DEPARTMENT OF THE INTERIOR
ALBERT B. FALL, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

WATER-SUPPLY PAPER 473

SURFACE WATER SUPPLY OF THE UNITED STATES

1918

PART III. OHIO RIVER BASIN

NATHAN C. GROVER, Chief Hydraulic Engineer
ALBERT H. HORTON and C. G. PAULSEN, District Engineers

Prepared in cooperation with
THE STATES OF ILLINOIS AND KENTUCKY

WASHINGTON
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SURFACE WATER SUPPLY OF OHIO RIVER BASIN, 1918.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1918.

The data presented in these reports were collected by the United States Geological Survey under the following authority contained in the organic law (20 Stat. L., p. 394):

Provided, That this officer [the Director] shall have the direction of the Geological Survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

The work was begun in 1888 in connection with special studies relating to irrigation in the arid West. Since the fiscal year ending June 30, 1895, successive sundry civil bills passed by Congress have carried the following item and appropriations:

For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

Annual appropriations for the fiscal years ended June 30, 1895–1919.

1895	$12,500.00
1896	20,000.00
1897 to 1900, inclusive	50,000.00
1901 to 1902, inclusive	100,000.00
1903 to 1906, inclusive	200,000.00
1907	150,000.00
1908 to 1910, inclusive	100,000.00
1911 to 1917, inclusive	150,000.00
1918	175,000.00
1919	148,244.10

In the execution of the work many private and State organizations have cooperated either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 5.

Measurements of stream flow have been made at about 4,500 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1918, 1,180 gaging stations were

being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements are made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in water-supply papers from time to time.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those that represent a rate of flow, as second-feet, gallons per minute, miners' inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in depth in inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, and acre-feet. They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed.

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off in inches" is the depth to which an area would be covered if all the water flowing from it in a given period were uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth of inches.

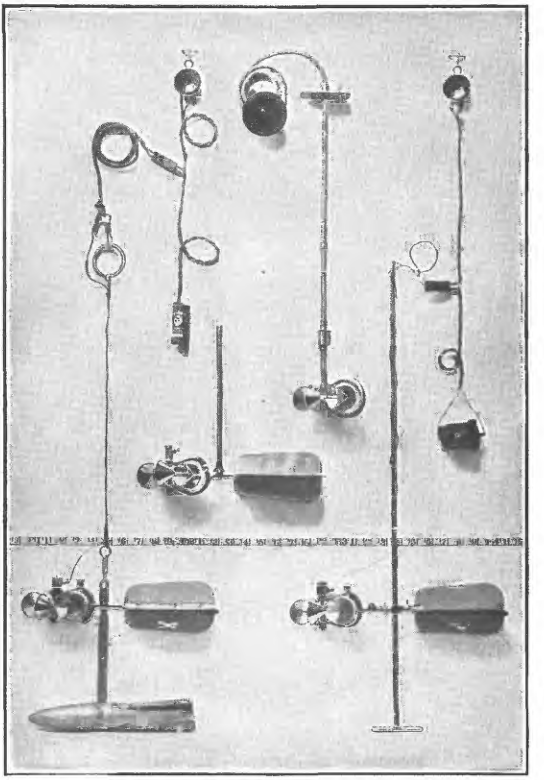
An "acre-foot," equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

The following terms not in common use are here defined:

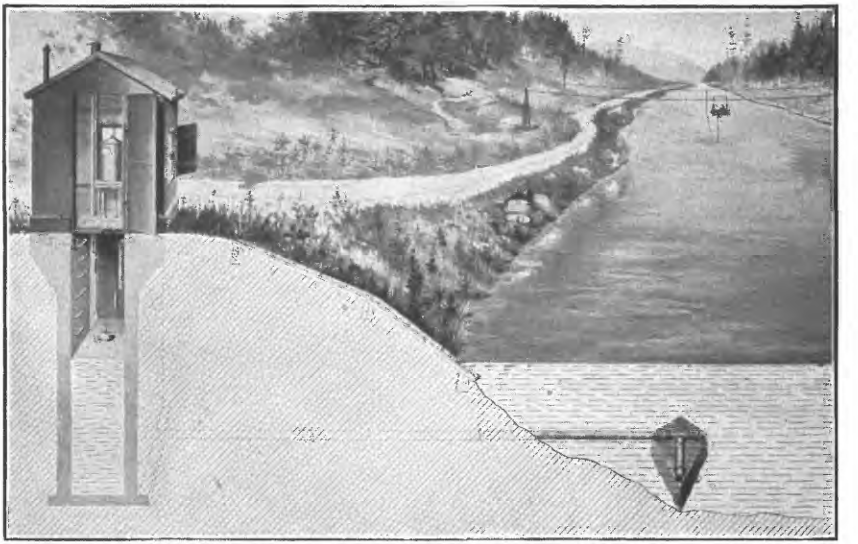
"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," a term used to designate the section or sections of the stream below the gage which determines the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

