

STATISTICAL ANALYSES OF FLOOD FREQUENCY, LOW-FLOW
FREQUENCY, AND FLOW DURATION OF STREAMS IN THE
PHILADELPHIA AREA, PENNSYLVANIA

By Andrew Voytik

U.S. GEOLOGICAL SURVEY

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Harrisburg, Pennsylvania

1986

UNITED STATES DEPARTMENT OF THE INTERIOR

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

<u>Multiply inch-pound unit</u>	<u>By</u>	<u>To obtain metric units</u>
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)
cubic foot per second per square mile (ft ³ /s)/mi ²	0.01093	cubic meter per second per square kilometer (m ³ /s)/km ²
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi ²)	2.590	square kilometer (km ²)

STATISTICAL ANALYSES OF FLOOD FREQUENCY, LOW-FLOW FREQUENCY, AND FLOW
DURATION OF STREAMS IN THE PHILADLEPHIA AREA, PENNSYLVANIA

by Andrew Voytik

ABSTRACT

Flood frequency, low-flow frequency, and flow-duration characteristics were computed for 26 stream-gaging stations in and near Philadelphia. Data were obtained from 21 continuous-recording stations and five stations that were initially continuous-recording stations, but which were subsequently converted to crest-stage stations. The annual peak flows were fitted to the three-parameter log-Pearson Type III distribution to develop the flood-frequency characteristics. The range of the reported annual recurrence intervals for flood-frequency depends on record length. Low-flow frequency characteristics for various numbers of consecutive days were also defined by fitting data to the log-Pearson Type III distribution. Standard analyses of daily discharges produced the duration curve characteristics. Results of these analyses are tabulated.

INTRODUCTION

The purpose of this report is to present updated flood-frequency, low-flow-frequency, and flow-duration characteristics for 26 stream-gaging stations in and near Philadelphia. Record length for the 26 gages ranges from less than 10 years for five gaging stations to 50 years for a long-term station (Schuylkill River at Philadelphia). The characteristics will be used by the City of Philadelphia for storm-water management and design.

Previous reports containing flood-frequency, low-flow frequency and flow-duration characteristics for the Philadelphia area (Busch and Shaw, 1966; Page and Shaw, 1977) did not use data from graphical records collected during the 1971-74 water years.^{1/} These graphical data make the record continuous from the mid-1960's through the 1981 water year for eight stations. The inclusion of flow data for these years into the discharge records improves the data base. The results of analyses of the available daily discharges and annual floods should provide reliable estimates of flow characteristics at these stations as these data are for the dry years of the 1960's as well as the wet years of the 1970's.

This report was compiled by the U.S. Geological Survey, in cooperation with the Philadelphia Water Department.

^{1/}A water year is a period from October 1 to September 30 and is designated by the calendar year of the last 9 months.

CHARACTERISTICS OF GAGING STATIONS

Station number, name, drainage area, type of gage and period of record for the 26 stations are given in table 1. The locations of the stations are given in figure 1.

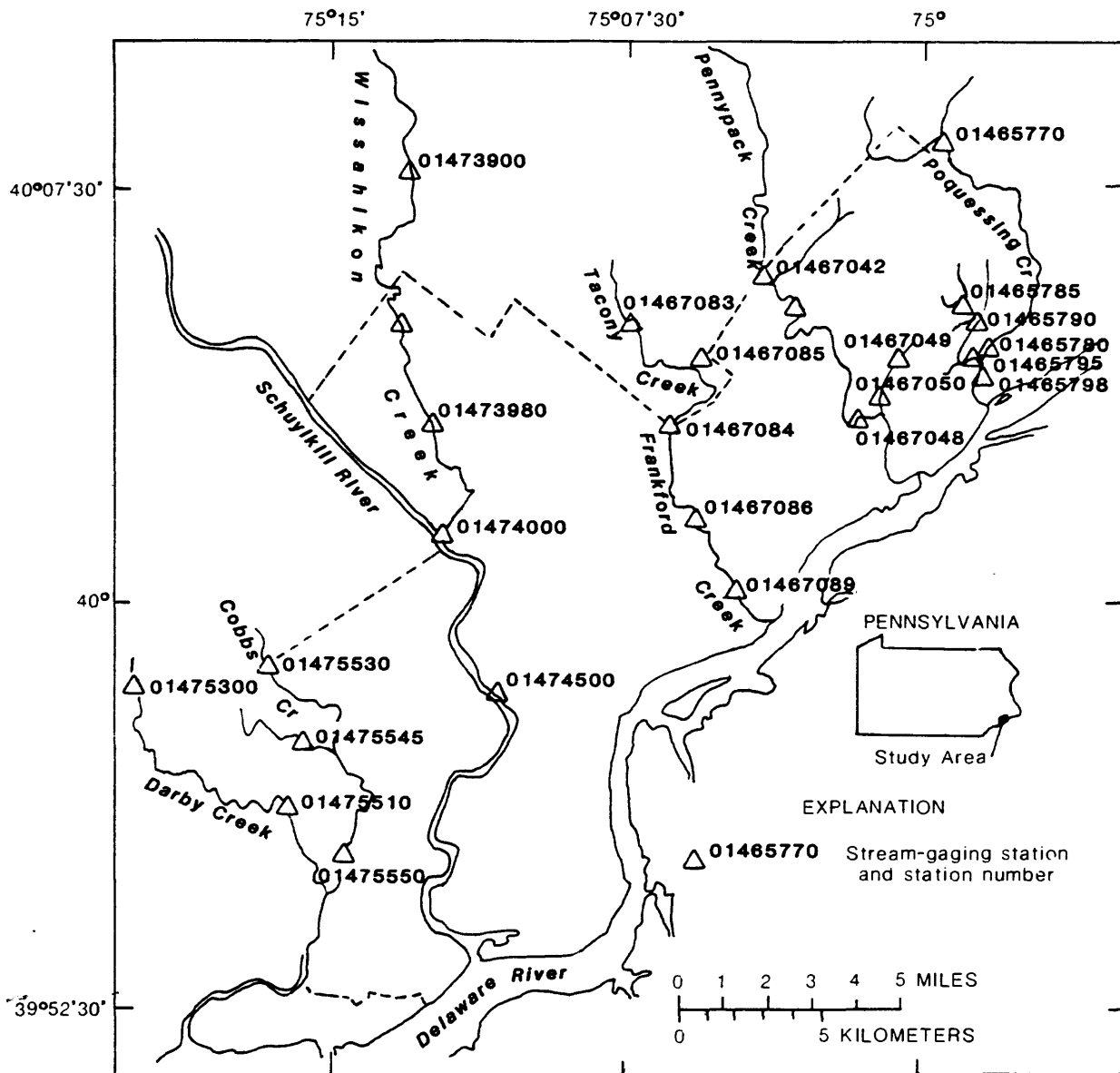


Figure 1.--Location of stream-gaging stations in and near Philadelphia, Pennsylvania.

