26	402	0	251	703
27	404	234	250	704	27	401	0	247	702
28	412	234	253	711	28	189	0	207	696
29	410	234	252	717	29	0	0	0	684
30	433	234	254	724	30	98	0	90	676
					31	0	0	0	665
	11,588	4,987	5,149			11,316	492	7,042	

Table 10. - Diversions to New York City Water Supply

Millions gallons per day for 24-hour period beginning 0900 local time

(River Master daily operation record)

Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1969 to date	Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1969 to date
Aug. 1	0	0	0	654	Sept. 1	424	0	250	641
2	0	0	0	644	2	450	0	299	642
3	0	0	0	634	3	453	0	328	644
4	381	0	229	634	4	450	0	353	645
5	402	0	246	634	5	450	0	348	647
6	401	0	244	634	6	450	0	351	648
7	403	0	244	634	7	451	0	357	650
8	402	0	252	634	8	452	0	354	651
9	402	0	250	635	9	452	0	348	653
10	403	0	248	635	10	451	0	343	654
11	404	0	247	635	11	450	0	349	656
12	403	0	253	635	12	452	0	352	657
13	402	0	253	636	13	450	0	345	658
14	414	0	253	636	14	449	0	355	660
15	413	0	252	637	15	448	0	346	661
16	388	0	250	637	16	448	0	360	662
17	373	0	249	636	17	457	0	289	663
18	401	0	251	637	18	453	0	365	665
19	400	0	250	637	19	454	0	364	666
20	402	0	254	637	20	452	0	356	667
21	403	0	253	637	21	453	0	365	669
22	402	0	251	637	22	452	0	360	670
23	417	0	247	638	23	452	0	344	671
24	400	0	254	638	24	452	0	348	672
25	407	0	252	638	25	453	0	351	673
26	421	0	244	638	26	452	0	336	674
27	425	0	252	639	27	451	0	362	675
28	425	0	245	639	28	452	0	346	676
29	426	0	252	640	29	449	0	352	677
30	426	0	267	640	30	449	0	351	678
31	426	0	241	641					
	11,372	0	6,983			13,511	0	10,327	

Table 10. - Diversions to New York City Water Supply

Million gallons per day for 24-hour period beginning 0900 local time

(River Master daily operation record)

Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1969 to date	Date 1969	East Delaware Tunnel	West Delaware Tunnel	Neversink Tunnel	Average June 1, 1969 to date
Oct. 1	451	0	350	679	Nov. 1	449	0	148	682
2	451	0	348	680	2	449	0	147	681
3	450	0	347	681	3	449	0	146	681
4	450	0	356	682	4	450	0	151	680
5	449	0	351	683	5	450	0	154	680
6	449	0	351	684	6	450	0	153	679
7	449	0	356	685	7	451	0	151	679
8	451	0	356	686	8	452	0	149	678
9	450	0	356	687	9	453	0	151	678
10	450	0	350	688	10	452	0	144	677
11	450	0	350	689	11	453	0	160	677
12	450	0	359	690	12	449	0	102	676
13	451	0	345	690	13	450	0	75	675
14	450	0	342	691	14	450	0	75	674
15	450	0	344	692	15	451	0	74	673
16	449	0	161	691	16	451	0	75	673
17	449	0	152	691	17	451	0	73	672
18	448	0	147	690	18	450	0	73	671
19	448	0	149	689	19	451	0	74	670
20	453	0	151	689	20	452	0	76	669
21	450	0	148	688	21	451	0	77	668
22	450	0	149	687	22	451	0	75	668
23	450	0	151	687	23	451	0	80	667
24	450	0	150	686	24	451	0	79	666
25	469	0	146	686	25	451	0	74	665
26	450	0	155	685	26	451	0	73	664
27	449	0	159	685	27	452	0	74	664
28	450	0	146	684	28	451	0	76	663
29	450	0	146	683	29	451	0	75	662
30	450	0	146	683	30	452	0	74	661
31	450	0	150	682					
Total	13,966	0	7,667		Total	13,525	0	3,108	

Table 11. - Storage in Pepacton Reservoir, N. Y., for year ending November 30, 1969

(Storage in millions of gallons above elevation 1, 152.00 ft. Add 7, 711 million gallons for total contents above sill of outlet tunnel, elevation 1, 126.50 ft.)
(River master daily operation record; gage reading at 0900)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	92,235	97,527	105,495	108,766	115,926	141,376	140,338	136,200	131,667	125,645	113,568	95,675
2	92,755	98,091	106,004	108,798	116,094	141,301	140,283	136,164	132,148	125,263	113,107	95,040
3	93,170	98,522	106,596	108,927	116,797	141,209	140,264	135,982	132,559	124,864	112,827	94,621
4	93,438	98,860	106,916	108,879	117,115	141,135	140,246	135,620	132,916	124,465	112,398	93,886
5	93,901	99,075	107,124	108,782	118,007	141,061	140,061	135,221	132,970	124,049	112,005	93,066
6	94,141	99,260	107,332	108,717	122,533	141,024	139,914	134,805	132,952	123,653	111,580	92,755
7	94,336	99,429	107,541	108,653	125,315	140,801	139,767	134,426	132,845	123,257	111,171	92,576
8	94,456	99,614	107,686	108,556	126,796	140,560	139,638	134,121	132,684	122,895	110,729	93,438
9	94,486	99,800	107,976	108,556	128,057	140,524	139,454	133,743	132,505	122,791	110,306	95,690
10	94,396	99,970	108,250	108,653	129,341	140,857	139,197	133,366	132,381	122,395	109,917	97,192
11	94,246	100,032	108,347	108,572	131,025	140,820	138,903	133,006	132,238	122,019	109,478	98,445
12	94,141	100,203	108,492	108,476	132,452	140,764	138,682	132,630	132,041	121,591	109,040	99,275
13	94,066	100,420	108,572	108,379	133,545	140,690	138,351	132,416	131,756	121,197	108,605	99,846
14	94,066	100,466	108,605	108,298	134,426	140,672	138,315	132,148	131,506	120,787	108,186	100,243
15	94,246	100,497	108,621	108,008	135,221	140,542	138,096	131,863	131,202	120,378	107,718	100,528
16	94,156	100,497	108,669	107,734	135,910	140,486	138,462	131,559	130,918	119,970	107,156	100,714
17	94,171	100,466	108,863	107,476	136,690	140,394	138,535	131,202	130,670	119,546	106,532	100,776
18	94,051	100,497	108,846	107,172	137,274	140,209	138,535	130,865	130,582	119,155	105,940	100,745
19	94,006	100,668	108,830	107,028	137,950	140,061	138,462	130,493	130,280	118,715	105,383	100,761
20	93,991	101,024	108,863	107,108	138,774	140,246	138,296	130,280	129,997	118,294	104,859	101,351
21	93,991	101,071	108,863	107,702	139,326	141,116	138,223	130,015	129,643	117,839	104,399	101,820
22	93,901	101,117	108,830	108,476	139,969	141,135	138,077	129,678	129,341	117,417	104,020	102,117
23	93,931	101,164	108,879	108,863	141,339	141,191	137,931	129,377	128,972	116,998	103,295	102,305
24	93,901	101,305	108,943	109,251	141,765	141,209	137,822	129,078	128,655	116,546	102,430	102,602
25	93,827	102,149	108,927	110,063	141,802	141,209	137,639	128,743	128,304	116,144	101,570	102,838
26	93,692	102,743	108,911	112,152	141,802	141,172	137,439	128,392	127,934	115,709	100,714	102,964
27	93,572	103,200	108,879	113,437	141,747	141,079	137,201	128,040	127,548	115,276	99,877	103,042
28	93,572	103,405	108,830	114,263	141,617	141,024	136,928	127,846	127,163	114,861	99,029	103,090
29	95,101	103,468	- -	114,894	141,524	140,746	136,617	129,767	126,779	114,429	98,153	103,074
30	96,234	103,909	- -	115,376	141,450	140,560	136,345	130,706	126,395	113,964	97,359	103,058
31	96,887	104,717	- -	115,709	- -	140,468	- -	131,256	126,028	- -	96,521	- -
Change	+5,287	+7,830	+4,113	+6,879	+25,741	-982	-4,123	-5,089	-5,228	-12,064	-17,443	+6,537
Equiv. mgd	+170.5	+252.6	+146.9	+221.9	+858.0	- 31.7	-137.4	-164.2	-168.6	-402.1	-562.7	+217.9
Equiv. cfs	+264	+391	+227	+343	+1,327	- 49.0	- 213	- 254	-261	-622	-870	+337

Change for year +11, 458 million gallons Equiv. for year 31.4 mgd Equiv. for year 48.6 cfs

Table 12. - Storage in Cannonsville Reservoir, N. Y, for year ending November 30, 1969

(Storage in millions of gallons above elevation 1,040.00 ft. Add 2,584 million gallons for total contents above sill of outlet tunnel, elevation 1,020.50 ft.)