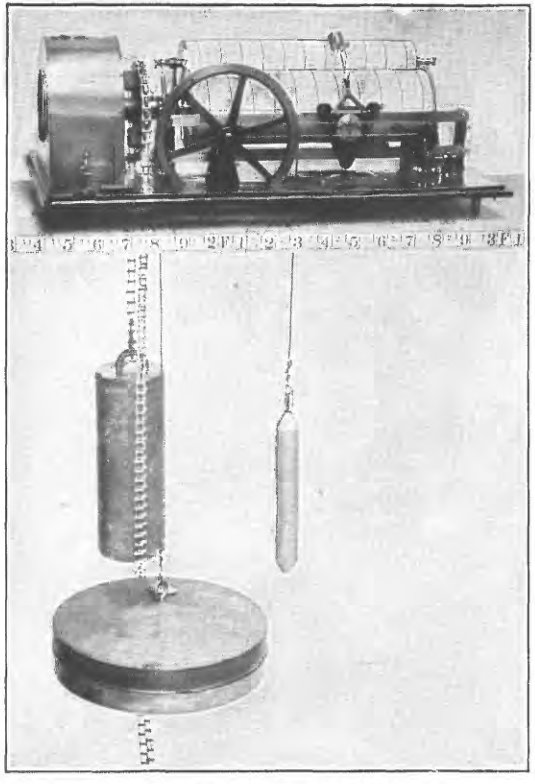
The "point of zero flow" for a gaging station is that point on the gage—the gage height—at which water ceases to flow over the gage.



A. PRICE CURRENT METERS.



B. TYPICAL GAGING STATION.



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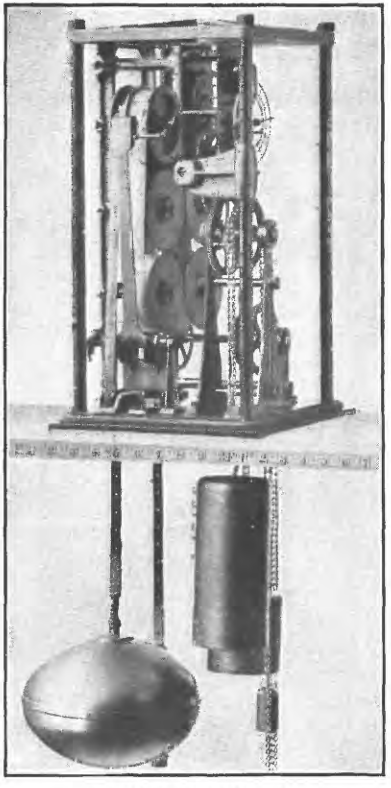
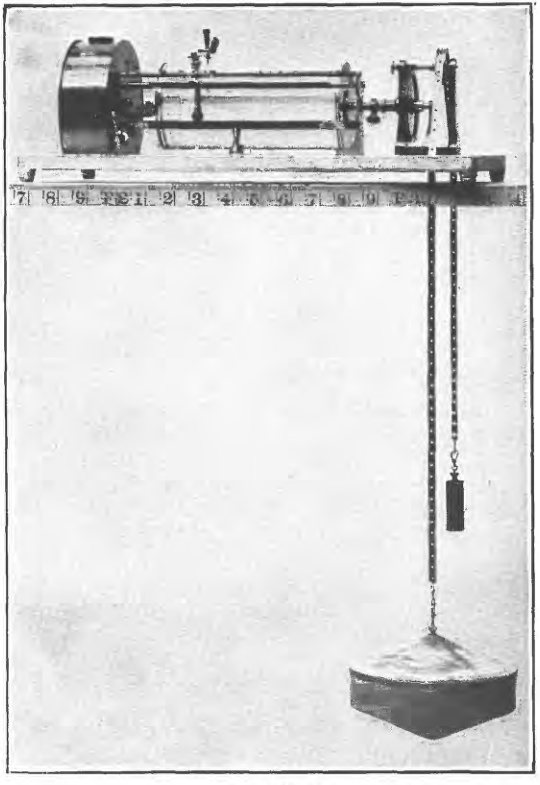