Table 1.--Gaging stations in and near Philadelphia, PA

Station number	Name	Drainage ² area (mi ²)	Type of Gage ^{1/}	Period of Record
01465770	Poquessing Creek at Trevose Rd., Phila., PA	5.08	REC	1964-81
01465780	Poquessing Creek above Byberry Creek at Phila., PA	13.2	REC CSG	1965-70 1971-80
01465785	Walton Run at Phila., PA	2.17	REC	1964-78
01465790	Byberry Creek at Chalfont Rd., Phila., PA	5.34	REC	1965-78
01465795	Byberry Creek at Grant Ave., Phila., PA	7.13	REC CSG	1964-70 1971-78
01465798	Poquessing Creek at Grant Ave., Phila., PA	21.4	REC	1965-81
01467042	Pennypack Creek at Pine Rd., Phila., PA	37.9	REC	1964-81
01467045	Pennypack Creek below Verree Rd., Phila., PA	42.8	REC CSG	1964-70 1971-81
01467048	Pennypack Creek at Lower Rhawn St. Br., Phila., PA	49.8	REC	1965-81
01467049	Wooden Bridge Run at Grant Ave., Phila., PA	1.06	REC	1973-78
01467050	Wooden Bridge Run at Phila., PA	3.35	REC	1965-81
01467083	Tacony Creek near Jenkintown, PA	5.25	REC	1973-78
01467084	Rock Creek above Curtis Arboretum near Phila., PA	1.15	REC	1971-78
01467085	Jenkintown Creek at Elkins Park, PA	1.17	REC	1973-78
01467086	Tacony Creek at County Line, Phila., PA	16.2	REC	1965-81
01467089	Frankford Creek at Torresdale Ave., Phila., PA	33.8	REC	1965-81
01473900	Wissahickon Creek at Fort Washington, PA	40.8	REC CSG	1961-68 1969-79
01473950	Wissahickon Creek at Bells Mill Rd., Phila., PA	53.6	REC	1965-81
01473980	Wissahickon Creek at Livezey Lane, Phila., PA	59.2	REC CSG	1965-70 1971-79
01474000	Wissahickon Creek at mouth Phila., PA	64.0	REC	1965-81
01474500	Schuylkill River at Phila., PA	1,893	REC	1931-81
01475300	Darby Creek at Waterloo Mills near Devon, PA	5.15	REC	1972-81
01475510	Darby Creek near Darby, PA	37.4	REC	1964-81
01475530	Cobbs Creek at U.S. 1 at Phila., PA	4.78	REC	1964-81
01475545	Naylor Creek at West Chester Pike near Phila., PA	1.10	REC	1972-78
01475550	Cobbs Creek at Darby, PA	22.0	REC	1964-81

^{1/} REC--continuous recorder
CSG--crest-stage gage

FLOOD FREQUENCY

Annual flood peaks for the periods of record shown in table 1 were analyzed; period of record for some stations includes those years when only a crest-stage gage was operated. A computer program (J407 in the U.S. Geological Survey WATSTORE System) was used to retrieve the annual maximum discharges and flood peaks and to compute, for each station, the mean standard deviation, and coefficient of skew. Flood-frequency characteristics were determined for all 26 stations by use of these statistics and the guidelines in U.S. Water Resources Council (WRC) Bulletin 17B (1981). A sample computer-generated statistical summary of the frequency analyses and a listing of annual peak discharges are shown in figures 2 and 3, respectively. The computer-generated flood-frequency curve for the same station is shown in figure 4. Flood-frequency characteristics taken from the computer outputs are listed in table 2 (at back). The range of reported annual recurrence intervals for flood-frequency distributions was arbitrarily limited by record length.

LOW-FLOW FREQUENCY

The procedures used to plot, compute, and present low-flow frequency and flow-duration data were developed by Riggs (1968, 1972) and Searcy (1959). A sample computer-generated summary of annual low-flows for Wissahickon Creek at mouth (Philadelphia) is shown in figure 5.

Summaries of lowest mean flows for 7, 14, 30, 60, 90, 120, and 183 consecutive days in each climatic year (beginning April 1) were extracted from daily flow records by computer. Low-flow frequency curves were defined by fitting these data to the log-Pearson Type III distribution. Graphical fitting was used where the log-Pearson distribution was considered unsuitable.

Results are shown in table 3 (at back). Discharges are reported to recurrence intervals as high as 10 or 20 years depending on the length of record. The long record of Schuylkill River justifies reporting discharges at recurrence intervals as high as 50 years.

Two sets of low-flow data are presented for Cobbs Creek at Darby. Because of streamflow losses or diversions over an undetermined period prior to 1971, the plotted data are from two different populations. Streamflow losses in Cobbs Creek were studied by Miller, and others (U.S. Geological Survey, written commun., 1971). Low-flow data for Cobbs Creek at Darby are tabulated for 1966-70 and 1972-80. Low-flow data for the period 1972-80 are believed to be representative of future flows.

A sample computer-generated log-Pearson fit to low-flow data and the plotted low-flow frequency curve are shown in figures 6 and 7, respectively, for Wissahickon Creek at mouth, Philadelphia.

FLOW DURATION

A flow-duration curve is the distribution of daily discharges, usually for the number of complete years in the period of record. It shows the percentages of time for which daily discharges in the period used exceeded various values. Flow-duration tables, which give points on the curves, were compiled by computer as shown in figure 8. See Searcy (1959) for details.

Flow-duration tables for the 26 stations are given in table 3. The duration curve for Wissahickon Creek at mouth is plotted in figure 9.

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

STATION - 01474000 /USGS WISSAHICKON CREEK AT MOUTH, PHILADELPHIA, PA. 1966-1981 01474000 /USGS

I N P U T D A T A S U M M A R Y

-- YEARS OF RECORD -- HISTORIC PEAKS GENERALIZED SKEW STD. ERROR OF SKEW GAGE BASE DISCHARGE USER-SET OUTLIER CRITERIA
SYSTEMATIC HISTORIC PEAKS 0 0.676 -- WRC WEIGHTED 0.0 0.0 HIGH OUTLIER LOW OUTLIER
16 0 0.676 -- WRC WEIGHTED 0.0 0.0 -- --

***** NOTICE -- PRELIMINARY MACHINE COMPUTATIONS. *****
***** USER RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION. *****

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 2016.9
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HBASE. 7172.3

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE DISCHARGE	FLOOD BASE EXCEEDANCE PROBABILITY	LOGARITHMIC MEAN	LOGARITHMIC STANDARD DEVIATION	LOGARITHMIC SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.5802	0.1209	0.387
W R C ESTIMATE	0.0	1.0000	3.5802	0.1209	0.540

ANNUAL FREQUENCY CURVE ORDINATES -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	W R C ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR W R C ESTIMATES	
				LOWER	UPPER
0.9950	2136.8	2054.4	1991.0	1611.3	2527.3
0.9900	2225.7	2156.3	2092.7	1704.3	2613.6
0.9500	2520.8	2486.0	2439.3	2018.8	2900.9
0.9000	2715.9	2698.5	2649.8	2230.2	3093.6
0.8000	2996.3	2998.0	2955.4	2535.0	3378.0
0.5000	3709.7	3735.8	3709.7	3281.1	4173.6
0.2000	4758.4	4775.0	4855.9	4225.5	5602.0
0.1000	5500.2	5485.6	5736.9	4808.4	6769.1
0.0400	6493.5	6412.2	6967.9	5530.7	8477.2
0.0200	7275.4	7124.5	8075.7	6069.9	9917.6
0.0100	8094.4	7856.6	9488.1	6614.9	11505.4
0.0050	8957.4	8614.5	10968.3	7172.1	13258.8
0.0020	10176.1	9663.7	13963.3	7934.8	15863.7

Figure 2.--Summary of flood frequency analysis - Wissahickon Creek at mouth, Philadelphia.

