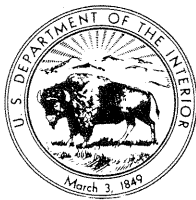


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

LOW-FLOW STUDY OF STREAMS IN ALBANY COUNTY, NEW YORK

by

F. Luman Robison



Open-file report
72-318
Albany, New York

1971

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

LOW-FLOW STUDY OF STREAMS IN ALBANY COUNTY, NEW YORK

by

F. Luman Robison

Prepared by
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

in cooperation with
CITY OF ALBANY

Open-file report

Albany, New York

1971

CONTENTS

	Page
Introduction.....	1
Origin of streamflow.....	1
Precipitation.....	2
Streamflow data.....	2
Chemical quality of streams.....	2
Magnitude and frequency of low flow.....	3
Areal distribution of streamflow.....	4
Conclusions.....	4
References.....	5

ILLUSTRATIONS

Figure 1. Sketch of hydrologic cycle.....	6
2. Graph showing recession of water level in observation well on campus of State University of New York, Albany, N.Y., summer of 1970.....	6
3. Graph of annual precipitation, 1930-70, Albany, N.Y., and summary for the period 1826-1970.....	7
4. Graph of daily precipitation at Albany County Airport, summer of 1970.....	7
5. Map showing streams in Albany County, N.Y., and vicinity, where discharge measurements were made on August 19, 1970.....	8
6. Map showing streams in Albany County, N.Y., and vicinity, where discharge measurements were made on September 25, 1970.....	9

TABLES

Table 1. Discharges of streams in Albany County, N.Y., and vicinity, August 19 and September 25, 1970.....	10
2. Discharges at miscellaneous and partial-record sites on streams listed in table 1, Albany County, N.Y., before August 19, 1970.....	16
3. Chemical analyses of water samples from streams measured in Albany County, N.Y., August 19, 1970.....	20
4. Water-quality requirements for selected industries and processes.....	24

PRECIPITATION

Variability of precipitation in Albany County is illustrated by figure 3, a bar graph showing yearly precipitation from 1826 to 1970. Extremes and average annual precipitation for the 145-year period are also shown.

Since 1964, when the minimum yearly total precipitation was recorded, the yearly total has gradually increased; but in only one year, 1969, has the yearly total equaled or surpassed the 30-year (1931-60) average of 35.08 inches.

Figure 4 is a bar graph of the daily rainfall for July, August, and September 1970 at the Albany County Airport. Rainfall was below normal during July and August and during most of September, until the heavy rain on September 27. Thus at the time of the two series of measurements, the streams were under base-flow conditions.

STREAMFLOW DATA

On August 19 and September 25, 1970, 38 base-flow measurements were made at 25 sites on ungaged streams in Albany County. These measurements are listed in table 1. Recorded discharges for three continuous-record gaging stations within the county, three in Greene County, and two elsewhere (Otsquago Creek at Fort Plain and Kayaderosseras Creek near West Milton) are also included in the table. Runoff, expressed in cubic feet per second per square mile for each site at the time of the measurement, is also shown. Measurements at some of these sites before August 19, 1970, are tabulated in table 2.

Figure 5, a map of Albany County and vicinity, shows location of sites where streamflow was measured on August 19, 1970. Site numbers on map are also listed in the first column of table 1. At each site on the map, the discharge in cubic feet per second and the runoff in cubic feet per second per square mile at the time of the measurements are shown. Figure 6, a similar map, shows location of sites where streamflow was measured on September 25, 1970.

CHEMICAL QUALITY OF STREAMS

Because of the current accelerated interest in the chemical quality of water for residential and industrial use, water samples were taken from some of the streams when measured on August 19, 1970. These samples were analyzed to determine the chemical constituents in the water from various streams. The results of these analyses are shown in table 3.

The overall significance of the analyses is indicated by two properties reported in table 3: dissolved-solids content and hardness of water. For the 27 analyses in the table, dissolved-solids content (residue on evaporation) ranges from 82 to 824 mg/l (milligrams per liter). Twenty-four of the analyses have a dissolved-solids content of less than 500 mg/l, the U.S. Public Health Service's (1962, p. 7) recommended limit for drinking water.

The desirable low dissolved-solids content is somewhat offset by the hardness of water, which ranges from 53 to 502 mg/l. In terms of hardness, water is commonly described as "hard" or "soft." The inexact meaning of these terms can be understood better by an examination of a table in Durfor and Becker (1964, p. 27). The table follows:

<u>Hardness range</u> (mg/l as CaCO ₃)	<u>Description</u>
0-60	Soft
61-120	Moderately hard
121-180	Hard
More than 180	Very hard

In terms of the preceding table only one analysis listed in table 3 (for Tenmile Creek at Medusa, N.Y.) indicates "soft" water. Seven of the analyses indicate moderately hard water and the remaining analyses indicate hard or very hard water.

Chemical quality requirements in industry vary from plant to plant. Requirements of a few selected industrial plants and processes are given in table 4 (from Hem, 1970, p. 334-335, after U.S. Federal Water Pollution Control Administration, 1968).

MAGNITUDE AND FREQUENCY OF LOW FLOW

The yield of a stream during periods of little rainfall, when the flow depends on contributions from ground water, may determine the feasibility of the construction of water-supply or sewage-treatment installations. The lowest average discharge for 7 consecutive days is commonly used as an index in low-flow analysis. This serves to smooth out short-term flow fluctuations that might distort the analysis if the daily discharge values were used. Low flows with a 10-year or 2-year recurrence interval are commonly used in low-flow analysis. The frequency is sometimes expressed as a probability. For example, for a 10-year recurrence interval there is a 0.10 probability that the specified low flow will occur during any one year.

Low-flow frequency relationships may be developed from daily discharge records at long-term gaging stations. The lowest annual average 7-consecutive-day discharge is determined by examination of the station data. The annual values are then arrayed in order of magnitude and a frequency plot is prepared. The magnitude and the frequency of low flow at stream sites where continuous discharge records are not available can be estimated by applying a regression analysis to base-flow discharge measurements, such as the data in table 1, and concurrent data of nearby long-term gaging stations. Such analysis has been made for all sites where sufficient discharge measurements have been made in Albany County. In addition to the 1970 data, the results of measurements in previous years were also used. Because there are no long-term, continuous-record, gaging stations in Albany County, it was necessary to use stations in nearby areas (see table 1) as index stations in the regression study. Where the information for the sites was sufficient to define an acceptable relationship, the 7-day 2-year and 7-day 10-year low flows are listed in table 1. For some sites the available data were insufficient for this purpose.

AREAL DISTRIBUTION OF STREAMFLOW

Data in table 1 and on figures 5 and 6 show that Hunger Kill, Blockhouse Creek, and Kaikout Kill, near Guilderland, and Van Rensselaer Creek at Menands, have the highest runoff per square mile under base-flow conditions of all the streams measured in Albany County. These streams drain parts of the Albany-Schenectady sand plain.