B. GURLEY PRINTING.



C. FRIEZ.

WATER-STAGE RECORDERS.

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1917, and ending September 30, 1918. At the beginning of January in most parts of the United States much of the precipitation in the preceding three months is stored as ground water in the form of snow or ice, or in ponds, lakes, and swamps, and this stored water passes off in the streams during the spring break-up. At the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for the year beginning October 1 is practically all derived from precipitation within that year.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter. (See Pls. I, II.) The general methods are outlined in standard textbooks on the measurement of river discharge.

From the discharge measurements rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to gage heights, give the discharge from which the daily, monthly, and yearly mean discharge is determined.

The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving results of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage heights and results of discharge measurements are published.

The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the permanence of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of control, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge gives, in general, the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders the

mean daily discharge may be obtained by averaging discharge at regular intervals during the day, or by using the discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day it does not indicate correctly the stage when the water surface was at crest height, and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column headed "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 2, are based.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS.

The accuracy of stream-flow data depends primarily (1) on the permanence of the stage-discharge relation and (2) on the accuracy of observation of stage, measurements of flow, and interpretation of records.

A paragraph in the description of the station gives information regarding the (1) permanence of the stage-discharge relation, (2) precision with which the discharge rating curve is defined, (3) refinement of gage readings, (4) frequency of gage readings, and (5) methods of applying daily gage heights to the rating table to obtain the daily discharge.[1]

For the rating tables "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined," within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "run-off in inches" are therefore not computed if such errors appear probable. The computations are also omitted for stations on

[1] For a more detailed discussion of the accuracy of stream-flow data see Grover, N. C., and Hoyt, J. C. Accuracy of stream-flow data: U. S. Geol. Survey Water-Supply Paper 400, pp. 53-59, 1916.

streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off in inches" previously published by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

The table of monthly discharge gives only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published.

COOPERATION.

Data for Allegheny River at Red House, N. Y., were collected in cooperation with the State of New York.

Work in Illinois during the year ending September 30, 1918, was carried on in cooperation with the State through the division of waterways of the Department of Public Works.

Work in Kentucky was done in cooperation with the State Geological Survey, J. B. Hoeing, State geologist.

The United States Engineer Corps cooperated in the maintenance of 9 gaging stations in the Ohio River basin and furnished base data for 30 additional stations.

Financial assistance was also rendered by the Alabama Geological Survey and the Tennessee Power Co.

DIVISION OF WORK.

Data for Allegheny River at Red House, N. Y., were collected and prepared for publication under the direction of C. C. Covert, district engineer, assisted by O. W. Hartwell, E. D. Burchard, and J. W. Moulton.

Data for the Ohio River basin, except those for the Allegheny at Red House, N. Y., for stations in Illinois, and for the basin of Tennessee River, were collected and prepared for publication under the direction of A. H. Horton, district engineer, assisted by B. J. Peterson, B. L. Hopkins, and B. L. Bigwood.

Data for stations in Illinois in the Ohio basin were collected and prepared for publication under direction of W. G. Hoyt, district engineer, assisted by H. C. Beckman.

Field data for stations in the Tennessee River basin were collected and prepared for publication under the direction of C. G. Paulsen, district engineer, assisted by B. J. Peterson, A. H. Condron, L. J. Hall, and Miss E. M. Tiller.

The records were assembled and reviewed by B. J. Peterson.