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

STATION - 01474000 /USGS WISSAHICKON CREEK AT MOUTH, PHILADELPHIA, PA. 1966-1981 01474000 /USGS

***** NOTICE --- PRELIMINARY MACHINE COMPUTATIONS. *****
***** USER RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION. *****

INPUT DATA LISTING EMPIRICAL FREQUENCY CURVES --- WEIBULL PLOTTING POSITIONS

WATER YEAR	DISCHARGE	CODES	WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	W R C ESTIMATE
1966	3000.0		1973	6870.0	0.0588	0.0588
1967	4310.0		1971	5560.0	0.1176	0.1176
1968	3750.0		1979	4890.0	0.1765	0.1765
1969	3690.0		1974	4600.0	0.2353	0.2353
1970	3210.0		1978	4420.0	0.2941	0.2941
1971	5560.0		1967	4310.0	0.3529	0.3529
1972	3140.0		1975	4160.0	0.4118	0.4118
1973	6870.0		1968	3750.0	0.4706	0.4706
1974	4600.0		1969	3690.0	0.5294	0.5294
1975	4160.0		1977	3460.0	0.5882	0.5882
1976	2530.0		1970	3210.0	0.6471	0.6471
1977	3460.0		1972	3140.0	0.7059	0.7059
1978	4420.0		1981	3100.0	0.7647	0.7647
1979	4890.0		1966	3000.0	0.8235	0.8235
1980	2480.0		1976	2530.0	0.8824	0.8824
1981	3100.0		1980	2480.0	0.9412	0.9412

Figure 3.--Annual peak discharges and their Weibull plotting positions - Wissahickon Creek at mouth, Philadelphia.

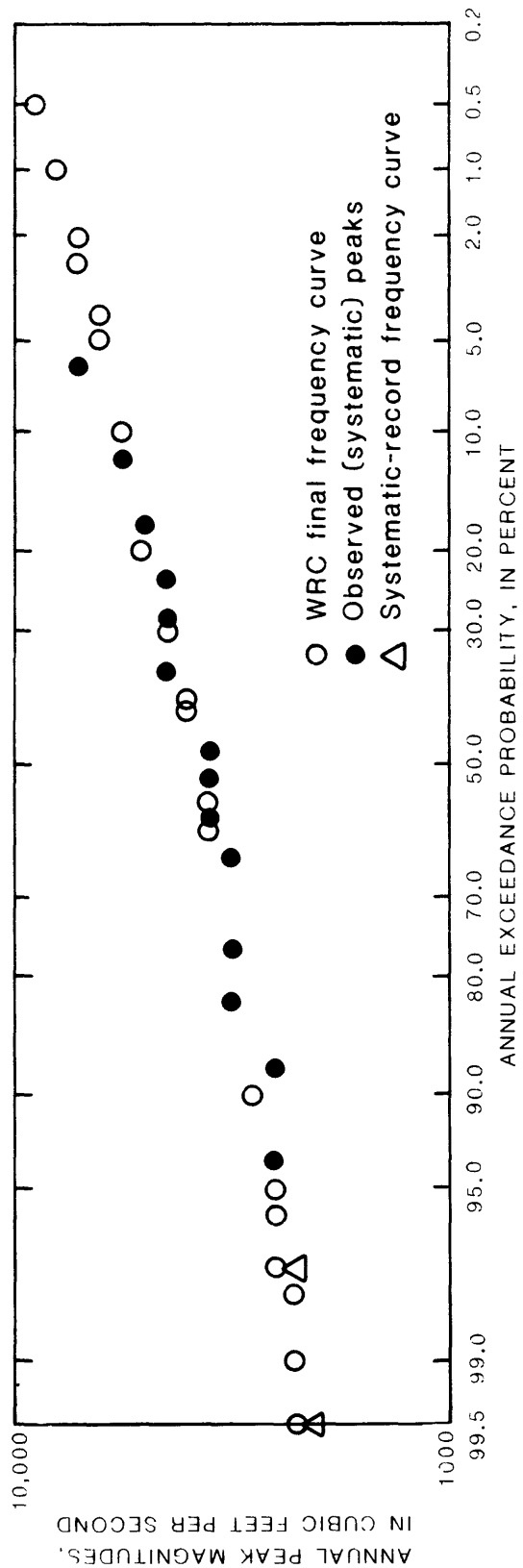


Figure 4.--Peak-flow frequency curve - Wissahickon Creek at mouth, Philadelphia.

Table 2.--Peak discharges at selected recurrence intervals

01465770 POQUESSING CREEK AT TREVOSE ROAD, PHILADELPHIA, PA
 PERIOD: 1965-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	744
5	1,060
10	1,320
25	1,710
50	2,050
100	2,860

01465780 POQUESSING CREEK ABOVE BYBERRY CREEK AT PHILADELPHIA, PA
 PERIOD: 1965-1980

Recurrence interval, in years	Estimated discharge in cubic feet per second
2	1,470
5	2,110
10	2,640
25	3,430
50	4,120
100	4,910

01465785 WALTON RUN AT PHILADELPHIA, PA
 PERIOD: 1965-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	667
5	924
10	1,110
25	1,380
50	1,590
100	1,820

01465790 BYBERRY CREEK AT CHALFONT ROAD, PHILADELPHIA, PA
 PERIOD: 1966-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	812
5	1,160
10	1,420
25	1,790
50	2,110
100	2,450

Table 2.--Peak discharges at selected recurrence intervals--continued

01465795 BYBERRY CREEK AT GRANT AVENUE, PHILADELPHIA, PA
 PERIOD: 1964-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	983
5	1,540
10	2,020
25	2,770
50	3,450
100	4,240

01465798 POQUESSING CREEK AT GRANT AVENUE, PHILADELPHIA, PA
 PERIOD: 1966-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	2,720
5	4,000
10	5,040
25	6,590
50	7,950
100	9,480

01467042 PENNYPACK CREEK AT PINE ROAD, PHILADELPHIA, PA
 PERIOD: 1965-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	2,600
5	3,570
10	4,270
25	5,200
50	5,940
100	6,720

01467045 PENNYPACK CREEK BELOW VEREE ROAD AT PHILADELPHIA, PA
 PERIOD: 1964-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	2,770
5	3,990
10	4,910
25	6,220
50	7,300
100	8,470

Table 2.--Peak discharges at selected recurrence intervals--continued

01467048 PENNYPACK CREEK AT LOWER RHAWN STREET BRIDGE, PHILADELPHIA, PA
 PERIOD: 1966-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	3,480
5	4,820
10	5,760
25	7,010
50	7,980
100	8,990

01467049 WOODEN BRIDGE RUN AT GRANT AVENUE, PHILADELPHIA, PA
 PERIOD: 1974-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	612
5	780
10	892
25	1,040
50	1,150

01467050 WOODEN BRIDGE RUN AT PHILADELPHIA, PA
 PERIOD: 1965-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	880
5	1,310
10	1,660
25	2,150
50	2,570
100	3,030