(River Master daily operation record; gage reading at 0900)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	31,369	50,636	54,533	47,258	60,500	96,575	95,600	94,322	78,774	75,459	47,836	17,418
2	32,620	51,779	55,005	46,435	61,205	96,832	95,508	94,215	78,830	74,671	46,635	17,101
3	33,725	52,059	55,457	45,545	62,479	96,897	95,402	93,911	78,885	73,954	46,390	17,214
4	34,696	51,977	55,726	44,645	63,447	96,913	95,371	93,470	79,037	73,371	45,723	16,365
5	35,647	51,896	55,762	43,655	66,019	96,929	95,326	92,907	79,217	72,788	44,834	15,747
6	36,300	51,849	55,677	42,794	67,437	96,961	95,326	92,953	79,355	71,848	43,866	15,354
7	36,974	52,176	55,628	42,132	72,390	96,897	95,037	92,131	79,452	71,146	42,899	16,146
8	37,648	52,199	55,591	41,711	74,588	96,591	94,915	91,416	79,548	70,788	41,964	17,319
9	38,318	52,187	55,555	41,312	76,274	96,607	94,717	90,518	79,659	70,324	40,902	21,610
10	38,517	52,071	55,420	40,944	77,600	97,058	94,444	89,621	79,797	69,569	39,842	24,447
11	38,454	52,257	55,274	40,598	79,106	96,961	94,246	88,556	79,990	68,907	38,696	26,489
12	38,360	52,514	55,091	39,936	80,529	96,897	93,957	87,450	80,114	68,152	37,371	28,116
13	38,601	52,677	54,981	39,295	81,741	96,752	93,470	86,294	80,211	67,255	36,102	29,422
14	39,032	52,724	54,801	38,633	82,420	96,591	93,227	85,080	80,294	66,567	34,884	30,469
15	39,463	52,525	54,568	38,381	83,229	96,414	93,333	84,183	80,349	65,764	33,616	31,239
16	39,894	52,315	54,334	38,307	83,894	96,285	93,592	83,374	80,308	64,873	32,351	32,008
17	40,167	52,047	54,077	38,255	84,661	96,124	93,866	82,507	80,280	64,033	31,137	32,778
18	40,482	51,791	53,832	38,173	85,297	95,915	94,033	81,987	80,418	63,103	29,867	33,309
19	40,829	51,651	53,401	38,307	85,947	95,786	94,200	81,683	80,501	62,059	28,617	33,804
20	41,186	51,662	52,922	38,938	86,756	95,770	94,383	81,206	80,556	60,915	27,383	34,706
21	41,501	51,593	52,350	40,388	87,233	96,527	94,672	80,990	80,584	59,413	26,362	35,756
22	41,869	51,464	51,744	41,911	87,825	96,752	94,824	80,556	80,590	58,754	25,528	36,528
23	42,289	51,301	51,313	43,298	88,876	97,058	94,915	80,280	80,239	57,618	24,405	37,301
24	42,657	50,963	50,764	44,667	90,229	97,202	94,930	80,308	79,838	56,458	23,645	38,074
25	42,920	51,639	50,087	46,846	91,599	97,283	94,824	79,838	79,645	55,298	22,863	39,011
26	43,225	52,374	49,539	51,254	92,694	97,396	94,839	79,631	79,300	54,054	22,067	39,726
27	43,424	52,619	48,826	54,206	93,637	97,138	94,839	78,982	78,968	52,689	21,316	40,314
28	44,422	52,584	48,058	56,055	94,550	96,768	94,778	78,249	78,595	51,441	20,535	40,913
29	45,078	52,537	- -	57,337	95,204	96,334	94,672	78,387	78,014	50,297	19,774	41,470
30	48,214	52,584	- -	58,546	95,883	96,044	94,413	78,553	77,324	49,060	18,986	42,027
31	49,679	53,284	- -	59,731	- -	95,803	- -	78,678	76,495	- -	18,254	- -
Change	+19,515	+3,605	-5,226	+11,673	+36,152	-80	-1,390	-15,735	-2,183	-27,435	-30,806	+23,773
Equiv. mgd	+629.5	+116.3	- 186.6	+376.5	+1,205	- 2.58	-46.3	- 507.6	- 70.4	- 914.5	-993.7	+792.4
Equiv. cfs	+974	+ 180	- 289	+582	+1,864	-3.99	-71.6	- 785	-109	-1,415	-1,537	+ 1,226

Change for year +11,863 million gallons Equiv. for year +32.5 mgd Equiv. for year +50.3 cfs

Table 13. - Storage in Neversink Reservoir, N. Y., for year ending November 30, 1969

(Storage in millions of gallons above elevation 1,310.00 ft. Add 525 million gallons for total contents above sill of outlet tunnel, elevation 1,314.00 ft.)

(River Master daily operation record; gage reading at 0900)

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	20,102	20,510	22,089	22,760	23,008	35,016	34,931	33,321	33,548	29,679	20,183	13,131
2	20,264	20,544	22,228	22,721	23,020	35,001	34,986	33,153	33,785	29,468	19,847	12,998
3	20,339	20,547	22,388	22,733	23,115	34,986	35,025	32,962	34,023	29,204	19,591	12,874
4	20,402	20,603	22,490	22,717	23,266	34,981	35,040	32,776	34,218	28,924	19,297	12,763
5	20,562	20,648	22,564	22,693	23,689	34,976	34,971	32,609	24,223	28,619	18,968	12,635
6	20,648	20,701	22,619	22,662	25,466	34,966	34,936	32,420	34,184	28,311	18,643	12,583
7	20,780	20,750	22,678	22,595	26,211	31,001	34,956	32,222	34,096	28,005	18,314	12,499
8	20,772	20,784	22,729	22,560	26,676	34,976	34,931	32,019	33,979	27,693	17,987	12,728
9	20,780	20,806	22,772	22,537	27,069	35,016	34,906	31,822	33,862	27,421	17,653	13,307
10	20,716	20,814	22,740	22,548	27,460	35,055	34,867	31,616	33,756	27,107	17,315	13,692
11	20,622	20,780	22,717	22,525	28,210	35,011	34,788	31,415	33,644	26,800	16,985	13,978
12	20,544	20,810	22,681	22,486	28,689	34,961	34,685	31,206	33,499	26,477	16,645	14,104
13	20,495	20,867	22,725	22,466	29,017	34,966	34,591	31,113	33,345	26,148	16,311	14,212
14	20,521	20,863	22,736	22,427	29,280	34,916	34,547	30,970	33,168	25,829	15,981	14,302
15	20,776	20,870	22,756	22,349	29,522	34,867	34,497	30,790	32,990	25,499	15,645	14,380
16	20,863	20,870	22,776	22,232	29,756	34,818	34,941	30,583	32,828	25,172	15,325	14,445
17	20,844	20,867	22,831	22,077	30,296	34,778	35,016	30,382	32,686	24,834	15,181	14,483
18	20,791	20,859	22,835	21,984	30,661	34,719	34,941	30,186	32,543	24,572	15,034	14,505
19	20,757	20,844	22,839	21,888	31,007	34,695	34,867	29,991	32,382	24,227	14,892	14,523
20	20,735	20,885	22,843	21,837	31,420	34,892	34,768	29,851	32,198	23,882	14,753	14,753
21	20,659	20,882	22,843	21,833	31,695	35,249	34,670	29,801	32,019	23,537	14,636	14,996
22	20,566	20,851	22,862	21,868	31,963	35,135	34,547	29,643	31,808	23,190	14,517	15,104
23	20,611	20,851	22,843	21,853	33,235	35,110	34,424	29,428	31,587	22,850	14,386	15,178
24	20,596	20,923	22,831	21,845	33,925	35,125	34,316	29,160	31,383	22,517	14,249	15,229
25	20,574	21,332	22,831	22,004	34,453	35,115	34,243	28,888	31,183	22,190	14,117	15,293
26	20,495	21,527	22,815	22,576	34,818	35,100	34,111	28,645	30,975	21,845	13,985	15,338
27	20,398	21,627	22,792	22,784	35,016	35,085	33,974	28,433	30,758	21,523	13,835	15,377
28	20,413	21,569	22,776	22,878	35,065	35,011	33,819	28,738	30,542	21,188	13,686	15,405
29	20,506	21,542	- -	22,945	35,060	34,981	33,654	32,259	30,323	20,867	13,550	15,422
30	20,563	21,653	- -	23,004	35,016	34,976	33,475	33,024	30,118	20,514	13,412	15,431
31	20,514	21,857	- -	23,024	- -	34,961	- -	33,312	29,882	- -	13,271	- -
Change	+527	+1,343	+919	+248	+11,992	-55	-1,486	-163	-3,430	-9,368	-7,243	+2,160
Equiv. mgd	+17.0	+43.3	+32.8	+8.00	+399.7	-1.77	-49.5	-5.26	-110.6	-312.3	-233.6	+72.0
Equiv. cfs	+26.3	+67	+50.7	+12.4	+618	-2.74	-76.6	-8.14	-171	-483	-361	+111