GAGING-STATION RECORDS.

ALLEGHENY RIVER BASIN.

ALLEGHENY RIVER AT RED HOUSE, N. Y.

LOCATION.—At highway bridge in Red House, Cattaraugus County, 5 miles below Salamanca and 13 miles above boundary line between New York and Pennsylvania. Conewango Creek, outlet of Chautauqua Lake, enters the Allegheny in Pennsylvania 30 miles below station.

DRAINAGE AREA.—1,640 square miles.

RECORDS AVAILABLE.—September 4, 1903, to September 30, 1918.

GAGE.—Gurley seven-day water-stage recorder on left bank just below highway bridge, installed September 3, 1917. Prior to that date, chain gage attached to upstream side of bridge near left end. Recorder inspected by W. E. Coe.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Coarse gravel; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum stage during year from water stage-recorder, 11.70 feet at 5 a. m. March 15 (discharge, 30,000 second-feet); minimum stage, 3.1 feet from 10 a. m. to 5 p. m. July 24 (discharge, 260 second-feet).

1903–1918: Maximum stage recorded, 12.7 feet March 26, 1913 (discharge, about 40,000 second-feet); minimum stage recorded, 2.7 feet on several days in December, 1908 (discharge, about 100 second-feet).

ICE.—Stage-discharge relation somewhat affected by ice.

REGULATION.—Low-water flow may be slightly affected by the operation of several small power plants above Salamanca. A storage reservoir on the divide between Oil Creek, tributary to Allegheny River, and Black Creek, tributary to Genesee River, was formerly used for supplying water to the Erie canal system through the abandoned Genesee River canal and Genesee River. This reservoir is no longer used for canal purposes, and all the water is turned into Allegheny River through Olean Creek.

ACCURACY.—Stage-discharge relation practically permanent between dates of shifting; affected by ice during most of the period from December to February. Rating curve well defined between 300 and 900 second-feet, and between 6,000 and 15,000 second-feet. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting gage-height graph. Open-water records good; others fair.

Discharge measurements of Allegheny River at Red House, N. Y., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 21	E. D. Burchard	[a]4.37	958	Mar. 20	E. D. Burchard	6.26	6,170
Jan. 21	do	[a]4.47	374	May 28	J. W. Moulton	5.96	5,300
Feb. 28	do	7.37	9,900	June 21	E. D. Burchard	3.58	657
28	do	7.30	9,560	Aug. 22	do	3.32	408

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Allegheny River at Red House, N. Y., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	340	15,000	1,460	800	360	10,600	1,740	1,660	2,240	992	635	538
2	402	10,200	1,870	750	340	13,300	1,710	1,580	2,110	918	481	675
3	410	7,260	1,480	650	380	13,300	1,640	1,460	1,860	836	392	635
4	655	4,930	1,420	600	360	11,000	2,160	1,310	1,490	727	463	556
5	1,050	3,940	1,350	480	340	8,230	2,250	1,240	1,370	655	1,540	585
6	1,010	3,180	1,170	550	340	9,250	2,060	1,240	1,220	625	1,360	1,550
7	998	2,780	998	550	360	10,200	1,860	1,240	1,240	547	894	1,370
8	878	2,460	775	700	380	7,440	1,770	1,220	1,460	509	780	980
9	844	2,160	700	750	420	6,540	1,920	1,210	1,160	490	1,040	802
10	867	1,990	700	600	460	11,600	2,110	1,460	980	490	942	696
11	786	1,830	750	400	800	9,600	1,970	2,480	905	528	905	605
12	786	1,680	800	360	1,700	8,070	2,060	2,980	1,180	518	1,100	576
13	1,170	1,540	850	320	6,500	9,250	2,110	2,820	1,920	490	1,070	1,250
14	1,440	1,410	850	360	9,000	23,400	3,660	2,290	1,580	445	870	2,330
15	1,290	1,290	850	380	9,600	28,400	5,290	2,020	1,160	400	980	1,640
16	2,070	1,250	800	380	8,900	21,800	5,290	1,940	1,000	378	1,020	1,480
17	1,920	1,210	800	380	5,830	15,100	5,420	1,800	942	362	859	3,090
18	1,480	1,170	750	380	3,310	9,600	5,560	1,770	942	340	696	3,660
19	1,790	1,100	750	380	3,540	7,140	5,560	1,740	848	325	595	2,620
20	7,510	1,040	750	380	18,800	5,970	5,290	1,360	696	299	518	3,420
21	7,560	1,010	1,100	380	16,800	5,420	4,770	1,460	685	292	481	4,640
22	6,170	1,080	1,700	380	12,900	5,160	4,270	2,290	2,580	280	427	4,020
23	4,550	1,280	1,700	360	8,900	4,640	3,780	3,310	4,820	266	409	3,200
24	5,080	1,280	1,900	360	8,230	4,140	3,540	4,520	3,730	292	392	2,580
25	10,200	1,180	2,800	360	6,990	3,660	3,200	4,400	2,600	1,140	370	2,220
26	10,200	1,170	2,600	380	10,900	3,200	2,680	5,560	2,040	1,020	332	2,110
27	12,800	938	2,000	400	11,000	2,840	2,350	7,140	1,690	675	325	2,310
28	17,800	1,080	1,600	400	9,600	2,540	2,110	5,160	1,420	500	299	2,200
29	18,800	1,100	1,400	400	.....	2,270	1,890	3,660	1,210	409	378	1,860
30	23,800	1,130	1,200	380	.....	2,040	1,770	2,860	1,080	716	566	1,580
31	21,800	.....	950	360	.....	2,040	.....	2,660	.....	665	538	.....