01467083 TACONY CREEK NEAR JENKINTOWN, PA
 PERIOD: 1974-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	1,350
5	2,210
10	2,920
25	3,990
50	4,920

Table 2.--Peak discharges at selected recurrence intervals--continued

01467084 ROCK CREEK ABOVE CURTIS ARBORETUM NEAR PHILADELPHIA, PA
 PERIOD: 1971-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	552
5	705
10	808
25	941
50	1,040

01467085 JENKINTOWN CREEK AT ELKINS PARK, PA
 PERIOD: 1974-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	243
5	312
10	358
25	418
50	463

01467086 TACONY CREEK AT COUNTY LINE, PHILADELPHIA, PA
 PERIOD: 1966-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	2,430
5	3,410
10	4,080
25	4,960
50	5,630
100	6,310

01467089 FRANKFORD CREEK AT TORRESDALE AVENUE, PHILADELPHIA, PA
 PERIOD: 1966-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	6,650
5	8,470
10	9,670
25	11,200
50	12,300
100	13,400

Table 2.--Peak discharges at selected recurrence intervals--continued

01473900 WISSAHICKON CREEK AT FORT WASHINGTON, PA
 PERIOD: 1962-1979

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	3,080
5	3,770
10	4,240
25	4,840
50	5,300
100	5,760

01473950 WISSAHICKON CREEK AT BELLS MILL ROAD, PHILADELPHIA, PA
 PERIOD: 1966-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	3,180
5	4,400
10	5,300
25	6,540
50	7,550
100	8,620

01473980 WISSAHICKON CREEK AT LIVEZEY LANE, PHILADELPHIA, PA
 PERIOD: 1966-1979

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	3,490
5	4,490
10	5,150
25	6,010
50	6,650
100	7,310

01474000 WISSAHICKON CREEK AT MOUTH, PHILADELPHIA, PA
 PERIOD: 1966-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	3,710
5	4,760
10	5,500
25	6,490
50	7,280
100	8,090

Table 2.--Peak discharges at selected recurrence intervals--continued

01474500 SCHUYLKILL RIVER AT PHILADELPHIA, PA
 PERIOD: 1931-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	41,000
5	62,300
10	78,100
25	99,700
50	117,000
100	136,000

01475300 DARBY CREEK AT WATERLOO MILLS NEAR DEVON, PA
 PERIOD: 1972-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	609
5	1,050
10	1,430
25	2,020
50	2,550
100	3,160

01475510 DARBY CREEK NEAR DARBY, PA
 PERIOD: 1965-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	3,070
5	4,470
10	5,470
25	6,820
50	7,890
100	9,000

01475530 COBBS CREEK AT U.S. HIGHWAY NO. 1 AT PHILADELPHIA, PA
 PERIOD: 1965-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	770
5	1,470
10	2,160
25	3,390
50	4,610
100	6,180

Table 2.--Peak discharges at selected recurrence intervals--continued

01475545 NAYLOR CREEK AT WEST CHESTER PIKE NEAR PHILADELPHIA, PA
 PERIOD: 1972-1978

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	407
5	504
10	571
25	659
50	727

01475550 COBBS CREEK AT DARBY, PA
 PERIOD: 1965-1981

Recurrence interval, in years	Estimated discharge, in cubic feet per second
2	2,640
5	3,770
10	4,600
25	5,740
50	6,660
100	7,650

STATION NUMBER 01474000

LOWEST MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

DISCHARGE-(CFS)

MEAN

WISSAHICKON CREEK AT MOUTH, PHILADELPHIA, PA.

YEAR	1	3	7	14	30	60	90	120	183
1967	9.70 1	11.00 1	12.00 1	14.00 1	18.00 1	22.00 1	23.00 1	32.00 2	46.00 3
1968	26.00 9	29.00 10	31.00 9	31.00 9	37.00 10	40.00 8	44.00 8	61.00 8	69.00 8
1969	15.00 4	16.00 4	16.00 3	17.00 3	21.00 3	24.00 2	26.00 2	30.00 1	33.00 1
1970	15.00 5	18.00 5	18.00 4	23.00 4	27.00 5	30.00 4	35.00 4	40.00 5	63.00 6
1971	19.00 6	21.00 6	22.00 6	23.00 5	26.00 4	39.00 7	42.00 7	41.00 6	55.00 5
1972	24.00 8	27.00 8	29.00 8	30.00 8	34.00 8	43.00 9	50.00 10	63.00 11	110.00 13
1973	30.00 11	31.00 11	34.00 11	35.00 10	35.00 9	44.00 10	48.00 9	62.00 9	88.00 10
1974	33.00 12	34.00 12	34.00 12	35.00 11	41.00 11	58.00 12	61.00 11	62.00 10	103.00 11
1975	27.00 10	29.00 9	33.00 10	35.00 12	43.00 12	53.00 11	61.00 12	76.00 13	74.00 9
1976	35.00 13	36.00 13	41.00 14	43.00 13	64.00 14	84.00 14	94.00 14	108.00 14	115.00 14
1977	14.00 3	14.00 2	15.00 2	16.00 2	20.00 2	26.00 3	29.00 3	34.00 3	35.00 2
1978	13.00 2	16.00 3	21.00 5	23.00 6	30.00 7	37.00 6	39.00 6	39.00 4	48.00 4
1979	23.00 7	24.00 7	24.00 7	24.00 7	28.00 6	32.00 5	37.00 5	51.00 7	64.00 7
1980	38.00 14	38.00 14	39.00 13	45.00 14	51.00 13	64.00 13	69.00 13	75.00 12	106.00 12

Figure 5.--Summary of low-flow data - Wissahickon Creek at mouth, Philadelphia.

Table 3.--Low-flow and flow-duration data

01465770 POQUESSING CREEK AT TREVOSE ROAD, PHILADELPHIA, PA

LOCATION--Lat. 40°07'55", long. 74°59'40", Bucks County, Hydrologic Unit 02040202, on right bank 30 ft (9 m) downstream from Trevose Road Bridge, 1 mi (1.6 km) southwest of Trevose

DRAINAGE AREA--5.08 mi² (13.2 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	1.3	1.4	1.9	2.5	3.2	3.8	5.2
5	.70	.76	1.2	1.7	2.2	2.5	3.4
10	.46	.52	.81	1.4	1.7	2.2	2.7
20	.32	.36	.62	1.2	1.3	1.9	2.2

DURATION OF DAILY FLOW--PERIOD: 1965-80

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
54	25	13	6.2	4.6	3.9	3.2	2.2	1.4	1.0	0.8

01465780 POQUESSING CREEK ABOVE BYBERRY CREEK AT PHILADELPHIA, PA

LOCATION--Lat. 40°04'10", long. 74°58'33", Philadelphia County, Hydrologic Unit 02040202, on left bank 2,200 ft (670 m) upstream from Byberry Creek at Philadelphia

DRAINAGE AREA--13.2 mi² (34.2 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-70

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	1.5	2.3	3.4	4.6	5.2	7.0	10
5	.39	.87	1.7	2.5	2.8	3.7	5.7
10	.17	.46	1.1	1.7	1.9	2.5	3.7