Change for year -4,556 million gallons Equiv. for year -12.5 mgd Equiv. for year -19.3 cfs

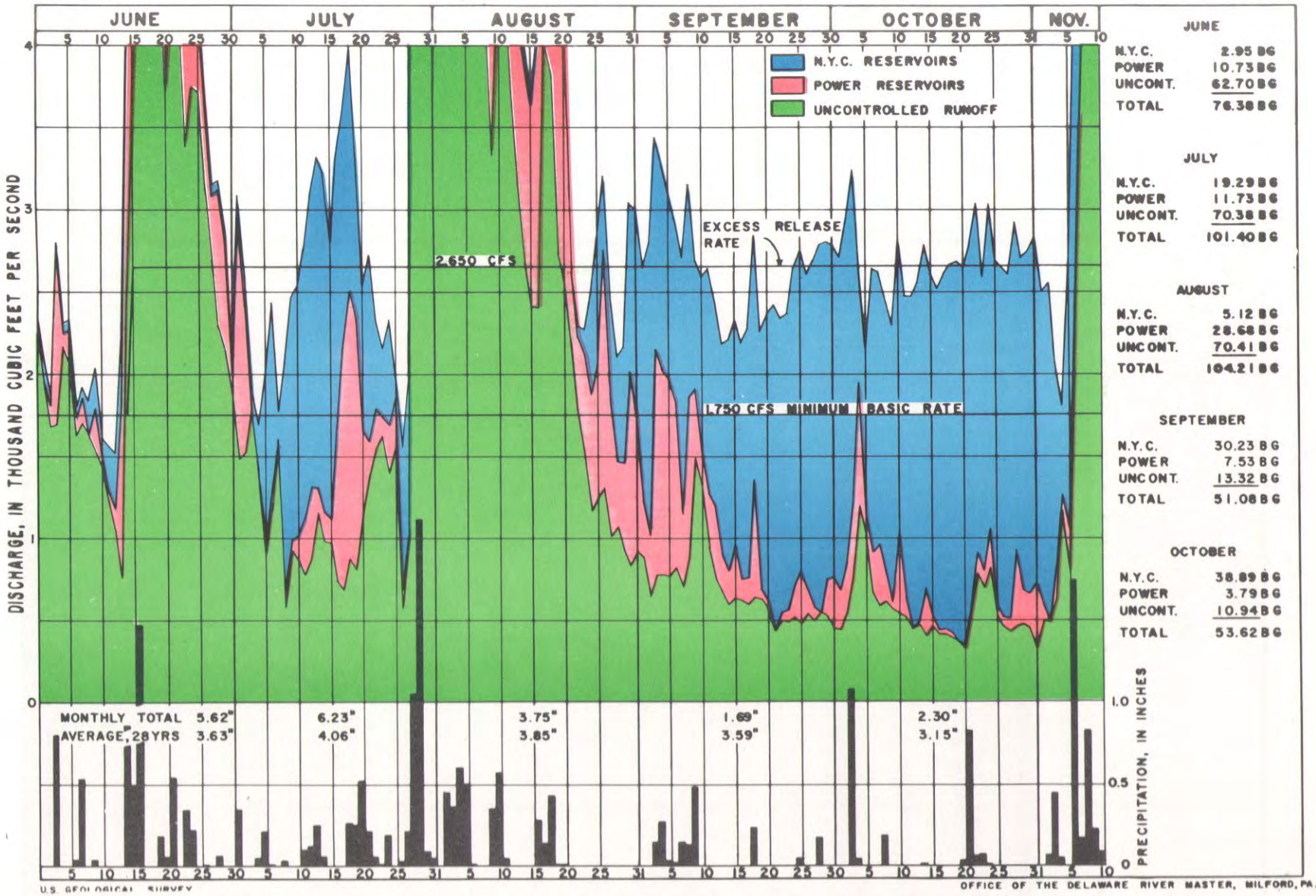
Table 14 - NEW YORK CITY CONSUMPTION OF WATER - 1914 to 1968

Year	Consumption in City proper		Required to be furnished to outside communities	Total	Annual billion
	Mgd	Gallons per capita per day	mgd	mgd	gallons
1914	544.4	106	----	544.4	198.706
1915	528.2	101	----	528.2	192.793
16	566.2	107	----	566.2	207.229
17	584.6	108	1.0 ±	585.6	213.744
18	659.2	120	3.0 ±	662.2	241.703
19	660.2	118	0.6 ±	660.8	241.192
1920	734.9	129	0.4	735.3	269.120
21	731.3	126	0.7	732.0	267.180
22	742.5	125	0.6	743.1	271.232
23	761.6	126	4.1	765.7	279.480
24	780.2	126	4.0	784.2	287.017
1925	839.6	133	6.7	846.3	308.900
26	863.3	134	9.0	872.3	318.390
27	868.1	132	8.0	876.1	319.776
28	877.8	131	10.7	888.5	325.191
29	943.7	138	19.0	962.7	351.386
1930	985.3	142	21.5	1,006.8	367.482
31	940.6	135	20.6	961.2	350.838
32	935.7	133	21.6	957.3	350.372
33	938.5	132	16.8	955.3	348.684
34	960.7	134	17.0	977.7	356.860
1935	950.1	132	19.5	969.6	353.904
36	972.5	134	19.5	992.0	363.072
37	975.3	133	17.4	992.7	362.336
38	980.3	133	17.9	998.2	364.343
39	1,002.1	135	22.9	1,025.0	374.125
1940	922.7	124	21.6	944.3	345.614
41	964.2	130	24.8	989.0	360.985
42	906.7	124	21.5	928.2	338.793
43	942.7	133	21.5	964.2	351.933
44	1,004.9	144	26.5	1,031.4	377.492
1945	1,056.2	146	22.0	1,078.2	393.543
46	1,117.1	146	24.1	1,141.2	416.538
47	1,159.0	149	30.4	1,189.4	434.131
48	1,172.3	150	31.5	1,203.8	440.591
49	1,166.9	149	36.2	1,203.1	439.132
1950	953.3	121	29.1	982.4	358.576
51	1,041.9	131	28.1	1,070.0	390.550
52	1,087.0	136	32.7	1,119.7	409.810
53	1,093.9	135	44.6	1,138.5	415.552
54	1,063.4	131	46.3	1,109.7	405.040
1955	1,109.9	136	45.3	1,155.2	421.648
56	1,111.3	136.2	48.9	1,160.2	424.633
57	1,169.0	143	57.2	1,226.2	447.563
58	1,152.9	140.8	49.6	1,202.5	438.912
59	1,204.3	146.8	60.3	1,264.6	461.579
1960	1,199.4	153.9	58.9	1,258.3	460.529
61	1,221.0	156.0	64.0	1,285.0	469.022
62	1,207.6	153.5	68.8	1,276.4	465.896
63	1,218.0	154.1	76.7	1,294.7	472.582
64	1,189.2	149.8	79.4	1,268.6	464.295
1965	1,052.1	131.9	71.2	1,123.3	409.995
66	1,044.9	130.4	73.2	1,118.1	408.128
67	1,135.3	141.0	71.0	1,206.3	440.302
68	1,242.0	153.6	78.2	1,320.2	483.175
69	1,328.7	163.5	80.1	1,408.8	514.229

The estimated continuous safe yield of all New York City's sources of supply obtainable without pumping is 1,665 mgd.