NOTE.—Discharge Dec. 9 to Feb. 14 estimated, because of ice, from discharge measurements, weather records, study of gage-height graph and comparison with similar studies for near-by streams.

Monthly discharge of Allegheny River at Red House, N. Y., for the year ending Sept. 30, 1918.

[Drainage area, 1,640 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	23,800	340	5,370	3.27	3.77
November	15,000	938	2,620	1.60	1.78
December	2,800	700	1,250	.762	.88
January	800	320	462	.282	.33
February	18,800	340	5,610	3.42	3.56
March	28,400	2,040	8,960	5.46	6.30
April	5,560	1,640	3,060	1.87	2.09
May	7,140	1,210	2,510	1.53	1.76
June	4,820	685	1,610	.982	1.10
July	1,140	266	553	.337	.39
August	1,540	299	699	.426	.49
September	4,640	538	1,860	1.13	1.26
The year	28,400	266	2,860	1.74	23.71

MONONGAHELA RIVER BASIN.

TYGART RIVER NEAR DAILEY, W. VA.

LOCATION.—At Burnt Bridge, on Staunton-Parkersburg pike 1 mile northeast of Dailey, Randolph County, and 2 miles south of Beverly, on Western Maryland Railway, Stalnaker Run enters river on right 1,000 feet below station.

DRAINAGE AREA.—194 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 20, 1915, to September 30, 1918.

GAGE.—Vertical staff on face of right abutment of bridge near downstream end; read by Charles W. Chenoweth.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Channel straight for 100 feet above bridge; curves slightly to right below bridge. Bed composed of small boulders. Banks sandy. Right bank high; left bank low; large overflow through meadows at high stages. Control probably permanent. Point of zero flow, September 26, 1917, at gage height 0.2 foot ±0.1 foot.

EXTREMES OF STAGE.—Maximum stage recorded during year, 15.9 feet at 5 p. m. March 13; minimum stage recorded, 0.68 foot October 7, 8, and 9.

1915–1918: Maximum stage recorded same as for 1918. Highest known flood reached a stage represented by gage height about 16 feet. Minimum stage recorded, 0.6 foot September 6, 1916.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation probably permanent except as affected by ice. Rating curve not fully developed. Gage read to hundredths twice daily. Records good.

The following discharge measurement was made by B. L. Hopkins:

May 3, 1918: Gage height, 2.10 feet; discharge, 216 second-feet.