Normans Kill, although having the largest drainage area of the county streams, during periods of low flow produces a very small unit runoff upstream from the Watervliet Reservoir; and because the reservoir stores and diverts practically all its inflow in the dry season, the flow below the dam consists only of the runoff from the part of the basin below that point.

For the other streams in the county, the measurements on August 19 show unit runoff ranging from 0 to 0.18 cfs (cubic feet per second per square mile) and on September 25, when the discharges were higher, indicate a runoff ranging from 0 to 0.23 cfs.

From the duration studies of the long-term gaging stations (Kayaderosseras Creek, Otsquago Creek, and Catskill Creek) used for correlation in this report, the percentages of time that the discharge of these streams would equal or exceed that on August 19 and September 25 are listed in table 1. The duration percentages are computed from the total periods of record for each station and are dependent on the basin characteristics and the local rainfall pattern for each stream. The long-term gaging station nearest to the county streams is on Catskill Creek at Oak Hill. The discharge on this stream on August 19 would be equaled or exceeded 99.3 percent of the time and the discharge on September 25, 85 percent of the time. This station is just south of the county line and its basin characteristics are not like some of the other county streams; but it can probably be safely estimated that the discharges of Albany County streams on the 2 days would be about at the 99- and 85-percent duration points, respectively.

CONCLUSIONS

The streamflow data summarized in this report provide a preliminary evaluation of the low-flow potential of Albany County streams. There is a need to continue the data collection at the continuous-record gaging stations and to continue to make periodic base-flow measurements at other sites to improve the computations presented in this report. No analysis has been made of the peak flows for streams in the county. There is a need for peak-flow data, especially in the urbanizing areas of the county, in order to aid in the design of waterways and to evaluate flood risks.

Most of the streams sampled for chemical analysis (24 of 27 analyses) have a dissolved-solids content less than the recommended limit for drinking water (500 mg/l). However, housewives as well as many industries would find the hardness of water of most streams sampled for chemical analysis objectionable. Most of the streams (26 of 27 analyses) have a hardness described as moderately hard to very hard (70 to 502 mg/l as CaCO₃). Many industries require water of less hardness and of a lower dissolved-solids content.

REFERENCES

Durfor, C. N., and Becker, Edith, 1964, Public water supplies of the 100 largest cities in the United States, 1962: U.S. Geol. Survey Water-Supply Paper 1812, 364 p.

Hem, J. D., 1970, Study and interpretation of the chemical characteristics of natural water (2d ed.): U.S. Geol. Survey Water-Supply Paper 1473, 363 p.

U.S. Federal Water Pollution Control Administration, 1968, Report of the Committee on water quality criteria: Washington, D.C., 234 p.

U.S. Public Health Service, 1962, Drinking water standards, 1962: U.S. Public Health Service Pub. 956, 61 p.

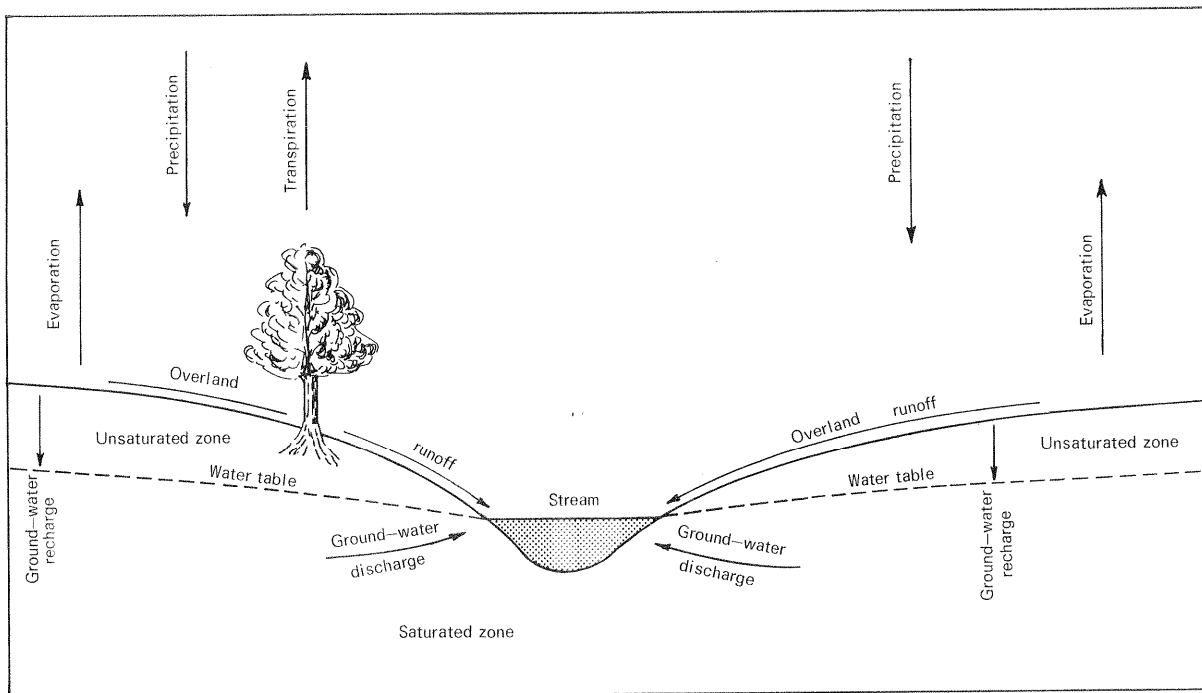


Figure 1.--Hydrologic Cycle.

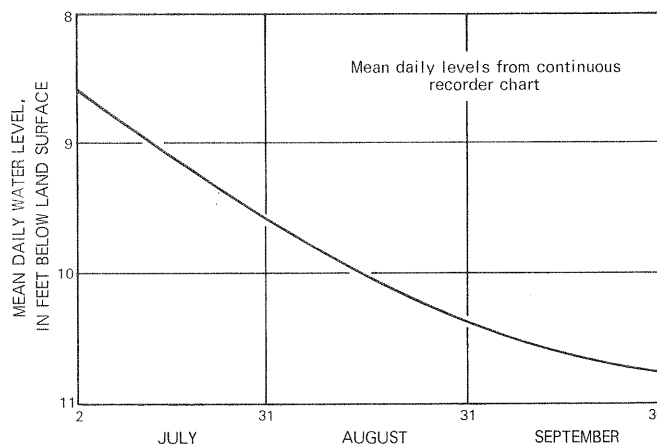


Figure 2.--Recession of water level in observation well on campus of State University of New York, Albany, N. Y., summer of 1970.