Data furnished by
New York City
Department of Water Resources
Bureau of Water Supply

PLATE I.—COMPONENTS OF FLOW, DELAWARE RIVER AT MONTAGUE, N.J. 1969



JUNE	
N.Y.C.	2.95 BG
POWER	10.73 BG
UNCONT.	62.70 BG
TOTAL	76.38 BG

JULY	
N.Y.C.	19.29 BG
POWER	11.73 BG
UNCONT.	70.38 BG
TOTAL	101.40 BG

AUGUST	
N.Y.C.	5.12 BG
POWER	28.68 BG
UNCONT.	70.41 BG
TOTAL	104.21 BG

SEPTEMBER	
N.Y.C.	30.23 BG
POWER	7.53 BG
UNCONT.	13.32 BG
TOTAL	51.08 BG

OCTOBER	
N.Y.C.	38.89 BG
POWER	3.79 BG
UNCONT.	10.94 BG
TOTAL	53.62 BG

U.S. GEOLOGICAL SURVEY

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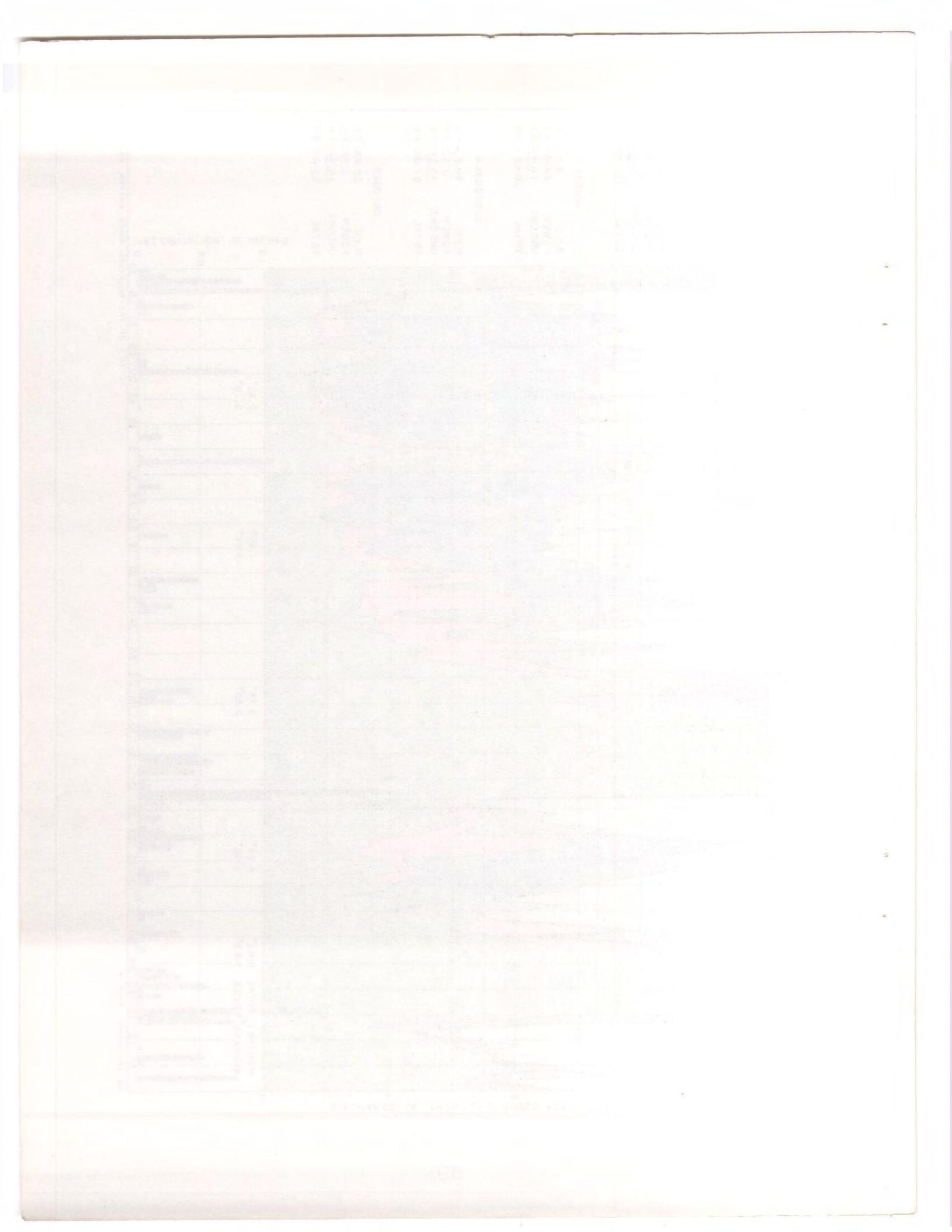
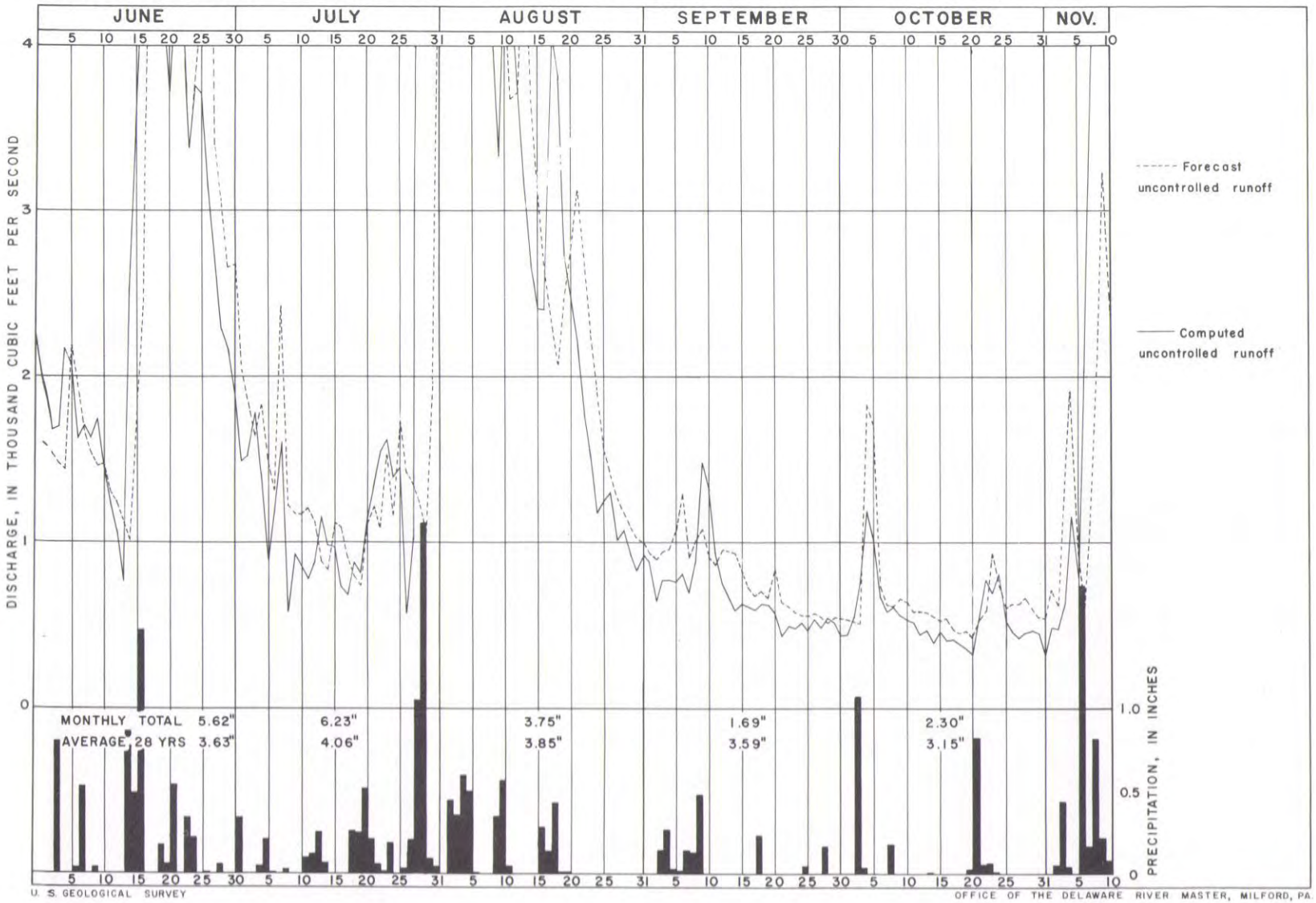