Daily gage height, in feet, of Tygart River near Dailey, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.80	2.35	2.66	2.50	2.70	3.00	1.70	2.40	1.85	3.57	1.10	1.94
2	.77	1.80	2.29	.....	2.40	2.88	1.68	2.25	1.72	2.60	.90	1.45
3	.74	1.58	2.05	.....	2.30	2.58	1.99	2.10	1.62	2.38	.89	1.32
4	.72	1.44	1.98	.....	2.20	2.32	2.22	2.02	1.52	1.90	.87	1.16
5	.71	1.37	1.82	2.50	2.60	2.85	.....	1.92	1.42	1.69	.85	1.00
6	.70	1.30	1.68	1.65	2.70	3.28	.....	1.82	1.30	1.60	.82	1.24
7	.66	1.23	1.58	1.95	3.35	5.62	.....	2.05	1.90	1.48	.85	1.08
8	.68	1.86	1.49	3.09	3.95	4.78	2.24	8.10	1.95	1.32	1.08	1.25
9	.68	1.24	1.45	.....	5.92	3.55	5.68	5.35	1.50	1.28	1.00	1.18
10	.69	1.10	1.45	.....	7.70	3.25	4.35	3.45	1.40	1.60	1.18	1.08
11	.70	1.06	.....	.....	4.60	3.10	3.62	2.88	1.28	1.68	1.57	1.02
12	.72	1.05	.....	3.40	4.38	2.88	3.38	2.55	1.15	1.32	1.78	.96
13	.74	1.04	.....	3.40	4.70	12.55	2.58	3.71	1.12	1.11	2.00	.97
14	.80	1.04	.....	.....	4.00	10.95	3.12	7.64	1.08	1.00	2.33	1.58
15	.84	1.01	1.45	.....	4.80	8.05	5.80	4.25	.98	1.00	1.95	1.36
16	.81	.98	1.45	3.20	4.00	5.14	4.85	3.25	.95	1.10	1.60	1.17
17	.78	.96	.....	.....	3.15	3.55	3.95	3.00	1.78	1.10	1.42	1.38
18	.76	.92	.....	.....	2.45	2.92	3.22	2.46	2.45	1.10	1.78	2.56
19	.76	.91	.....	3.20	2.50	2.68	2.72	2.05	2.02	1.91	2.81	2.86
20	1.52	.91	.....	.....	7.70	2.55	2.60	2.08	1.58	1.55	1.94	2.22
21	1.54	.90	.....	.....	6.05	2.45	2.88	2.15	1.42	1.35	1.57	2.70
22	1.30	.92	1.50	1.80	3.50	2.18	3.22	1.98	1.50	1.18	1.38	2.49
23	1.14	.97	1.42	.....	3.10	2.79	2.92	3.68	1.38	.99	1.24	1.93
24	1.14	.98	3.16	.....	2.75	2.56	3.00	3.58	1.28	.94	1.15	1.70
25	1.36	1.10	4.68	1.80	4.30	2.55	3.75	5.90	1.41	.90	1.06	1.58
26	1.48	1.10	3.58	.....	9.60	2.45	3.61	8.91	3.34	1.04	1.01	1.40
27	1.80	1.10	2.97	6.45	5.15	2.28	3.38	4.18	2.15	1.08	.95	1.34
28	2.40	1.10	2.70	10.18	3.52	2.20	3.08	3.55	1.78	.90	.90	1.24
29	1.86	2.16	2.50	8.18	.....	2.05	2.75	2.98	8.75	.88	.88	1.18
30	2.20	2.30	2.50	4.45	.....	2.00	2.52	2.44	4.88	.89	.88	1.12
31	2.40	.....	2.50	3.32	.....	2.00	.....	2.15	.....	1.28	2.12	.....

NOTE.—Stage-discharge relation affected by ice Dec. 10 to Jan. 29. Gage not read Dec. 11–14, 17–21, Jan. 2–4, 9–11, 14, 15, 17, 18, 20, 21, 23, 24, 26. Gage heights Apr. 5-7 withheld because of observer's error in making readings.

TYGART RIVER AT BELINGTON, W. VA.

LOCATION.—At highway bridge at Belington, Barbour County, a quarter of a mile above mouth of Mill Creek.

DRAINAGE AREA.—390 square miles.

RECORDS AVAILABLE.—June 5, 1907, to September 30, 1918.