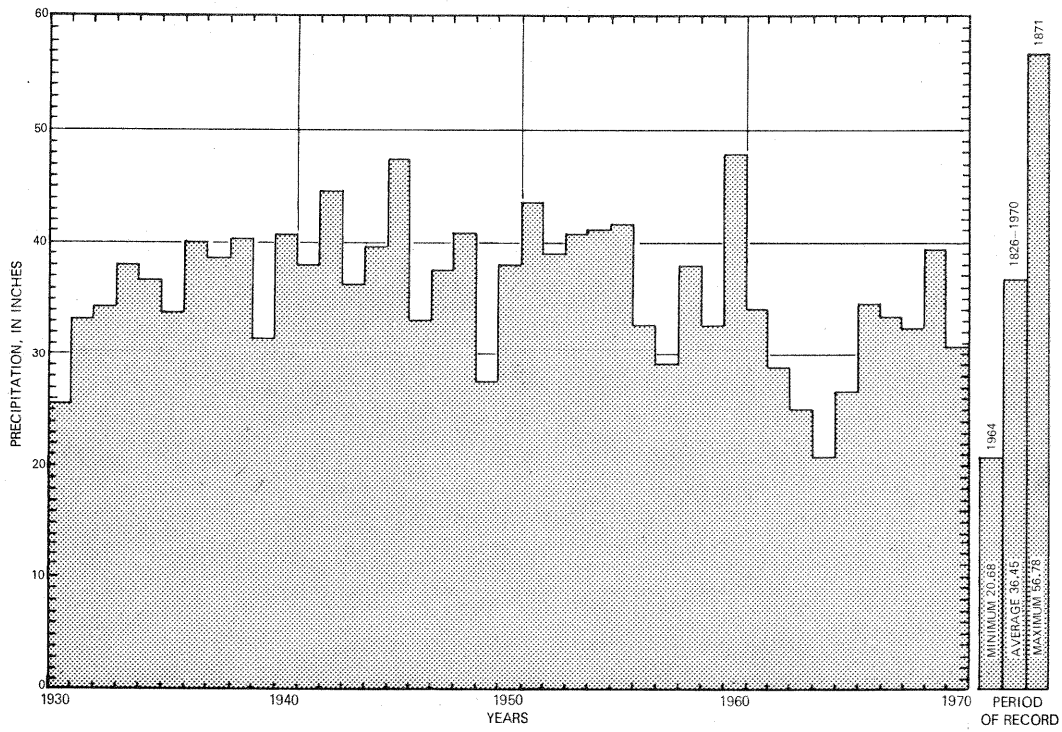


Figure 3.--Annual precipitation, 1930-70, Albany, N. Y., and summary for the period 1826-1970.

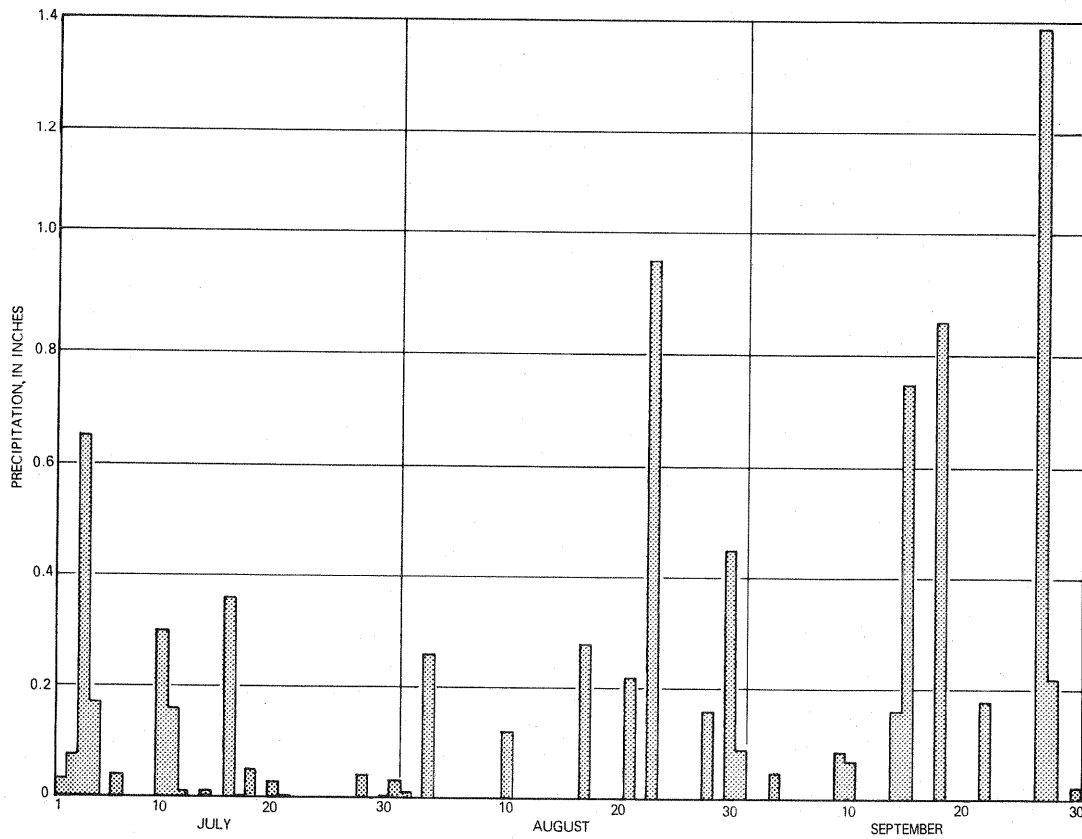


Figure 4.--Daily precipitation at Albany County Airport, summer of 1970.

Table 1.--Discharges of streams in Albany County, N.Y., and vicinity, August 19 and September 25, 1970

cfs, Cubic feet per second. cfsm, Cubic feet per second per square mile. sq mi, Square mile.

T, Trace (less than 0.01 cfs).