DURATION OF DAILY FLOW--PERIOD: 1965-70

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
100	49	22	11	7.8	6.3	5.3	3.5	2.0	1.4	0.8

Table 3.--Low-flow and flow-duration data--continued

01465785 WALTON RUN AT PHILADELPHIA, PA

LOCATION--Lat. 40°05'22", long. 74°59'37", Philadelphia County, Hydrologic Unit 02040202, on right bank 110 ft (34 m) downstream from bridge on Decatur Road, 1 mi (1.6 km) upstream from mouth, Philadelphia

DRAINAGE AREA--2.17 mi² (5.62 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-78

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	0.46	0.58	0.89	1.4	1.8	2.1	2.5
5	.23	.39	.65	1.0	1.2	1.4	1.8
10	.16	.30	.53	.82	.95	1.1	1.4
20	.11	.24	.43	.70	.80	.91	1.2

DURATION OF DAILY FLOW--PERIOD: 1965-78

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
30	14	6.2	2.0	1.4	1.2	1.0	0.8	0.5	0.4	0.3

01465790 BYBERRY CREEK AT CHALFONT ROAD, PHILADELPHIA, PA

LOCATION--Lat. 40°05'01", long. 74°58'57", Philadelphia County, Hydrologic Unit 02040202, on right bank 200 ft (61 m) downstream from Chalfont Road Bridge, 0.2 mi (0.3 km) downstream from Walton Run, Philadelphia

DRAINAGE AREA--5.34 mi² (13.8 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-78

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	1.5	1.7	2.6	3.6	4.2	5.0	6.4
5	1.2	1.3	1.9	2.6	3.0	3.5	4.5
10	1.0	1.2	1.6	2.1	2.4	2.8	3.3
20	.86	1.0	1.3	1.7	2.0	2.4	2.7

DURATION OF DAILY FLOW--PERIOD: 1966-78

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
67	34	16	5.9	4.3	3.6	3.1	2.4	1.7	1.4	1.1

Table 3.--Low-flow and flow-duration data--continued

01465795 BYBERRY CREEK AT GRANT AVENUE, PHILADELPHIA, PA

LOCATION.--Lat. 40°03'45", long. 74°59'47", Philadelphia County, Hydrologic Unit 02040202, on left bank 120 ft (37 m) upstream from Grant Avenue Bridge, and 1,300 ft (400 m) west of Frankford Avenue, Philadelphia

DRAINAGE AREA--7.13 mi² (18.5 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-70

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	1.5	1.8	2.4	3.3	4.1	4.9	6.3
5	.91	1.1	1.4	1.9	2.5	2.9	3.8
10	.64	.76	1.0	1.4	1.8	2.1	2.8

DURATION OF DAILY FLOW--PERIOD: 1965-70

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
64	28	13	5.9	4.3	3.7	3.2	2.4	1.6	1.3	1.1

01465798 POQUESSING CREEK AT GRANT AVENUE, PHILADELPHIA, PA

LOCATION.--Lat. 40°03'25", long. 74°59'08", Philadelphia County, Hydrologic Unit 02040202, on right bank 600 ft (180 m) upstream from Delaware River Expressway, and 3,000 ft (910 m) upstream from mouth, in northeast Philadelphia

DRAINAGE AREA--21.4 mi² (55.4 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	4.5	5.6	7.0	10	12	17	22
5	2.6	3.1	4.5	7.0	8.4	11	15
10	2.0	2.3	3.5	5.9	6.8	9.3	13
20	1.6	1.8	2.9	5.0	5.5	8.5	11

DURATION OF DAILY FLOW--PERIOD: 1966-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
280	130	61	25	17	14	11	7.7	5.0	3.6	2.6

Table 3.--Low-flow and flow-duration data--continued

01467042 PENNYPACK CREEK AT PINE ROAD, PHILADELPHIA, PA

LOCATION--Lat. 40°05'23", long. 75°04'10", Philadelphia County, Hydrologic Unit 02040202, on right bank 20 ft (6 m) below Pine Road, 300 ft (91 m) upstream from Stream "A" at north city limits of Philadelphia

DRAINAGE AREA--37.9 mi² (98.2 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	18	21	23	28	33	37	48
5	12	14	15	19	22	25	30
10	9.3	11	12	15	17	20	23
20	7.7	8.6	9.0	12	14	17	19

DURATION OF DAILY FLOW--PERIOD: 1965-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
380	200	120	70	53	44	37	26	17	14	11

01467045 PENNYPACK CREEK BELOW VERREE ROAD, PHILADELPHIA, PA

LOCATION--Lat. 40°05'04", long. 75°03'34", Philadelphia County, Hydrologic Unit 02040202, on left bank 600 ft (180 m) downstream from Verree Road, and 1 mi (1.6 km) downstream from Rockledge Branch, Philadelphia

DRAINAGE AREA--42.8 mi² (111 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-70

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	12	13	16	19	22	26	34
5	8.4	9.1	11	13	16	18	23
10	7.1	7.8	9.4	11	14	15	19

DURATION OF DAILY FLOW--PERIOD: 1965-70

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
280	150	92	58	43	35	29	21	14	12	10

Table 3.--Low-flow and flow-duration data--continued

01467048 PENNYPACK CREEK AT LOWER RHAWN STREET BRIDGE, PHILADELPHIA, PA

LOCATION--Lat. 40°03'00", long. 75°01'59", Philadelphia County, Hydrologic Unit 02040202, on left bank at downstream side of footbridge pier, 400 ft (120 m) downstream from Rhawn Street Bridge, 0.8 mi (1.3 km) upstream from Wooden Bridge Run, in Philadelphia

DRAINAGE AREA--49.8 mi² (129 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	22	24	30	38	44	52	66
5	15	16	20	27	30	37	45
10	11	12	16	21	22	30	35
20	8.5	9.0	12	16	17	24	27

DURATION OF DAILY FLOW--PERIOD: 1966-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
550	300	190	95	66	54	44	32	21	17	14

01467049 WOODEN BRIDGE RUN AT GRANT AVENUE, PHILADELPHIA, PA

LOCATION--Lat. 40°04'36", long. 75°01'19", Philadelphia County, Hydrologic Unit 02040202, on left bank 20 ft (6 m) downstream from Grant Avenue Bridge in northeast Philadelphia

DRAINAGE AREA--1.06 mi² (2.75 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1975-78

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	0.17	0.26	0.33	0.66	0.90	1.0	1.2
5	.12	.16	.19	.42	.57	.64	.88
10	.09	.11	.12	.33	.41	.47	.77

DURATION OF DAILY FLOW--PERIOD: 1974-78

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
16	8.9	3.8	0.8	0.5	0.4	0.3	0.3	0.2	0.1	0.1

Table 3.--Low-flow and flow-duration data--continued

01467050 WOODEN BRIDGE RUN AT PHILADELPHIA, PA

LOCATION--Lat. 40°03'19", long. 75°01'22", Philadelphia County, Hydrologic Unit 02040202, on left bank 200 ft (60 m) upstream from Penn Central Railroad bridge, 350 ft (107 m) downstream from Holme Avenue, and 1,500 ft (460 m) upstream from mouth, in Philadelphia