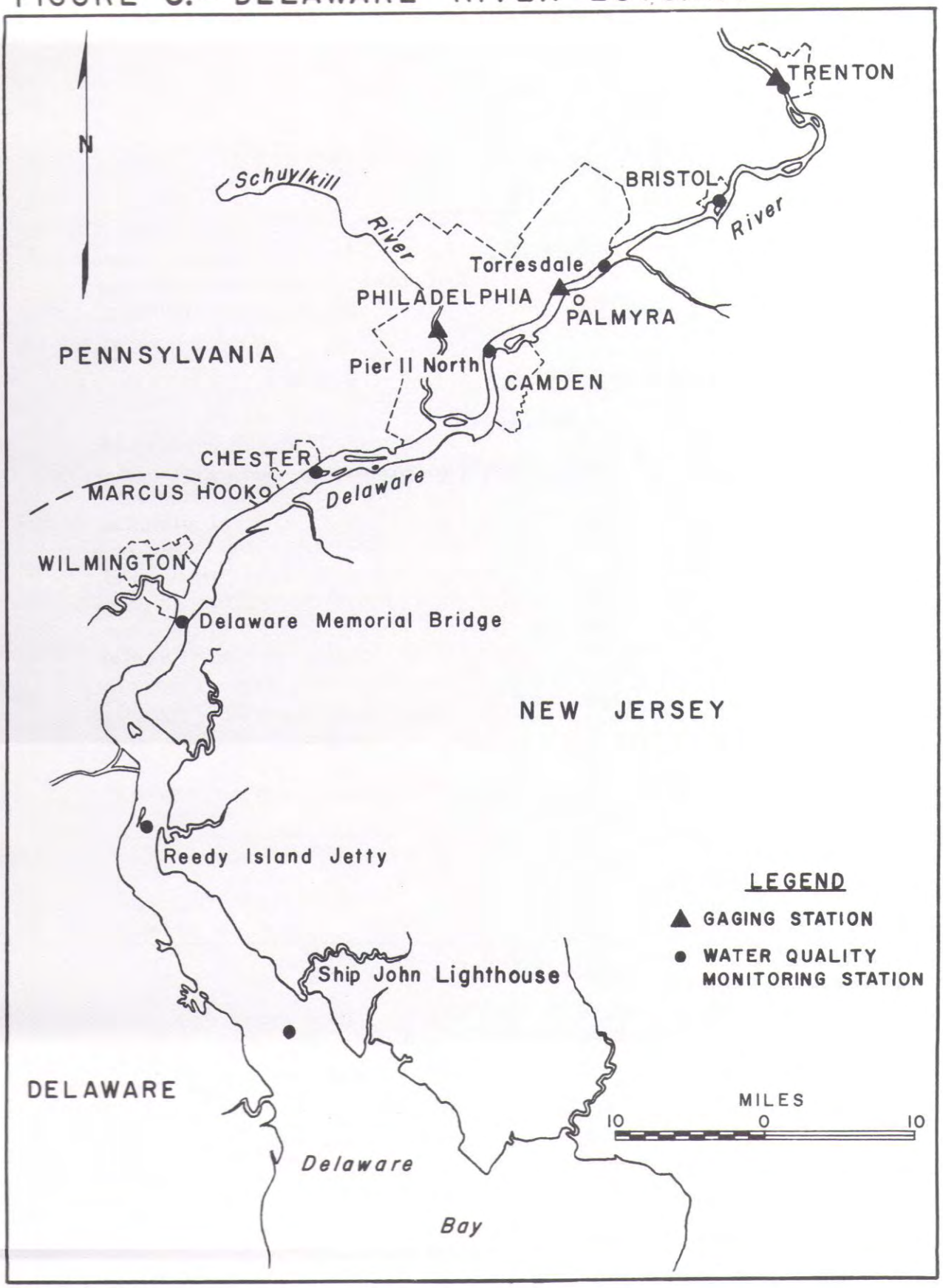
FIGURE 2.— UNCONTROLLED COMPONENT, DELAWARE RIVER AT MONTAGUE, N.J. 1969



Section III

WATER QUALITY OF THE DELAWARE RIVER ESTUARY

FIGURE 3.— DELAWARE RIVER ESTUARY



Section III

WATER QUALITY OF THE DELAWARE RIVER ESTUARY

Introduction

This section describes several parameters of water quality that are being recorded continuously by electronic monitoring instruments located at selected sites along the Delaware River estuary from Trenton, N. J., to Ship John Lighthouse, N. J.

Water-Quality Monitoring

The system of monitoring instruments established in the estuary is maintained by personnel of the U. S. Geological Survey which is contributing to a cooperative program of water-quality investigations supported by funds from the Federal Government, the City of Philadelphia Water Department, the Delaware Geological Survey, the Delaware River Basin Commission, and other agencies of federal, state, and local governments. The water-quality data obtained from the instruments include specific conductance, pH, dissolved oxygen, and temperature. These water-quality parameters are considered most useful for evaluating river water for municipal and industrial use. Figure 3 shows the areas of the estuary where water quality is recorded by monitoring instruments.

The quality parameters recorded by the instruments at each location are:

Mile point from Capes May and Henlopen	Station name	Specific conductance	pH	Dissolved oxygen	Temperature
134.5	Trenton, N. J.	X	X	X	X
119.2	Bristol, Pa.	X	X	X	X
110.0	Torresdale, Philadelphia, Pa.	X	X	X	X
100.1	Pier 11 North, Philadelphia, Pa.	X	X	X	
82.3	Chester, Pa.	X	X	X	X
68.7	Delaware Memorial Bridge, Del.	X	X	X	X
53.9	Reedy Island Jetty Del.	X			
36.8	Ship John Lighthouse, N. J.	X			

The changing chemical quality of water in the Delaware estuary is attributable in varying significance to the river's maritime use, the change of tide, the influence of seasonal inflow of fresh water, and municipal and industrial usage. For the past 20 years the chemical composition of Delaware River water has been documented by the U. S. Geological Survey during monthly studies that were made by boat at eight selected mile points along the river from Bristol to Marcus Hook, Pa. At these locations, and at others intermittently, chemical analysis were made on bottom and surface samples from cross-sectional points of the river. These data have been published annually in U. S. Geological Survey Water-Supply Papers. The measuring of water quality by instrument began in 1955 and expanded early in 1960. The data obtained by this method are now computer processed in the Survey's Atlantic Coast Region's Current Records Center in Philadelphia, then stored, and regularly disseminated to program cooperators.

Significance of Parameter Studies

Specific Conductance

The materials that dissolve in surface water and their varying degrees of concentration identify water by chemical type and help to demonstrate the general usefulness of streams as a source of supply for domestic and industrial use. Most water solutes are composed of dissociated ions of soluble salts which will impart to water the ability to transmit an electric current. This characteristic of water is its specific conductance, the measurement of which is used to estimate the total dissolved-solids content of water. As dissolved solids increase in concentration, specific conductance increases proportionately. Values of conductance are reported usually in micromhos (1 millionth of mho) because most natural waters have dissociated ions in concentrations that give readings less than 1 mho. Also because conductance is influenced by temperature, a standard reference temperature of 25° degrees C (Celsius) is normally specified in reported values.

At the monitored stations in the Delaware River estuary specific conductance is used as an index of the concentration of salinity in the estuary and is utilized to estimate the intrusion and diffusion of oceanic salts. At the mouth of Delaware Bay salinity is at its maximum and decreases upstream to a fresh-water minimum, usually above the Philadelphia-Camden area. In the fresh-water area specific conductance variations may indicate that the dissolved solids in water are resulting from man's use of the river.

Fresh water from upstream sources has a seasonal influence on the quality of water in the Delaware River estuary by the effects of dilution and flushing of estuary salts downstream. During the summer and fall fresh-water inflows are commonly at their lowest, and consequently the dissolved solids in fresh water are more concentrated, and the ocean salts in the estuary move farther upstream. During the winter and spring runoff, the opposite occurs when fresh water dilutes dissolved solids and simultaneously flushes estuary salts downstream. During the report year the effects of fresh-water inflow at Trenton on the concentration of salts at several estuary stations as far downstream as Reedy Island Jetty are shown in Figure 4. Daily mean river levels at Chester for the period December 1, 1968 to November 30, 1969 are shown in Figure 5. In addition, daily chloride concentrations at Chester, Delaware Memorial Bridge and Reedy Island Jetty are presented in Tables 15, 16, 17.

Hydrogen Ion Concentration (pH)

The pH is the measure of the activity of hydrogen ions in water and indicates acidity, alkalinity, and corrosive properties of water. A pH of 7.0 indicates that water (at 25°C) is neither acid nor alkaline. Lower values denote increasing acidity; higher values denote increasing alkalinity. Water that is either excessively acidic or alkaline will attack metals and ordinary concrete, and either may indicate the presence of pollutants. A lowered pH may indicate an increase of carbon dioxide in water, usually resulting from the decomposition of organic matter. The pH of most natural waters varies between 6.0 and 8.5. Although pH is not published in this report, data for the Delaware estuary recorded at monitored stations are available for inspection at the Current Records Center.

Dissolved Oxygen and Temperature

Dissolved oxygen in water is essential to the respiration of nearly all living organisms in water and to the natural processes of stream purification when organic pollutants decompose. Thus, natural and man-made pollutants tend to consume oxygen. It is replenished to streams from the atmosphere and by photosynthesis. The ability of water to hold oxygen at equilibrium with a normal atmosphere is a function of temperature and the salinity of water. Oxygen is more soluble in cold water than in warm water and is used up by living organisms more rapidly in warm water; it is also slightly less soluble in ocean water than in fresh

water. Daily dissolved oxygen concentrations at three estuary stations and water temperature at one station are plotted in Figure 5.

Temperature affects the usefulness of water for many purposes and for this reason observed changes in temperature along waterways of supply have become increasingly significant. As much as 90 percent of the water withdrawn from the Delaware River is used as a coolant and that which is returned to the river as heated discharge commonly reduces the capacity of water to retain dissolved oxygen.

Discharge and Estuarine Quality During 1969

During December 1968 streamflow conditions were about normal, but through January and the first half of February low air temperatures and below normal precipitation caused low flow in streams. During the first half of February the mean discharge of the Delaware River at Trenton was 7,860 cfs. This was about 70 percent of normal. In early March streamflows reached record lows, and estuarine salinity established record highs for this time of year.