Stream and place of determination (numbers in column 1 refer to figures 5 and 6)	Drainage area (sq mi)	Date	Gage height (feet)	Dis-charge (cfs)	Runoff (cfsm)	Percent dura-tion	Discharge		
							7-day, 2-year low (cfs)	7-day, 10-year low (cfs)	
Site no.	Station no.								
	3305	Kayaderoseras Creek at gaging station near West Milton	8-19 9-25	1.19 1.40	20.6 37	0.23 .41	98.2 82	23	18
	3490	Otsquago Creek at gaging station at Fort Plain	8-19 9-25	.12 .20	2.2 4.1	.04 .07	99.9 93.2	3.7	2.5
1	3504.70	Little Schoharie Creek on County Highway 10 near Rensselaerville	8-19	--	0	0	--	--	--
2	3509	Beaverdam Creek near Knox	8-19	--	0	0	--	0	0
3	3509.5	Switz Kill on County Highway near Berne	8-19	--	.32	.01	--	.30	.10
4	3510	Fox Creek at West Berne	8-19	--	1.32	.02	--	1.50	.30
5	3562.80	Shaker Creek Tributary on Wade Road at Latham	8-19	--	.14	.07	--	.20	.12

Table 1.--Discharges of streams in Albany County, N.Y., and vicinity, August 19 and September 25, 1970 (Continued)

Stream and place of determination (numbers in column 1 refer to figures 5 and 6)	Site Station no.	Drainage area (sq mi)	Date	Gage height (feet)	Discharge (cfs)	Runoff (cfsm)	Percent duration	Discharge	
								7-day, 2-year low (cfs)	7-day, 10-year low (cfs)
Van Rensselaer Creek on State Highway 377 at Menands	6 3591.25	0.64	8-19 9-25	-- --	0.44 .79	0.69 1.23	-- --	0.70	0.50
Indian House Creek on Dunnsville Road at Dunnsville	7 3592.70	2.83	8-19 9-25	-- --	0 0	0 0	-- --	0	0
Bozen Kill on Westfall Road near Altamont	8 3593.20	13.5	8-19 9-25	-- --	.03 .10	T T	-- --	--	--
Black Creek on School Road near Voorheesville	9 3593.25	14.4	8-19 9-25	-- --	.02 .10	T T	-- --	--	--
Black Creek at mouth near Guilderland Center	10 3593.30	19.3	9-25	--	.10	T	--	T	0
Bozen Kill on State Highway 158 near Guilderland Center	11 3593.40	51.8	9-25	--	.85	.02	--	.40	.20
Hunger Kill on Old State Road near Guilderland	12 3595.07	3.91	8-19	--	4.86	1.24	--	--	--

Table 1.--Discharges of streams in Albany County, N.Y., and vicinity, August 19 and September 25, 1970 (Continued)

Stream and place of determination (numbers in column 1 refer to figures 5 and 6)	Site Station no.	Drainage area (sq mi)	Date	Gage height (feet)	Discharge (cfs)	Runoff (cfsm)	Percent duration	Discharge (cfs)	
								7-day, 2-year low	7-day, 10-year low
Hunger Kill at gaging station at Guilderland	13 3595.13	8.16	8-19 9-25	1.78 1.90	6.50 7.60	.80 .93	-- --	5.0	4.6
Blockhouse Creek on State Highway 155 near Guilderland	14 3595.17	1.96	8-19 9-25	-- --	1.10 1.26	.56 .64	-- --	.75	.50
Kaikout Kill on Foundry Road near Guilderland	15 3595.18	1.55	8-19 9-25	-- --	1.51 2.04	.97 1.32	-- --	1.5	1.2
Normans Kill at gaging station near Westmere	16 3595.19	131	8-19 9-25	1.26 1.31	8.30 12.0	.06 .09	-- --	7.9	6.8
Vly Creek Tributary on New Salem Road at New Salem	17 3595.20	1.50	8-19	--	0	0	--	--	--
Vly Creek on New Salem Road at Voorheesville	18 3595.205	12.3	8-19	--	1.60	.13	--	--	--
Krum Kill on Blessing Road at Karlsfeld	19 3595.24	5.58	8-19 9-25	-- --	1.01 1.45	.18 .26	-- --	1.4	.90

Table 1.--Discharges of streams in Albany County, N.Y., and vicinity, August 19 and September 25, 1970 (Continued)

Site no.	Stream and place of determination (numbers in column 1 refer to figures 5 and 6)	Drainage area (sq mi)	Date	Gage height (feet)	Discharge (cfs)	Runoff (cfsm)	Percent dura- tion	Discharge	
								7-day, 2-year low (cfs)	7-day, 10-year low (cfs)
20	3595.39 Normans Kill Tributary on Bender Lane at Bethlehem Center	1.24	8-19 9-25	-- --	0.03 .11	0.02 .09	-- --	0.05	T
21	3595.85 Vloman Kill at New Scotland	2.55	8-19 9-25	-- --	.26 .52	.10 .20	-- --	.25	.15
22	3595.88 Phillipin Kill on Orchard St. at Unionville	1.30	8-19	--	.01	T	--	--	--
23	3595.90 Phillipin Kill on State Highway 32 near Feura Bush	4.70	8-19	--	.02	T	--	--	--
24	3595.92 Vloman Kill on Jericho Rd. at Mallorys Corners	17.2	8-19	--	.18	.01	--	.05	T
25	3595.95 Dowers Kill on Jericho Rd. near Selkirk	4.75	8-19	--	0	0	--	0	0
26	3598.10 Onesquethaw Creek on Highway 85 near Clarksville	.62	8-19 9-25	-- --	0 0	0 0	-- --	0 0	0 0

Table 1.--Discharges of streams in Albany County, N.Y., and vicinity, August 19 and September 25, 1970 (Continued)

Stream and place of determination (numbers in column 1 refer to figures 5 and 6)	Site Station no.	Drainage area (sq mi)	Date	Gage height (feet)	Discharge (cfs)	Runoff (cfsm)	Percent duration	Discharge	
								7-day, 2-year low (cfs)	7-day, 10-year low (cfs)
Onesquethaw Creek on Highway 32 near Clarksville	27 3598.30	17.8	8-19 9-25	-- --	0.08 .19	T .01	-- --	-- --	-- --
Feuri Spruyt on County Highway 101 at South Bethlehem	28 3599.04	7.49	8-19 9-25	-- --	.05 .10	T .01	-- --	-- --	-- --
Coeymans Creek at gaging station near Selkirk	29 3599.02	35.1	8-19 9-25	2.75 2.86	2.30 3.06	.07 .09	-- --	1.40	0.9
Hannacrois Creek on State Highway 32 and 143 at Dormansville	30 3599.15	13.2	8-19 9-25	-- --	.02 .07	T T	-- --	-- --	-- --
Silver Creek on Boomhower Road near Dormansville	31 3599.16	.32	8-19	--	0	0	--	--	--
Silver Creek Tributary on Boomhower Road at Dormansville	32 3599.17	.60	8-19 9-25	-- --	.10 .14	.17 .23	-- --	-- --	-- --
Hannacrois Creek at gaging station near New Baltimore	33 3599.24	61.6	8-19 9-25	.55 .72	.02 .06	T T	-- --	-- --	-- --

Table 1.--Discharges of streams in Albany County, N.Y., and vicinity, August 19 and September 25, 1970 (Continued)