DRAINAGE AREA--3.35 mi² (8.68 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW-- PERIOD: 1967-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	0.74	0.87	1.3	2.1	2.7	3.4	4.3
5	.48	.62	.88	1.6	1.9	2.5	3.4
10	.37	.51	.70	1.3	1.6	2.1	2.9
20	.29	.43	.57	1.1	1.3	1.8	2.6

DURATION OF DAILY FLOW--PERIOD: 1966-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
52	24	11	3.8	2.5	2.1	1.7	1.3	0.8	0.7	0.5

01467083 TACONY CREEK NEAR JENKINTOWN, PA

LOCATION--Lat. 40°05'08", long. 75°08'08", Montgomery County, Hydrologic Unit 02040202, on right bank 700 ft (213 m) downstream from State Highway 73 (Washington Lane) and 0.5 mi (0.8 km) south of Jenkintown Railroad Station

DRAINAGE AREA--5.25 mi² (13.6 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1974-78

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	2.5	3.0	3.4	5.1	5.8	6.0	6.8
5	1.8	2.3	2.6	3.5	4.3	4.5	5.0
10	1.6	2.0	2.3	3.0	3.9	4.1	4.5

DURATION OF DAILY FLOW--PERIOD: 1973-78

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
54	31	18	9.2	7.1	6.2	5.2	3.9	2.8	2.6	2.3

Table 3.--Low-flow and flow-duration data--continued

01467084 ROCK CREEK ABOVE CURTIS ARBORETUM NEAR PHILADELPHIA, PA

LOCATION--Lat. 40°04'54", long. 75°09'03", Montgomery County, Hydrologic Unit 02040203, on right bank 60 ft (18 m) upstream from stone arch bridge, 1,600 ft (488 m) upstream from Washington Lane, Cheltenham Township and about 1.2 mi (1.9 km) upstream from mouth

DRAINAGE AREA--1.15 mi² (2.98 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW-- PERIOD: 1973-78

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	0.54	0.66	0.90	1.3	1.4	1.6	1.9
5	.47	.57	.78	1.0	1.1	1.3	1.6
10	.45	.54	.72	.92	1.0	1.2	1.5

DURATION OF DAILY FLOW--PERIOD: 1972-78

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
17	9.6	4.8	2.0	1.5	1.2	1.0	0.8	0.6	0.6	0.5

01467085 JENKINTOWN CREEK AT ELKINS PARK, PA

LOCATION--Lat. 40°04'45", long. 75°06'36", Montgomery County, Hydrologic Unit 02040202, on right bank 20 ft (6 m) downstream from Cedar Road Bridge, 0.5 mi (0.8 km) east of Elkins Park, and 1 mi (1.6 km) west of Rockledge

DRAINAGE AREA--1.17 mi² (3.03 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1975-78

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	0.32	0.38	0.49	0.82	0.96	1.0	1.1
5	.16	.22	.31	.50	.59	.64	.70
10	.13	.17	.25	.38	.46	.51	.56

DURATION OF DAILY FLOW--PERIOD: 1974-78

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
12	6.0	3.6	2.2	1.8	1.5	1.2	0.7	0.4	0.3	0.2

Table 3.--Low-flow and flow-duration data--continued

01467086 TACONY CREEK AT COUNTY LINE, PHILADELPHIA, PA

LOCATION--Lat. 40°02'33", long. 75°06'47", Philadelphia County, Hydrologic Unit 02040203, on left bank 20 ft (6 m) upstream from dam, 120 ft (37 m) upstream from Adams Avenue Bridge in Philadelphia

DRAINAGE AREA--16.7 mi² (43.2 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	7.5	8.3	10	13	15	18	21
5	4.8	5.7	7.7	10	12	14	16
10	3.8	4.5	6.3	8.3	10	12	14
20	3.0	3.5	5.2	7.1	9.0	11	13

DURATION OF DAILY FLOW--PERIOD: 1966-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
160	88	51	27	21	17	14	11	7.3	6.0	4.8

01467089 FRANKFORD CREEK AT TORRESDALE AVENUE, PHILADELPHIA, PA

LOCATION--Lat. 40°00'25", long. 75°05'33", Philadelphia County, Hydrologic Unit 02040203, on left bank at Worrel Avenue, 400 ft (122 m) upstream from Torresdale Avenue, 1.5 mi (2.4 km) west of Frankford Arsenal in Philadelphia

DRAINAGE AREA--33.8 mi² (87.5 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	10	13	17	23	28	32	42
5	7.5	9.5	13	17	23	26	33
10	6.3	7.6	11	15	20	23	28
20	5.3	6.2	9.2	13	18	21	25

DURATION OF DAILY FLOW--PERIOD: 1966-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
440	240	120	43	30	24	20	16	11	9.2	7.8

Table 3.--Low-flow and flow-duration data--continued

01473900 WISSAHICKON CREEK AT FORT WASHINGTON, PA

LOCATION--Lat. 40°07'26", long. 75°13'13", Montgomery County, Hydrologic Unit 02040203, on concrete bridge on State Highway 73, 0.5 mile (0.8 km) downstream from Sandy Run, and 1 mile (1.6 km) south of Fort Washington

DRAINAGE AREA--40.8 mi² (106 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1963-69

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	7.0	7.9	9.0	11	13	15	18
5	6.2	7.0	8.0	9.9	11	12	14
10	6.0	6.7	7.8	9.2	10	11	12

DURATION OF DAILY FLOW--PERIOD: 1962-68

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
270	140	84	46	29	24	19	13	8.5	7.5	6.5

01473950 WISSAHICKON CREEK AT BELLS MILL ROAD, PHILADELPHIA, PA

LOCATION--Lat. 40°04'50", long. 75°13'35", Philadelphia County, Hydrologic Unit 02040203, on left bank 300 ft (91 m) upstream from Bells Mill Road, 0.5 mi (0.8 km) south of Mt. St. Joseph College in Philadelphia

DRAINAGE AREA--53.6 mi² (139 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	20	21	24	31	34	41	54
5	12	13	16	20	22	27	35
10	10	11	14	16	19	24	28
20	9.0	10	12	14	17	22	25

DURATION OF DAILY FLOW--PERIOD: 1966-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
520	250	150	84	61	51	42	30	20	16	13

Table 3.--Low-flow and flow-duration data--continued

01473980 WISSAHICKON CREEK AT LIVEZEY LANE, PHILADELPHIA, PA

LOCATION--Lat. 40°02'59", long. 75°12'52", Philadelphia County, Hydrologic Unit 02040203, 300 ft (91 m) upstream from dam at Green Valley Boat Club, 500 ft (150 m) downstream from Creshiem Creek in Philadelphia

DRAINAGE AREA--59.2 mi² (153 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-70

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	18	20	23	28	29	36	49
5	10	12	13	16	19	21	29
10	7.0	8.0	9.3	11	14	15	21

DURATION OF DAILY FLOW--PERIOD: 1966-70

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
380	180	120	69	48	41	35	27	18	15	13

01474000 WISSAHICKON CREEK AT MOUTH, PHILADELPHIA, PA

LOCATION -Lat. 40°00'54", long. 75°12'24", Philadelphia County, Hydrologic Unit 02040203, on left bank 100 ft (30 m) upstream from dam at Ridge Ave., 750 ft (229 m) upstream from mouth, 1,000 ft (305 m) northwest of Gustine Lake in Philadelphia