Although heavy rains on June 14 and 15 improved river flows temporarily, the little rain at the beginning of the year's second half caused below normal flow in streams of the Delaware River basin. However, on July 27 conditions changed dramatically when heavy thunderstorms began and continued intermittently through August 2, causing high water and flood damage on small tributaries in the Pocono and Catskill Mountains. For the first 15 days of August the average daily discharge of the Delaware River at Trenton was 24,600 cfs. This was 595 percent of the normal.

During the year's last quarter, precipitation was below normal, but flow in the Delaware was generally maintained above normal by regulated releases from reservoirs.

Temperature

At Torresdale the temperature of Delaware River water during December 1968 ranged from a high of 9° C during the early part of the month to a low of 1° C during the last part of the month. These measurements were about 2° C higher than the maximum for December 1967 and 2° C lower than the minimum that occurred for the same period. During January 1969 estuarine temperatures were near freezing, but by the end of the month they rose to near 4° C. In February average temperatures were 1° C above the normal of 3° C.

Water temperatures rose seasonally during March, April and May and reached 20° C at most stations by May 15. They continued to rise to an average 26° C in the reach of the river from Bristol to the Delaware

Memorial Bridge during July and August. From September through November they declined seasonally to an average 18° C in October and 11° C in November.

Dissolved Oxygen

Dissolved oxygen levels in the Delaware River during December 1968 increased to 13.4 mg/l (milligrams per liter). Through January and February dissolved oxygen content of the estuary remained seasonably high, exceeding 10 mg/l upstream from Philadelphia and 8 mg/l south of Philadelphia to Wilmington. During March, April and May dissolved oxygen content in the estuary declined. A record low for March was recorded, and the average concentration at Pier 11 North was 6.8 mg/l--1.1 mg/l lower than the previous low average for March (7.9 mg/l). By mid-May dissolved oxygen ranged from 7 to 10 mg/l in the Bristol-Torresdale area and from 0.0 to 3.0 mg/l in the area of Pier 11 North to Chester.

The dissolved oxygen content in the estuary continued its seasonal decline to typical summer levels, but during August it generally exceeded 3 mg/l at Bristol and Torresdale and ranged from 0.0 to 6.0 mg/l at Pier 11 North. At Chester the average for the month was 1.4 mg/l. During September at Pier 11 North the range was from 0.0 to 0.9 mg/l, which was about the same as that recorded during the previous September. At Delaware Memorial Bridge the dissolved oxygen averaged 4.2 mg/l during September and increased to 5.1 mg/l for October.

Salinity

At the beginning of the report year the 250 mg/l isochlor was retreating and by December 15 the isochlor was located near Wilmington. That location was about 7 miles downstream from its position on November 15 and 10 miles above its position of a year earlier. Daily maximum chlorides at Chester rose from 30 mg/l on January 12 to 127 mg/l on January 22. From February 15 to 28 the daily maximum chloride at Chester rose from 40 to 234 mg/l. Estuarine salinity reached a high of 670 mg/l on March 3 and established a record high for the month. The average concentration of chloride at high-water slack for March at Chester was 243 mg/l, as compared to the March average of 23 mg/l for the preceding 8 years. However, higher inflows during late March and during April and May reduced substantially the estuarine salinity by dilution. On May 12 the estimated location of the 250 mg/l isochlor was about 3 miles downstream from the Delaware Memorial Bridge.

Salinity in the estuary for September and October was much less than a year earlier, but the 250 mg/l isochlor advanced to Mile Point 83 near Chester by October 31. By November 20 the isochlor receded to Mile Point 72 near the Delaware Memorial Bridge.

TABLE 15

CHLORIDE CONCENTRATIONS, DELAWARE RIVER AT CHESTER, PA.

(Daily maximum and minimum chloride concentrations in milligrams per liter)

December 1, 1968 to November 30, 1969

Day	December		January		February		March		April		May		June		July		August		September		October		November	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1	*	*	*	*	48	42	304	52	*	*	*	*	31	*	*	*	*	*	*	*	95	45	262	115
2	*	*	*	*	48	43	577	61	*	*	*	*	33	*	*	*	*	*	33	*	102	47	366	112
3	*	*	*	*	45	42	670	97	*	*	*	*	31	*	*	*	34	*	38	31	77	46	271	122
4	*	*	*	*	42	40	507	97	*	*	*	*	31	*	*	*	*	..	37	33	81	45	231	98
5	*	*	*	*	41	38	434	94	*	*	*	*	33	*	*	*	*	*	33	*	107	46	197	92
6	*	*	*	*	41	38	332	81	*	*	*	*	33	*	*	*	*	*	*	*	91	45	155	85
7	*	*	33	*	41	38	239	77	*	*	*	*	32	31	30	*	*	*	30	*	85	46	202	87
8	*	*	37	*	42	37	366	78	*	*	*	*	32	31	*	*	*	*	30	30	88	47	219	81
9	*	*	37	*	60	37	288	74	*	*	*	*	32	31	30	*	*	*			61	47	181	80
10	*	*	33	*	50	35	327	78	*	*	*	*	36	31	31	*	*	*			84	48	256	78
11	*	*	31	*	49	36	217	80	*	*	*	*	36	31	31	*	*	*			92	49	165	59
12	*	*	30	*	48	38	127	55	*	*	*	*	37	31	33	*	*	*			127	52	128	54
13	*	*	37	*	47	37	245	61	*	*	*	*	36	33	31	*	*	*			128	53	95	59
14	*	*	85	33	41	37	360	87	*	*	*	*	38	33	32	30	*	*			158	55	91	49
15	*	*	51	38	40	37	245	84	*	*	*	*	38	33	33	30	*	*			159	53	75	46
16	*	*	43	36	48	35	291	78	*	*	*	*	36	33	38	31	*	*	36	33	211	59	53	42
17	*	*	45	37	52	37	239	61	*	*	*	*	36	32	37	31	*	*	36	34	154	59	74	42
18	*	*	46	37	129	38	212	61	*	*	*	*	42	33	35	31	*	*	37	34	144	55	54	44
19	*	*	51	39	114	40	251	77	*	*	*	*	35	31	35	32	*	*	43	34	118	55	56	51
20	*	*	59	39	105	45	318	81	*	*	31	*	36	31	37	31	*	*	41	34	148	59	51	48
21	*	*	105	42	178	46	304	78	*	*	*	*	34	30	37	31	*	*	44	35	131	59	52	37
22	*	*	127	42	118	45	187	57	*	*	*	*	32	30	38	34	*	*	43	35	242	58	52	36
23	*	*	117	44	85	44	122	53	*	*	*	*	33	*	34	33	*	*	43	37	149	56	50	35
24	*	*	92	44	102	45	95	48	*	*	*	*	33	*	38	31	*	*	53	38	208	59	39	34
25	*	*	85	42	112	48	87	37	*	*	30	*	30	*	38	33	*	*	52	48	179	75	39	34
26	*	*	53	42	59	45	47	32	*	*	30	*	*	*	39	33	*	*	60	40	215	80	38	32
27	*	*	48	41	91	46	38	31	*	*	30	*	*	*	39	35	*	*	75	41	285	87	37	31
28	*	*	48	41	234	48	33	*	*	*	30	*	30	*	37	*	*	*	74	42	254	92	35	31
29	*	*	48	41			*	*	*	*	30	*	*	*	31	*	*	*	74	42	279	94	35	31
30	*	*	52	42			*	*	*	*	30	*	*	*	*	*	*	*	101	45	274	107	34	30
31	*	*	53	44			*	*			31	*			*	*	*	*			276	108		

* Less than 30 mg/l; blank space denotes missing data

TABLE 16

CHLORIDE CONCENTRATIONS, DELAWARE RIVER AT DELAWARE MEMORIAL BRIDGE, DELAWARE

(Daily maximum and minimum chloride concentrations in milligrams per liter)