Stream and place of determination (numbers in column 1 refer to figures 5 and 6)	Site Station no.	Drainage area (sq mi)	Date	Gage height (feet)	Dis- charge (cfs)	Runoff (cfsm)	Percent dura- tion	Discharge	
								7-day, 2-year low (cfs)	7-day, 10-year low (cfs)
Fox Creek on Pearson Road near Preston Hollow	34 3614.65	3.43	8-19 9-25	-- --	T 0.02	T T	-- --	T	0
Catskill Creek Tributary on Niles Road at Medusa	35 3614.80	6.58	8-19 9-25	-- --	0 --	0 --	-- --	0	0
Catskill Creek at gaging station at Oak Hill	36 3615	98	8-19 9-25	1.58 1.76	.30 3.00	T .03	99.3 85	1.0	.3
Tenmile Creek on County Highway at Medusa	37 3615.50	19.1	8-19 9-25	-- --	1.57 1.62	.08 .08	-- --	2.5	0.8
Eightmile Creek on County Highway at Medusa	38 3615.60	12.8	8-19 9-25	-- --	0 0	0 0	-- --	0	0
Tenmile Creek at gaging station at Oak Hill	39 3615.70	35.3	8-19 9-25	2.29 2.33	2.70 3.00	.08 .08	-- --	--	--
Wolf Fly Creek at South Westerlo	40 3617.6	6.45	8-19 9-25	-- --	T .03	T T	-- --	T	0

Table 2.--Discharges at miscellaneous and partial-record sites on streams listed in table 1., Albany County, N.Y., before August 19, 1970

Note.--All measurements made under base-flow conditions unless otherwise noted:

- a, Not base flow.
- b, Regulated.
- c, Peak discharge.
- cfs, Cubic feet per second.
- sq mi, Square mile.

Station no.	Station name	Drainage area (sq mi)	Measurements	
			Date	Discharge (cfs)
1-3509	Beaverdam Creek near Knox	6.91	7-26-62	0.01
			10-17-62	.55
			9- 5-63	.01
			7- 7-64	.05
			5- 3-65	5.18
1-3509.5	Switz Kill near Berne	28.3	7-25-62	.49
			4-19-63	^a 2.59
			9- 5-63	.38
			7- 7-64	.51
			5- 3-65	.37
			10-18-66	1.59
1-3562.80	Shakers Creek Tributary at Latham	2.09	5-17-60	1.38
			6-28-60	.52
			7-26-60	.49
			8-19-60	1.16
			9-27-60	1.93
			9- 6-63	.28
			9-17-64	.07
			6-22-65	.14
1-3591.25	Van Rensselaer Creek at Menands	.64	7-11-55	.68
			7-14-55	.80
			7-22-55	.90
			8-11-55	.82
			8-22-63	.65
			9- 3-63	.64
			9- 6-63	.80
			9-27-63	.69
			10-30-63	.76
			8-31-64	.60
6-21-65	^b .01			

Table 2.--Discharges at miscellaneous and partial-record sites on streams listed in table 1., Albany County, N.Y., before August 19, 1970 (Continued)

Station no.	Station name	Drainage area (sq mi)	Measurements	
			Date	Discharge (cfs)
1-3592.70	Indian House Creek at Dunnsville	2.83	9- 5-63	0
1-3593.30	Black Creek at mouth near Guilderland Center	19.3	7- 5-62	.33
			6-27-63	.58
			9- 5-63	0
1-3593.40	Bozen Kill near Guilderland Center	51.8	7- 5-62	.47
			6-27-63	2.31
			9- 5-63	.28
			7-16-65	.44
1-3595.07	Hunger Kill near Guilderland	3.91	7-27-60	5.57
			9- 7-60	5.23
			9-19-60	5.67
			9-27-60	7.98
1-3595.17	Blockhouse Creek near Guilderland	1.96	7- 5-62	1.02
			6-27-63	1.00
			9- 5-63	.89
			9-27-63	.71
			8-31-64	1.20
			6-21-65	.60
			10-19-65	^a 2.79
10-28-66	.76			
1-3595.18	Kaikout Kill near Guilderland	1.55	7- 5-62	1.62
			6-27-63	2.01
			9- 5-63	1.66
			9-27-63	1.65
			8-31-64	2.24
			6-21-65	.95
1-3595.20	Vly Creek Tributary at New Salem	1.50	5-11-62	1.19
			5-29-62	.08
			6-21-62	.24
1-3595.24	Krum Kill at Karlsfeld	5.58	6-21-62	1.88
			7- 5-62	1.15
			9- 5-63	1.30
1-3595.39	Normans Kill Tributary at Bethlehem Center	1.24	9-29-60	1.45
			10-15-60	.52
			10-10-61	.12

Table 2.--Discharges at miscellaneous and partial-record sites on streams listed in table 1., Albany County, N.Y., before August 19, 1970 (Continued)

Station no.	Station name	Drainage area (sq mi)	Measurements	
			Date	Discharge (cfs)
1-3595.85	Vloman Kill at New Scotland	2.55	8-29-62	0.36
			6-27-63	.38
			8-23-63	.26
			9- 5-63	.25
			7-24-64	.16
			7-28-64	.12
1-3595.92	Vloman Kill at Mallorys Corners	17.2	9- 8-65	.08
			9-29-65	.40
			10-21-65	.43
			6-24-66	.22
			7-14-66	.03
			7-26-66	.04
			8-10-66	.03
			8-26-66	.09
			9-12-66	.13
			10-10-66	.39
			6- 7-67	1.46
9- 7-67	.29			
1-3595.95	Dowers Kill near Selkirk	4.75	8-22-62	.04
			6-27-63	.02
			7-12-63	0
			9- 5-63	0
			5- 5-64	.89
			9- 8-65	0
			9-29-65	.07
			10-21-65	.15
			1-3598.10	Onesquethaw Creek near Clarksville
1-3598.30	Onesquethaw Creek near Clarksville	17.8	4- 5-52	^c 935
1-3599.15	Hannacrois Creek at Dormansville	13.2	7- 2-63	1.99
			9- 5-63	.02
1-3615.50	Tenmile Creek at Medusa	19.1	7-20-62	2.68
			8-13-62	1.95
			9-19-62	.58
			6-27-63	4.69
			7-12-63	3.73
			9- 5-63	1.55
5- 5-64	22.7			

Table 2.--Discharges at miscellaneous and partial-record sites on
streams listed in table 1., Albany County, N.Y., before
August 19, 1970 (Continued)

Station no.	Station name	Drainage area (sq mi)	Measurements	
			Date	Discharge (cfs)
1-3615.60	Eightmile Creek at Medusa	12.8	10-16-55	^a 1,710
			7-20-62	.01
			8-13-62	0
			9-19-62	0
			6-27-63	1.03
			7-12-63	.21
			9- 5-63	0
			5- 5-64	8.81
1-3617.60	Wolf Fly Creek at South Westerlo	6.45	7-20-62	.01
			8-13-62	0
			6-27-63	1.02
			7-12-63	.22
			9- 5-63	0
			5- 5-64	4.68

Table 3.--Chemical analyses of water samples from streams measured in Albany County, N.Y., August 19, 1970

(CFS, cubic feet per second; MG/L, milligrams per liter; LAT, latitude; LONG, longitude; specific conductance is in micromhos per centimeter at 25°C)