DRAINAGE AREA--64.0 mi² (166 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1967-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	26	28	32	39	43	54	70
5	16	18	23	28	30	36	44
10	13	15	19	24	25	31	36
20	11	13	17	21	22	29	32

DURATION OF DAILY FLOW--PERIOD: 1966-80

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
660	300	180	100	75	62	51	39	27	21	17

Table 3.--Low-flow and flow-duration data--continued

01474500 SCHUYLKILL RIVER AT PHILADELPHIA, PA

LOCATION.--Lat. 39°58'00", long. 75°11'20", Philadelphia County, Hydrologic Unit 02040203, on right bank 150 ft (46 m) upstream from Fairmont Dam, 1,500 ft (457 m) upstream from Spring Garden Street Bridge, in Philadelphia, and 8.7 m (14.0 km) upstream from mouth. Water-quality sampling site 1.6 mi (2.6 km) upstream

DRAINAGE AREA--1,893 mi² (4,903 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW.--PERIOD: 1933-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	280	320	410	590	720	880	1,260
5	130	150	210	320	380	470	730
10	79	97	140	220	260	330	530
20	50	64	98	160	190	240	400
30	38	50	75	140	160	210	340
50	29	38	64	110	130	170	280

DURATION OF DAILY FLOW.--PERIOD: 1932-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
12,700	6,000	2,100	1,200							
	8,500	3,400	1,600	760	370	230	150			

01475300 DARBY CREEK AT WATERLOO MILLS NEAR DEVON, PA

LOCATION.--Lat. 40°01'21", long. 75°25'20", Chester County, Hydrologic Unit 02040202, on left bank 125 ft (38 m) upstream from bridge on Waterloo Road, 2 mi (3.2 km) south of Devon, and 2.5 mi (4.0 km) northwest of Newtown Square

DRAINAGE AREA--5.15 mi² (13.3 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW.--PERIOD: 1974-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	2.7	3.1	3.5	4.2	4.3	4.9	6.0
5	2.5	2.8	3.0	3.5	4.0	4.5	4.8
10	2.4	2.7	2.8	3.2	3.8	4.3	4.5

DURATION OF DAILY FLOW.--PERIOD: 1973-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
49	26	17	12	9.2	8.0	6.5	4.4	3.2	2.7	2.1

Table 3.--Low-flow and flow-duration data--continued

01475510 DARBY CREEK NEAR DARBY, PA

LOCATION--Lat. 39°55'44", long. 75°16'22", Delaware County, Hydrologic Unit 02040202, on right bank 30 ft (9 m) upstream from Providence Road Bridge, 1.1 mi (1.8 km) northwest of Upper Darby, 2.3 mi (3.7 km) upstream from Cobbs Creek, and 8.4 mi (13.5 km) upstream from mouth

DRAINAGE AREA--37.4 mi² (96.9 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1965-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	23	25	28	33	36	41	50
5	17	18	21	25	29	32	37
10	15	16	19	21	26	28	31
20	14	15	17	19	23	24	27

DURATION OF DAILY FLOW--PERIOD: 1965-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
320	180	110	73	56	50	43	33	24	21	17

01475530 COBBS CREEK AT U.S. HIGHWAY NO. 1 AT PHILADELPHIA, PA

LOCATION--Lat. 39°59'29", long. 75°16'49", Philadelphia County, Hydrologic Unit 02040203, on left bank 30 ft (9 m) downstream from bridge on U.S. Highway No. 1 and 50 ft (15 m) upstream from unnamed tributary at west city limits of Philadelphia

DRAINAGE AREA--4.78 mi² (12.4 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	2.0	2.2	2.9	3.5	4.0	4.5	5.7
5	1.5	1.7	2.2	2.6	3.0	3.4	4.2
10	1.3	1.5	1.9	2.3	2.6	2.9	3.6
20	1.2	1.3	1.6	2.0	2.3	2.6	3.0

DURATION OF DAILY FLOW--PERIOD: 1965-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
2	5	10	25	40	50	60	75	90	95	98
42	24	13	6.7	5.2	4.5	3.9	3.0	2.2	1.8	1.6

Table 3.--Low-flow and flow-duration data--continued

01475545 NAYLOR CREEK AT WEST CHESTER PIKE NEAR PHILADELPHIA, PA

LOCATION--Lat. 39°58'13", long. 75°18'11", Delaware County, Hydrologic Unit Unit 02040203, on right bank 200 ft (60 m) north of West Chester Pike 0.4 mi (0.6 km) west of intersection of West Chester Pike and U.S. Highway 1 and 8 mi (13 km) west of City Hall, Philadelphia

DRAINAGE AREA--1.10 mi² (2.85 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1974-78

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	0.42	0.59	0.68	0.89	1.0	1.2	1.3
5	.28	.39	.49	.66	.77	.86	1.1
10	.21	.32	.39	.54	.67	.72	.95

DURATION OF DAILY FLOW--PERIOD: 1973-78

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
13	6.8	3.3	1.2	0.9	0.8	0.7	0.6	0.5	0.4	0.4

01475550 COBBS CREEK AT DARBY, PA

LOCATION--Lat. 39°55'02", long. 75°14'52", Philadelphia County, Hydrologic Unit 02040202, on right bank 60 ft (18 m) upstream from dam, 200 ft (61 m) upstream from bridge on Woodland Avenue, at Darby, and 1.1 mi (1.8 km) upstream from mouth

DRAINAGE AREA--22.0 mi² (57.0 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1966-70

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	0.76	1.3	3.4	6.8	9.2	12	15
5	.36	.62	1.7	3.7	6.6	8.1	10
10	.22	.38	1.1	2.4	5.2	6.3	8.0

DURATION OF DAILY FLOW--PERIOD: 1965-70

Discharge, in cubic feet per second, which was exceeded for indicated percentage of time

2	5	10	25	40	50	60	75	90	95	98
180	89	37	14	8.0	6.0	4.3	2.3	1.1	0.6	0.4

Table 3.--Low-flow and flow-duration data--continued

01485550 COBBS CREEK AT DARBY, PA

LOCATION--Lat. 39°55'02", long. 75°14'52", Philadelphia County, Hydrologic Unit 02040202, on right bank 60 ft (18 m) upstream from dam, 200 ft (61 m) upstream from bridge on Woodland Avenue, at Darby, and 1.1 mi (1.8 km) upstream from mouth

DRAINAGE AREA--22.0 mi² (57.0 km²)

MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW--PERIOD: 1972-80

Recurrence interval in years	Lowest average flow, in cubic feet per second, for indicated number of consecutive days						
	7	14	30	60	90	120	183
2	7.6	9.2	12	17	21	23	29
5	5.5	7.7	10	14	17	19	25
10	4.4	6.9	8.5	12	14	16	22

DURATION OF DAILY FLOW--PERIOD: 1971-80

<u>Discharge, in cubic feet per second, which was exceeded for indicated percentage of time</u>										
<u>2</u>	<u>5</u>	<u>10</u>	<u>25</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>75</u>	<u>90</u>	<u>95</u>	<u>98</u>
250	140	72	31	23	19	15	13	8.8	7.6	6.2