December 1, 1968 to November 30, 1969

Day	December		January		February		March		April		May		June		July		August		September		October		November	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1	383	52	188	31					222	*					777	45					1,600	405	2,200	929
2	479	42	332	35					245	*					664	55					1,360	484	2,800	923
3	315	35	524	38					222	*					912	91					1,000	552	2,320	991
4	653	52	794	45					428	*					811	97					1,220	405	2,100	800
5	366	*	704	38					631	*	268	*			845	125					1,810	490	2,010	749
6	52	*	417	35			3,250	1,400	479	*	541	*	676	102	833	108					1,380	411	1,770	636
7	91	*	681	42			3,500	1,290	394	*	445	*	687	59	822	159					1,900	332	2,080	732
8	45	*	344	35			3,390	1,260	177	*	450	*	709	102	861	177					1,590	405	2,220	704
9	55	*	377	55			3,250	1,190	97	*	394	*	760	102	895	148			217	*	1,530	377	2,020	698
10	154	*	205	55			3,360	985	154	*	262	*	670	125	997	182			222	*	1,540	400	2,360	755
11	268	*	205	48			3,080	991	59	*	344	*	867	137	1,120	182			194	*	1,640	479	2,360	341
12			199	48			2,550	721	91	*	188	*	890	159	974	199					1,820	518	2,460	428
13							3,110	805	102	*	171	*	957	91	1,260	199					1,900	535	1,980	355
14							3,200	1,120	85	*	194	*	850	137	1,340	182					2,090	529	1,910	400
15							3,210	923	114	*	239	*	743	154	1,230	194			383	55	1,990	552	1,600	262
16							2,580	923	108	*	228	*	608	74	1,260	182			279	55	2,060	687	1,010	182
17									137	*	251	*	394	42	1,050	171			484	91	1,860	557	1,340	182
18	262	31					3,070	1,310	142	*	211	*			1,170	205			338	59	1,900	546	1,330	239
19	659	31					3,210	1,210	97	*	199	*			1,260	228			496	154	2,010	563	1,680	310
20	918	35					3,220	1,240	85	*	199	*			1,120	222			462	194	1,860	552	1,060	182
21	721	31							85	*	97	*			845	456			366	159	1,900	445	822	148
22	890	42							52	*	91	*							1,010	171	1,990	569	980	131
23	940	45							52	*	137	*							1,480	239	1,460	467	777	97
24	400	*							42	*	125	*							1,290	291	2,200	591	653	80
25	177	*					1,920	912	*	*	108	*							1,220	262			856	80
26	327	*					2,010	52	*	*	125	*	355	45					1,400	315			631	48
27	405	35					304	38	*	38	171	*	310	48					1,370	344			777	74
28	614	42					119	31			228	*	332	48					1,330	344			766	80
29	529	35									310	59	355	45					1,280	338	1,940	777	771	91
30	205	*									467	31	467	52					1,520	450	1,990	794	709	97
31	125	*									664	*									2,130	845		

* Less than 30 mg/l; blank space denotes missing data

TABLE 17

CHLORIDE CONCENTRATIONS, DELAWARE RIVER AT REEDY ISLAND JETTY, DELAWARE

(Daily maximum and minimum chloride concentrations in milligrams per liter)

December 1968 to November 30, 1969

Day	December		January		February		March		April		May		June		July		August		September		October		November	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1	4,270	1,150	3,220	1,010	5,250	2,730	7,590	5,560	3,530	839	3,570	811			3,150	755	217	*	3,220	1,500	4,020	2,270	4,930	3,220
2	3,990	1,190	3,010	417	5,460	2,590	7,770	5,630	3,570	980	3,780	952			2,760	783	131	*	3,390	1,430	4,370	2,270	5,320	3,250
3	3,640	1,220	3,850	755	5,180	2,970	8,290	5,490	2,480	726	3,430	839			3,180	895	74	*	3,150	1,430	4,060	2,340	4,860	3,180
4	4,790	1,680	4,440	1,290	3,530	1,750	7,630	5,040	3,320	783	2,660	726			2,870	923	45	*	3,500	1,290	4,690	2,170	4,830	3,110
5	3,600	726	4,930	1,890	3,320	1,500	7,100	5,070	3,250	811	3,080	755			3,040	1,010	*	*	3,530	1,260	5,350	2,660	4,650	3,080
6	1,400	274	4,970	2,060	4,090	1,470	7,140	4,900	2,900	698	3,080	811			2,760	952	188	*	3,530	1,150	5,110	2,550	4,090	2,900
7	2,130	245	5,210	2,240	4,480	1,850	6,470	4,970	3,390	726	2,940	895			2,660	1,040	670	*	3,710	1,150	5,180	2,480	5,210	3,040
8	2,800	332	3,600	1,500	4,480	1,990	7,210	4,620	2,520	529	2,520	923			3,250	1,290	1,330	*	4,270	980	4,820	2,550	5,140	3,040
9	3,500	529	4,090	1,890	4,410	1,990	6,580	4,620	2,060	557	2,310	783			3,250	1,220	2,030	*	4,480	1,500	4,760	2,410	5,000	3,220
10	3,640	811	4,580	2,200	3,570	1,220	6,790	4,620	2,240	529	1,960	614	3,080	1,040	3,570	1,260	2,060	188	4,090	1,330	4,550	2,480	5,350	3,290
11	4,440	1,710	4,270	1,750	5,460	1,960	6,540	4,340	923	304	2,270	642	3,250	1,040	3,880	1,330	2,590	245	3,920	1,430	4,620	2,550	5,140	3,040
12	4,690	2,170	4,650	1,680	6,540	2,620	6,020	4,020	1,710	274	1,750	529	3,110	1,150	3,570	1,360	2,550	360	4,020	1,570	4,410	2,550	4,970	3,010
13	4,090	2,170	5,670	2,100	5,880	3,080	7,170	4,200	1,470	274	1,990	445	2,970	980	3,640	1,430	2,340	389	4,090	1,500	4,510	2,590	4,900	2,690
14	3,920	1,680	5,840	2,590	4,970	2,340	7,590	4,860	1,190	304	2,200	417	3,040	923	3,810	1,430	2,240	445	4,020	1,570	4,930	2,870	4,160	2,870
15	3,740	1,540	6,650	2,690	6,020	2,550	7,030	4,620	1,220	245	2,240	445	2,590	923	4,020	1,360	1,990	445	4,440	1,610	5,140	2,690	4,020	2,590
16	4,270	1,640	6,370	3,080	6,230	2,970	7,240	4,440	1,540	274	1,780	445	2,590	726	4,020	1,400	2,100	473	3,920	1,710	5,000	2,940	3,180	2,100
17	4,090	1,260	6,300	3,360	5,950	3,290	7,070	4,440	1,750	274	1,570	417	2,620	670	3,740	1,360	1,780	501	3,850	1,610	4,440	2,690	3,570	1,960
18	4,270	980	6,190	3,430	6,400	3,710	6,720	4,300	1,780	245	1,290	360	2,870	642	3,500	1,330	1,780	445	3,920	1,400	4,720	2,620	3,040	2,100
19	4,790	1,290	5,630	3,390	6,370	3,780	6,680	4,300	1,920	217	1,640	332	2,340	614	3,600	1,360	1,680	417	4,340	1,850	4,440	2,520	4,090	2,520
20	4,970	1,470	5,840	3,320	6,540	4,230	7,070	4,270	1,820	245	923	274	2,340	557	3,710	1,500	2,590	445	3,990	1,960	4,620	2,520	3,320	1,960
21	4,230	1,540	5,840	3,530	6,720	4,060	6,540	4,370	2,130	217	1,290	159	2,060	529	3,500	1,570	3,080	670	4,440	2,030	4,270	2,240	3,500	1,710
22	4,970	1,640	5,810	3,710	6,540	3,850	6,120	3,850	1,640	188	1,890	245	2,620	586	3,850	1,540	3,390	642	4,620	2,030	4,650	2,520	4,020	1,640
23	4,580	2,100	5,740	3,570	6,020	3,920	6,160	3,500	1,500	245	1,640	304	2,760	839	3,250	1,850	3,740	670	4,860	2,170	4,020	2,200	3,670	1,430
24	3,040	1,220	5,630	3,640	6,400	3,920	5,910	3,710	1,710	188	1,710	332	2,550	642	4,230	1,960	3,740	811	4,480	2,200	4,720	2,340	3,220	1,360
25	2,240	952	5,490	3,460	6,750	4,090	5,910	3,570	2,870	159	2,060	274	2,760	614	4,130	1,750	3,950	923	4,300	2,170	4,340	2,410	3,740	1,430
26	3,740	726	4,970	3,110	6,720	4,090	5,390	2,620	3,220	131	2,340	304	3,220	670	3,950	1,750	3,780	1,190	4,440	2,200	4,830	2,270	3,040	1,330
27	4,760	1,640	5,180	2,900	8,050	4,580	3,880	1,290	3,880	642	3,220	389	3,010	698	4,090	1,820	3,920	1,400	4,410	2,240	4,610	2,550	3,570	1,330
28	4,790	1,640	5,140	2,760	7,770	5,320	4,060	1,190	3,880	839	2,760	473	2,940	614	3,500	1,610	3,710	1,540	4,200	2,200	4,610	2,620	3,570	1,290
29	3,740	1,470	5,530	2,900			4,270	1,150	3,740	557	3,250	445	2,900	586	2,200	473	3,780	1,540	4,410	2,170	4,900	2,800	3,920	1,640
30	3,710	1,010	5,670	2,900			3,920	726	3,920	755	3,740	614	3,040	670	980	102	3,320	1,470	4,480	2,240	4,930	2,760	3,880	1,640
31	4,720	1,360	5,420	2,900			3,430	755							670	*	3,320	1,430			5,000	3,010		