DATE	TIME	DIS- CHARGE (CFS)	SILICA (SiO2) (MG/L)	CAL- CIUM (CA) (MG/L)	MAG- NE- SIUM (MG)	SODIUM (NA) (MG/L)	PO- TAS- SIUM (K) (MG/L)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	SULFATE (SO4) (MG/L)	CHLO- RIDE (CL) (MG/L)	FLUO- RIDE (F) (MG/L)
01350950 - SWITZ KILL NEAR BERNE, N.Y. (LAT 42 36 41 LONG 074 09 24)												
AUG.. 1970	1225	.32	4.4	49	3.3	5.7	1.2	148	0	16	9.3	.2
01351000 - FOX CREEK AT WEST BERNE, N.Y. (LAT 42 37 42 LONG 074 11 08)												
AUG.. 1970	1120	1.3	11	46	3.5	9.3	1.9	150	0	10	18	.1
01356310 - SHAKER CREEK TRIBUTARY NEAR LATHAM, N.Y. (LAT 42 45 01 LONG 073 46 54)												
AUG.. 1970	1645	.14	9.4	92	18	140	4.2	226	8	84	375	.1
01359125 - VAN RENSSELAER CREEK AT MENANDS, N.Y. (LAT 42 41 03 LONG 073 44 32)												
AUG.. 1970	0840	.44	11	88	18	20	1.5	252	0	70	52	.2
01359320 - BOZEN KILL NEAR ALTAMONT, N.Y. (LAT 42 42 50 LONG 074 02 47)												
AUG.. 1970	0850	.03	5.9	51	9.7	22	2.5	132	0	68	29	.1
01359325 - BLACK CREEK NEAR VOORHEESVILLE, N.Y. (LAT 42 40 35 LONG 073 57 10)												
AUG.. 1970	0955	.01	8.0	66	11	6.3	1.4	240	0	15	16	.1
01359507 - HUNGER KILL NEAR GUILDERLAND, N.Y. (LAT 42 43 25 LONG 073 55 06)												
AUG.. 1970	1545	4.9	8.9	63	7.7	34	1.2	142	0	46	71	.2

DATE	ORGANIC NITRO- GEN (N) (MG/L)	NITRITE (NO2) (MG/L)	AMMONIA (NH4) (MG/L)	NITRATE (NO3) (MG/L)	DIS- SOLVED SOLIDS (RESI- DUE AT 180 C) (MG/L)	DIS- SOLVED SOLIDS (SUM OF CONSTI- TUENTS) (MG/L)	HARD- NESS (CA, MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	SPECI- FIC COND- UCTANCE (MICRO- MHOS)	PH (UNITS)	TEMP- ERATURE (DEG C)	COLOR (PLAT- INUM- COBALT UNITS)
01350950 - SWITZ KILL NEAR BERNE, N.Y. (LAT 42 36 41 LONG 074 09 24)												
AUG.. 1970	--	.01	.09	1.0	163	163	136	15	293	8.0	23.0	2
01351000 - FOX CREEK AT WEST BERNE, N.Y. (LAT 42 37 42 LONG 074 11 08)												
AUG.. 1970	--	.00	.10	1.0	185	175	130	6	322	7.9	21.0	5
01356310 - SHAKER CREEK TRIBUTARY NEAR LATHAM, N.Y. (LAT 42 45 01 LONG 073 46 54)												
AUG.. 1970	--	.04	.13	2.1	--	844	--	--	1320	8.3	--	5
01359125 - VAN RENSSELAER CREEK AT MENANDS, N.Y. (LAT 42 41 03 LONG 073 44 32)												
AUG.. 1970	--	.17	.13	9.4	--	394	294	87	707	8.1	--	--
01359320 - BOZEN KILL NEAR ALTAMONT, N.Y. (LAT 42 42 50 LONG 074 02 47)												
AUG.. 1970	--	.05	.06	.2	269	253	167	59	439	8.1	18.0	0
01359325 - BLACK CREEK NEAR VOORHEESVILLE, N.Y. (LAT 42 40 35 LONG 073 57 10)												
AUG.. 1970	--	.01	.14	2.0	264	244	210	13	423	7.8	19.0	30
01359507 - HUNGER KILL NEAR GUILDERLAND, N.Y. (LAT 42 43 25 LONG 073 55 06)												
AUG.. 1970	--	.04	.18	.4	329	302	188	72	559	8.1	--	0

Table 3.--Chemical analyses of water samples from streams measured in Albany County, N.Y., August 19, 1970 (Continued)

DATE	TIME	DIS-CHARGE (CFS)	SILICA (SiO2) (MG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUD-RIDE (F) (MG/L)
01359517 - BLOCK HOUSE CREEK NEAR GUILDERLAND, N.Y. (LAT 42 41 08 LONG 073 54 05)												
AUG.. 1970 19...	1355	1.1	10	69	11	38	2.5	176	0	39	63	.1
01359518 - KAIKOUT KILL NEAR GUILDERLAND, N.Y. (LAT 42 41 20 LONG 073 54 08)												
AUG.. 1970 19...	1435	1.5	9.7	47	7.2	8.8	1.0	144	0	18	23	.1
01359519 - NORMANSKILL CREEK NEAR WESTMERE, N.Y. (LAT 42 40 43 LONG 073 54 25)												
APR.. 1970 3...	1130	2130	5.9	23	5.5	17	1.8	40	0	35	35	.0
0135952A - VLY CREEK AT VOORHEESVILLE, N.Y. (LAT 42 38 56 LONG 073 56 09)												
AUG.. 1970 19...	0810	1.6	9.1	64	9.6	12	1.1	218	0	26	27	.4
01359524 - KRUM KILL AT KARLSFELD, N.Y. (LAT 42 38 56 LONG 073 50 51)												
AUG.. 1970 19...	1040	1.0	9.3	61	12	62	5.7	158	0	60	96	.1
01359539 - NORMANS KILL TRIB AT BETHLEHEM CENTER, N.Y. (LAT 42 36 28 LONG 073 47 42)												
AUG.. 1970 19...	1545	.03	8.6	67	12	22	3.4	210	0	49	30	.1
01359585 - VLOMAN KILL AT NEW SCOTLAND, N.Y. (LAT 42 37 27 LONG 073 54 16)												
AUG.. 1970 19...	1745	.26	8.4	68	10	12	1.7	168	1	63	20	.1
DATE	ORGANIC NITRO-GEN (N) (MG/L)	NITRITE (NO2) (MG/L)	AMMONIA (NH4) (MG/L)	NITRATE (NO3) (MG/L)	DIS-SOLVED SOLIDS (RESI-DUE AT 180 C) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE (MG/L)	SPECI-FIC COND-UCTANCE (MICRO-MHOS)	PH (UNITS)	TEMP-ERATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)
01359517 - BLOCK HOUSE CREEK NEAR GUILDERLAND, N.Y. (LAT 42 41 08 LONG 073 54 05)												
AUG.. 1970 19...	--	.02	.22	36	365	355	217	73	602	8.1	19.0	2
01359518 - KAIKOUT KILL NEAR GUILDERLAND, N.Y. (LAT 42 41 20 LONG 073 54 08)												
AUG.. 1970 19...	--	.02	.24	7.4	195	192	146	28	343	8.0	--	2
01359519 - NORMANSKILL CREEK NEAR WESTMERE, N.Y. (LAT 42 40 43 LONG 073 54 25)												
APR.. 1970 3...	.36	.05	.17	3.6	157	147	80	47	262	7.6	4.0	14
0135952A - VLY CREEK AT VOORHEESVILLE, N.Y. (LAT 42 38 56 LONG 073 56 09)												
AUG.. 1970 19...	--	.01	.10	4.8	277	261	199	20	479	8.1	18.0	5
01359524 - KRUM KILL AT KARLSFELD, N.Y. (LAT 42 38 56 LONG 073 50 51)												
AUG.. 1970 19...	--	.02	4.3	12	464	400	202	72	760	7.3	--	10
01359539 - NORMANS KILL TRIB AT BETHLEHEM CENTER, N.Y. (LAT 42 36 28 LONG 073 47 42)												
AUG.. 1970 19...	--	.02	.14	.2	319	295	216	44	527	8.2	20.0	5
01359585 - VLOMAN KILL AT NEW SCOTLAND, N.Y. (LAT 42 37 27 LONG 073 54 16)												
AUG.. 1970 19...	--	.03	.06	22	286	289	160	23	461	8.3	23.0	3