STATION - 01474000 WISSAHICKON CREEK AT MOUTH, PHILADELPHIA, PA. N = 14 NZI = 0

1967-1980, 12 MON PERIOD ENDING MARCH 31

7-DAY LOW VALUE

INPUT DATA (ZERO VALUES OMITTED)

12.000	31.000	16.000	18.000	22.000	29.000	34.000	34.000	33.000	41.000
15.000	21.000	24.000	39.000						

*** THE FOLLOWING STATISTICS (MEAN THROUGH COEFFICIENT OF VARIATION) ARE BASED ON ONLY THE NON-ZERO VALUES ***

MEAN = 26.357
 VARIANCE = 86.863
 STANDARD DEVIATION = 9.320
 SKEWNESS = 0.011
 STANDARD ERROR OF SKEWNESS = 0.597
 SERIAL CORRELATION COEFFICIENT = 0.123
 COEFFICIENT OF VARIATION = 0.354

MEAN LOGS = 1.393
 VARIANCE LOGS = 0.028
 STANDARD DEVIATION LOGS = 0.167
 SKEWNESS LOGS = -0.454
 STANDARD ERROR OF SKEWNESS LOGS = 0.597
 SERIAL CORRELATION COEFFICIENT LOGS = 0.086
 COEFFICIENT OF VARIATION LOGS = 0.120

NON EXCEED PROB RECURRENCE INTERVAL PARAMETER VALUE

0.0100	100.00	8.886
0.0200	50.00	10.229
0.0500	20.00	12.522
0.1000	10.00	14.854
0.2000	5.00	18.067
0.5000	2.00	25.432
0.8000	1.25	34.354
0.9000	1.11	39.574
0.9600	1.04	45.497
0.9800	1.02	49.484
0.9900	1.01	53.158

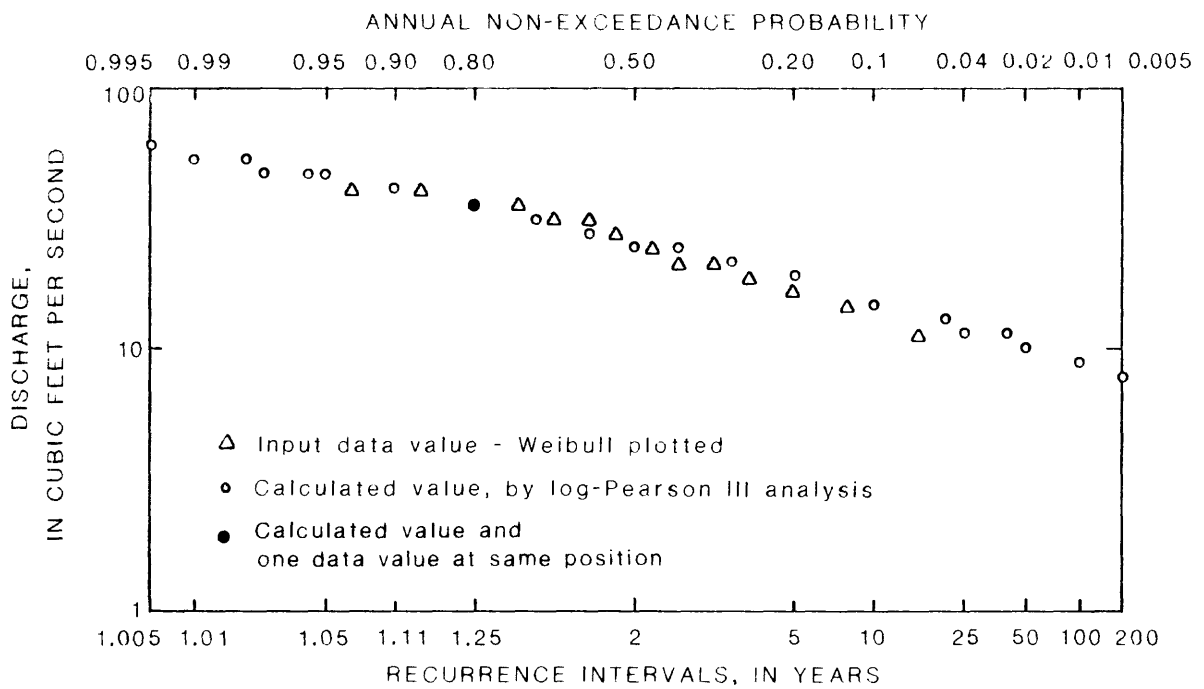


Figure 7.--Seven-day low-flow frequency curve - Wissahickon Creek at mouth, Philadelphia (station 01474000).

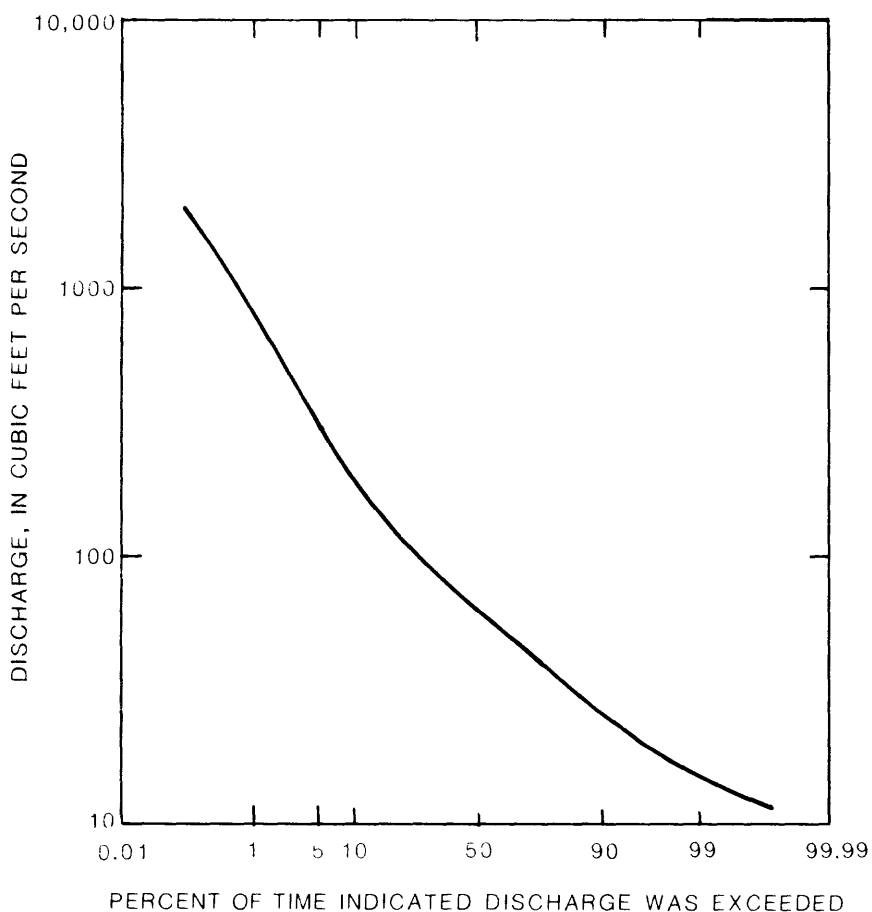


Figure 9.--Flow-duration curve - Wissahickon Creek at mouth, Philadelphia.

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