* Less than 30 mg/l; blank space denotes missing data

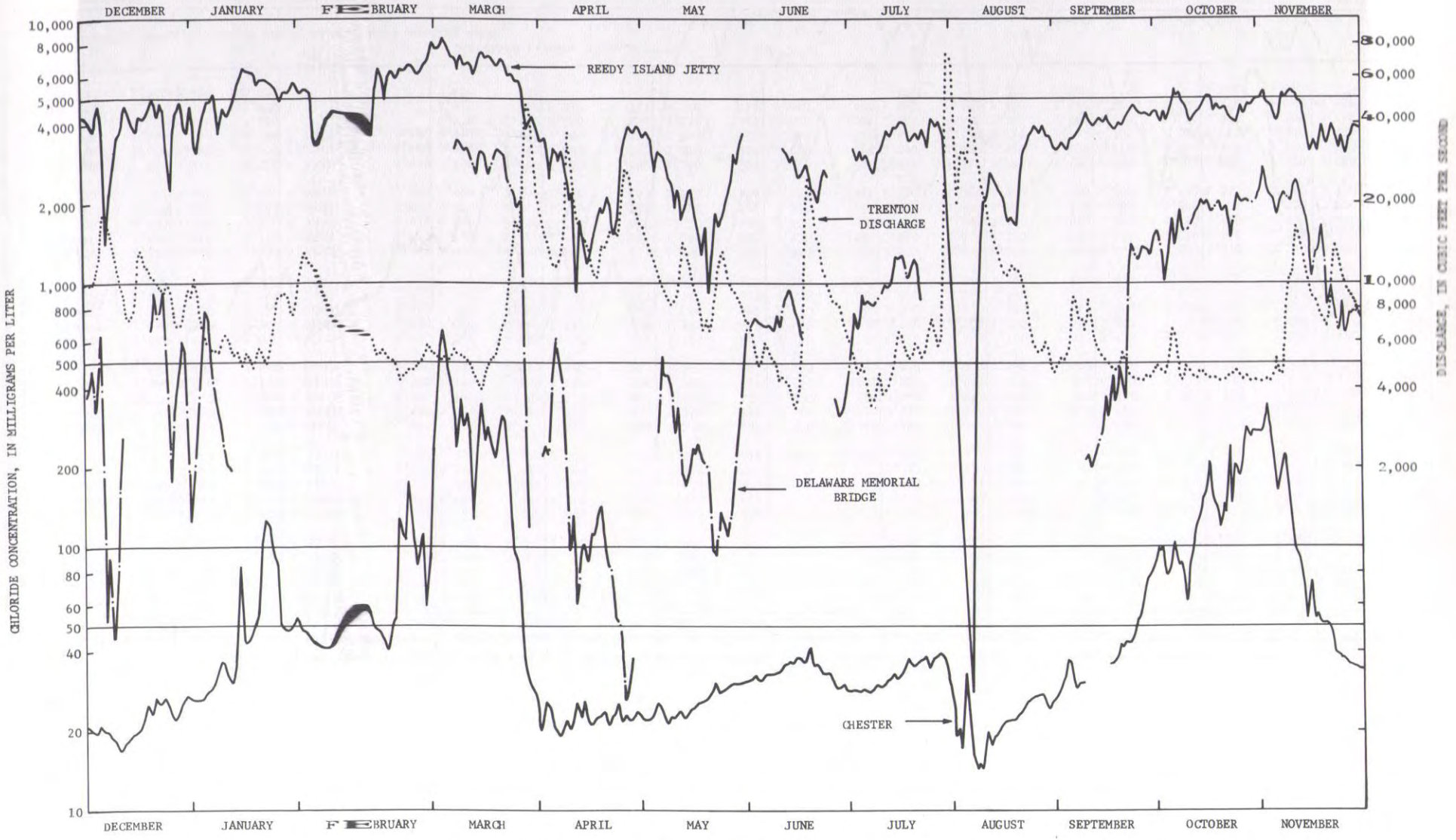


FIGURE 4.--DISCHARGE OF THE DELAWARE RIVER AT TRENTON, WITH DAILY MAXIMUM CHLORIDE CONCENTRATION OF THE DELAWARE RIVER AT CHESTER, PA., DELAWARE MEMORIAL BRIDGE, DEL., AND REEDY ISLAND JETTY, DEL., FOR THE PERIOD DECEMBER 1, 1968 TO NOVEMBER 30, 1969.

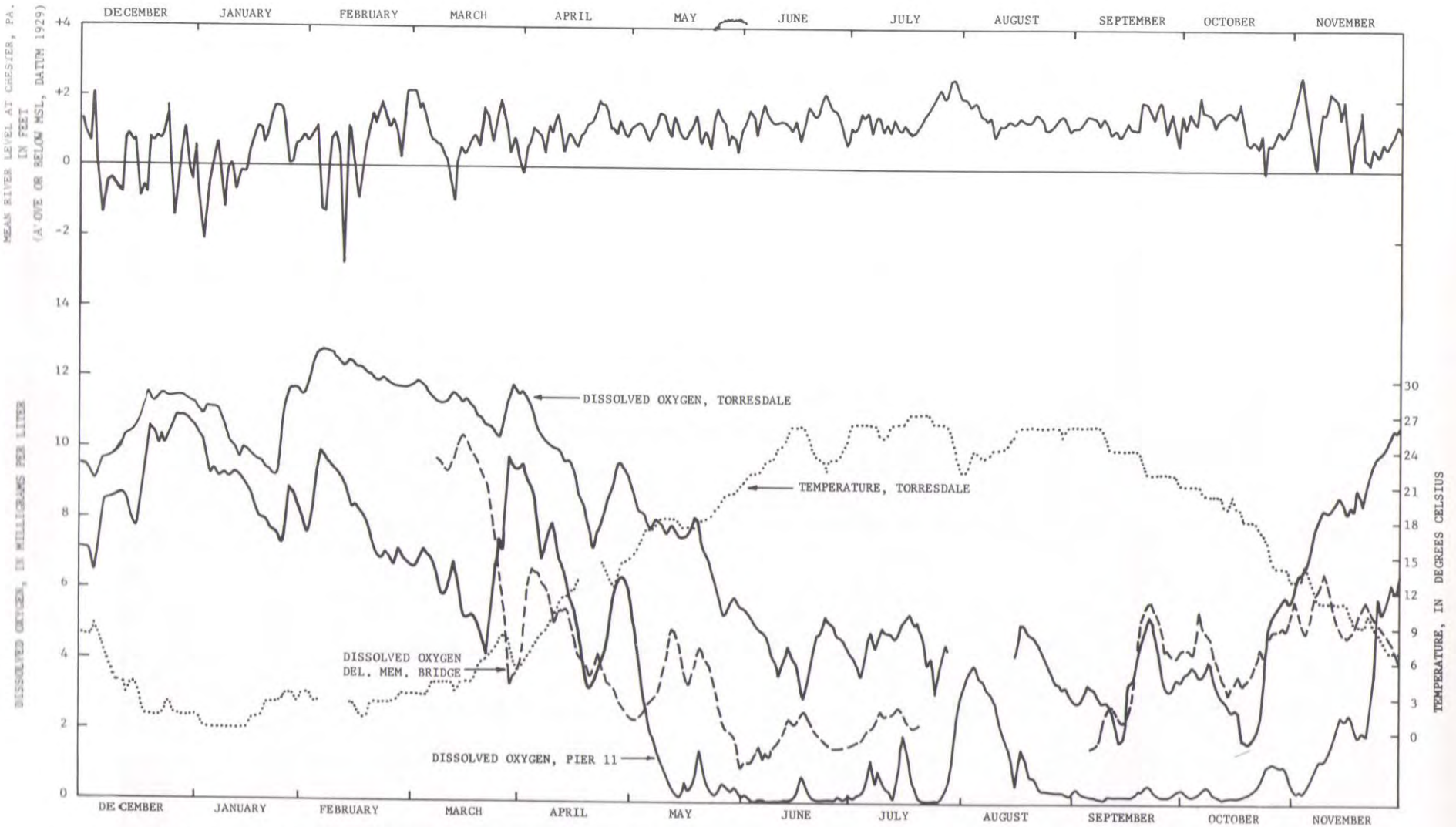


FIGURE 5. - DELAWARE RIVER DAILY MEAN RIVER LEVEL AT CHESTER, PA. DAILY MEAN WATER TEMPERATURE AT TORRESDALE, PHILADELPHIA, PA. AND DAILY MEAN DISSOLVED OXYGEN CONCENTRATIONS AT TORRESDALE AND PIER 11 NORTH, PHILADELPHIA, PA. AND DELAWARE MEMORIAL BRIDGE, DEL. FOR THE PERIOD DECEMBER 1, 1968 TO NOVEMBER 30, 1969.