Table 3.--Chemical analyses of water samples from streams measured in Albany County, N.Y., August 19, 1970 (Continued)

DATE	TIME	DIS- CHARGE (CFS)	SILICA (SI02) (MG/L)	CAL- CIUM (CA) (MG/L)	MAG- NE- SIUM (MG)	SODIUM (NA) (MG/L)	PO- TAS- SIUM (K) (MG/L)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	SULFATE (SO4) (MG/L)	CHLD- RIDE (CL) (MG/L)	FLUD- RIDE (F) (MG/L)
01359588 - PHILLIPIN KILL AT UNIONVILLE, N.Y. (LAT 42 36 49 LONG 073 52 35)												
AUG.. 1970 19...	1135	.01	4.4	57	11	37	7.7	234	0	36	33	.3
01359590 - PHILLIPIN KILL NEAR FEURA BUSH, N.Y. (LAT 42 35 24 LONG 073 50 49)												
AUG.. 1970 19...	1200	.02	3.2	43	6.7	240	6.3	180	0	64	295	.3
01359592 - VLOMAN KILL AT MALLORYS CORNERS, N.Y. (LAT 42 33 54 LONG 073 49 48)												
AUG.. 1970 19...	1245	.18	2.2	46	11	17	3.4	166	0	38	20	.2
01359595 - DOWERS KILL NEAR SELKIRK, N.Y. (LAT 42 34 04 LONG 073 48 53)												
AUG.. 1970 19...	1345	.00	7.8	79	10	140	4.7	232	0	25	222	.2
01359830 - ONESQUETHAW CREEK NEAR CLARKSVILLE, N.Y. (LAT 42 33 49 LONG 073 55 44)												
AUG.. 1970 19...	1700	.08	4.6	61	5.6	25	3.6	151	1	48	47	.0
01359902 - COEYMANS CREEK AT SELKIRK, N.Y. (LAT 42 31 38 LONG 073 49 14)												
APR.. 1970 3...	1300	560	4.2	40	3.8	9.1	1.5	100	0	30	15	.0
01359904 - FEURI SPRUYT AT SOUTH BETHLEHEM, N.Y. (LAT 42 31 40 LONG 073 50 50)												
AUG.. 1970 19...	1440	.05	7.5	150	31	27	9.6	132	0	356	28	.3
DATE	ORGANIC NITRO- GEN (N) (MG/L)	NITRITE (NO2) (MG/L)	AMMONIA (NH4) (MG/L)	NITRATE (NO3) (MG/L)	DIS- SOLVED SOLIDS (REST- DUE AT 180 C) (MG/L)	DIS- SOLVED SOLIDS (SUM OF CONSTI- TUENTS) (MG/L)	HARD- NESS (CA, MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	SPECI- FIC COND- UCTANCE (MICRO- MHOS)	PH (UNITS)	TEMP- ERATURE (DEG C)	COLOR (PLAT- INUM- COBALT UNITS)
01359588 - PHILLIPIN KILL AT UNIONVILLE, N.Y. (LAT 42 36 49 LONG 073 52 35)												
AUG.. 1970 19...	--	.04	1.2	--	--	332	187	0	573	7.7	--	5
01359590 - PHILLIPIN KILL NEAR FEURA BUSH, N.Y. (LAT 42 35 24 LONG 073 50 49)												
AUG.. 1970 19...	--	.02	.75	4.2	824	751	134	0	1500	8.1	--	10
01359592 - VLOMAN KILL AT MALLORYS CORNERS, N.Y. (LAT 42 33 54 LONG 073 49 48)												
AUG.. 1970 19...	--	.35	.46	8.1	226	228	160	24	403	8.0	--	5
01359595 - DOWERS KILL NEAR SELKIRK, N.Y. (LAT 42 34 04 LONG 073 48 53)												
AUG.. 1970 19...	--	.00	.77	.1	594	604	238	48	1210	8.1	--	15
01359830 - ONESQUETHAW CREEK NEAR CLARKSVILLE, N.Y. (LAT 42 33 49 LONG 073 55 44)												
AUG.. 1970 19...	--	.01	.08	.2	299	271	175	52	488	8.3	28.0	6
01359902 - COEYMANS CREEK AT SELKIRK, N.Y. (LAT 42 31 38 LONG 073 49 14)												
APR.. 1970 3...	.61	.08	.22	3.8	174	157	116	34	278	8.0	--	29
01359904 - FEURI SPRUYT AT SOUTH BETHLEHEM, N.Y. (LAT 42 31 40 LONG 073 50 50)												
AUG.. 1970 19...	--	.01	1.5	.3	762	676	502	394	1110	7.9	--	0

Table 3.--Chemical analyses of water samples from streams measured in Albany County, N.Y., August 19, 1970 (Continued)

DATE	TIME	DIS-CHARGE (CFS)	SILICA (SiO2) (MG/L)	CALCIUM (CA) (MG/L)	MAGNESIUM (MG)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)
01359915 - HANNACROIS CREEK AT DORMANSVILLE, N.Y. (LAT 42 29 49 LONG 073 58 46)												
AUG.. 1970	1100	.02	4.6	23	3.2	4.1	1.1	74	0	12	6.3	.1
01359924 - HANNACROIS CREEK NEAR NEW BALTIMORE, N.Y. (LAT 42 26 22 LONG 073 48 41)												
APR.. 1970	1530	843	4.0	24	2.6	5.1	1.0	50	0	24	7.6	.1
01361266 - TAGHKANIC CREEK TRIBUTARY AT TAGHKANIC, N.Y. (LAT 42 08 22 LONG 073 40 14)												
AUG.. 1970	0815	.10	5.8	26	2.9	4.6	.9	58	0	29	6.9	.1
01361276 - TAGHKANIC CREEK TRIB NO 2 NR EAST TAGHKANIC, N.Y. (LAT 42 07 20 LONG 073 40 58)												
AUG.. 1970	0905	.03	5.8	27	3.8	4.6	.4	66	0	26	7.0	.1
01361465 - FOX CREEK NEAR PRESTON HOLLOW, N.Y. (LAT 42 27 46 LONG 074 10 53)												
AUG.. 1970	1405	.00	4.4	37	4.2	5.7	.9	118	0	17	6.5	.1
01361550 - TEN MILE CREEK AT MEDUSA, N.Y. (LAT 42 26 10 LONG 074 07 58)												
AUG.. 1970	1540	1.6	3.6	18	1.8	5.0	.9	50	0	10	8.7	.1

DATE	ORGANIC NITRO-GEN (N) (MG/L)	NITRITE (NO2) (MG/L)	AMMONIA (NH4) (MG/L)	NITRATE (NO3) (MG/L)	DIS-SOLVED SOLIDS (RESI-DUE AT 180 C) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA, MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC COND-UCTANCE (MICRO-MHOS)	PH (UNITS)	TEMP-ERATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)
01359915 - HANNACROIS CREEK AT DORMANSVILLE, N.Y. (LAT 42 29 49 LONG 073 58 46)												
AUG.. 1970	--	.02	.13	4.2	--	53	70	10	169	7.5	16.0	2
01359924 - HANNACROIS CREEK NEAR NEW BALTIMORE, N.Y. (LAT 42 26 22 LONG 073 48 41)												
APR.. 1970	.18	.03	.08	1.5	108	94	70	30	164	8.0	--	14
01361266 - TAGHKANIC CREEK TRIBUTARY AT TAGHKANIC, N.Y. (LAT 42 08 22 LONG 073 40 14)												
AUG.. 1970	--	.01	.12	.0	127	105	77	30	189	7.7	15.0	5
01361276 - TAGHKANIC CREEK TRIB NO 2 NR EAST TAGHKANIC, N.Y. (LAT 42 07 20 LONG 073 40 58)												
AUG.. 1970	--	.00	.02	5.4	116	112	83	29	193	8.0	13.5	0
01361465 - FOX CREEK NEAR PRESTON HOLLOW, N.Y. (LAT 42 27 46 LONG 074 10 53)												
AUG.. 1970	--	.00	.01	9.7	148	144	110	13	248	7.8	21.0	2
01361550 - TEN MILE CREEK AT MEDUSA, N.Y. (LAT 42 26 10 LONG 074 07 58)												
AUG.. 1970	--	.01	.02	1.2	82	74	53	12	136	7.9	23.0	0

Table 4.--Water-quality requirements for selected industries and processes

[Concentrations represent upper limits for water at point of use before addition of internal conditioners and are in milligrams per liter except as indicated (From Hem, 1970, p. 334-335, and after U.S. Federal Water Pollution Control Adm., 1968)]

Constituent	Boiler feedwater pressure (pounds per square inch gauge)		Textiles (scouring, bleaching, and dyeing)	Chemical pulp and paper		Wood chemicals	Synthetic rubber	Petroleum products	Canned, dried, and frozen fruits and vegetables	Soft- drinks and bottling	Leather tanning (general finishing processes)	Hydraulic cement manu- facture
	0-150	150-700		700-1,500	1,500-5,000							
Silica (SiO ₂)	30	10	0.7	0.01	50	50	--	--	50	--	--	35
Aluminum (Al)	5	.1	.01	.01	--	--	--	--	--	--	--	--
Iron (Fe)	1	.3	.05	.01	1.0	.1	0.1	1	.2	0.3	0.3	25
Manganese (Mn)	.3	.1	.01	--	.5	.05	.1	--	.2	.05	.2	.5
Calcium (Ca)	--	0	0	--	20	20	80	75	100	--	--	--
Magnesium (Mg)	--	0	0	--	12	12	36	30	--	--	--	--
Ammonium (NH ₄)	.1	.1	.7	--	--	--	--	--	--	--	--	--
Copper (Cu)	.5	.05	.05	.01	--	--	--	--	--	--	--	--
Zinc (Zn)	--	0	0	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO ₃)	170	120	48	--	--	250	--	--	--	--	--	--
Sulfate (SO ₄)	--	--	--	--	--	100	--	--	250	500	250	250
Chloride (Cl)	--	--	--	--	200	200	500	300	250	500	250	250
Fluoride (F)	--	--	--	--	--	--	--	--	1	(¹)	--	--
Nitrate (NO ₃)	--	--	--	--	--	--	5	--	10	--	--	--
Hardness (as CaCO ₃)	20	0	0	25	100	100	900	350	250	--	--	--
Alkalinity (as CO ₃)	140	100	40	--	--	--	200	150	250	85	--	400
Acidity (as CO ₃)	0	0	0	--	--	--	--	--	0	--	--	0
pH	8.0-10.0	8.2-10.0	8.2-9.0	8.8-9.2	(²)	6-10	6.5-8.0	6.2-8.3	6.0-9.0	6.5-8.5	6.0-8.0	6.5-8.5
Dissolved solids	700	500	200	.5	100	--	1,000	--	1,000	500	--	600
Color (units)	--	--	--	5	30	10	20	20	5	10	5	--
Organics:												
CCl ₄ extract	1	1	.5	0	--	--	--	--	.2	(³)	(³)	1
Methylene-blue active substances	1	1	.5	0	--	--	--	--	--	--	--	--
Chemical oxygen demand	5	5	.5	0	--	--	--	--	--	--	--	--
Dissolved oxygen	2.5	.007	.007	.007	--	--	--	--	--	--	--	--
Temperature (°F)	--	--	--	--	95	--	--	--	--	--	--	--
Suspended solids	10	5	0	0	10	10	30	5	10	10	5	500

¹Not to exceed U.S. Public Health Service drinking-water standards.
²Limit for noncarbonate hardness, 70 mg/l as CaCO₃.
³Ranges from 2.5 to 10.5 depending on process and product.
⁴Carbon chloroform extract limit 0.2 mg/l; also specified to be free from taste and odor.
⁵Carbon chloroform extract limit 0.2 mg/l.