GAGE.—Chain gage attached to the upstream side of highway bridge to left of center of the river; read by S. A. Campbell. Sea-level elevation of zero of gage, 1,679.89 feet.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Channel straight above and below bridge. Bed composed of firm, coarse gravel. Banks high. Control slightly shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 19.42 feet at 7.30 a. m. March 14 (discharge, 17,400 second-feet); minimum stage recorded, 1.90 feet at 7 a. m. October 9 (discharge, 8 second-feet).

1907–1918: Maximum stage recorded, 21.48 feet March 13, 1917 (discharge, 20,100 second-feet); minimum stage recorded, 1.70 feet October 2, 1914 (discharge, 3 second-feet).

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—The change in rating curve indicated by discharge measurements made in 1920 probably was caused by the high water in March, 1918. Stage-discharge relation also affected by ice. Rating curve used for open-water periods October 1, 1917, to March 15, 1918, fairly well defined between 13 and 300 second-feet and well defined between 300 and 4,000 second-feet; curve extended beyond these limits. Curve used March 16 to September 30, 1918, fairly well defined between 50 and 150 second-feet and well defined between 150 and 3,000 second-feet; extended beyond these limits. Gage read to hundredths once daily. Owing to indistinct figures at footmarks on gage scale, some of the gage readings were in error by multiples of half a foot. Records for these days were interpreted by comparison with records for stations at Dailey, Fetterman, Midvale, and Hall. Daily discharge for open-water periods ascertained by applying daily gage height to rating table; for period of ice effect estimated by means of observer's notes, weather records and comparison with records for other stations. Open-water records fair; those for period of ice effect, roughly approximate.

Records of discharge for years ending September 30, 1916 and 1917, as given in following tables supersede those published in previous reports owing to revision based on comparison of discharge at Belington with that at Dailey and the combined discharge at stations at Belington, Midvale, and Hall with that at Fetterman.

The following discharge measurement was made by B. L. Hopkins:

August 29, 1918: Gage height, 4.38 feet; discharge, 823 second-feet.

Daily discharge, in second-feet, of Tygart River at Belington, W. Va., for the years ending Sept. 30, 1916–1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.												
1	77	100	290	1,340	2,510	672	1,060	550	590	160	110	40
2	5,260	90	270	4,830	3,100	820	1,000	618	440	141	90	32
3	2,040	70	252	3,930	1,970	1,340	820	760	395	2,670	56	34
4	820	70	233	1,760	1,200	1,060	820	730	465	1,690	50	31
5	590	55	233	1,130	1,000	1,000	820	700	490	672	110	34
6	440	89		1,000	700	940	760	645	350	350	618	22
7	372	82		1,200	2,350	2,590	618	515	310	226	618	32
8	310	82		940	2,350	6,250	540	540	395	160	350	60
9	233	114		820	1,690	2,920	645	1,060	270	119	252	90
10	149	95		700	1,340	1,690	820	820	310		219	100
11	141	93	200	3,930	1,200	1,200	940	672	395	80	252	90
12	138	93		9,920	2,190	820	1,000	490	290		252	49
13	119	152		3,930	6,250	820	1,060		252	116	590	25
14	100	160		2,750	4,330	1,410	820	320	198	212	645	270
15	91	4,030		1,690	1,900	5,150	760		540	330	440	2,190
16	104	4,530			1,340	3,100	645	395	350	330	270	1,480
17	99	1,620	1,340		940	1,830	740	940	252	185	219	760
18	95	820	8,100		820	1,200	820	645	172	500	290	330
19	95	618	7,740	1,040	700	940	700	520	290	800	192	198
20	2,350	820	2,510		590	940	645	490	418	310	116	141
21	1,200	820	1,340		880	820	590	330	418	202	97	110
22	700		880	2,430	1,060	4,000	540	350	820		91	89
23	490		672	1,690	880	5,000	440	310	590	320		75
24	465		540	1,690	820	2,750	490	330	270		90	73
25	372	400	330	1,270	820	1,620	820	350	192			61
26	233		540	880	1,200	1,130	1,830	270	1,900	290	56	59
27	219		1,060	700	1,060	820	2,350	1,480	820	208	60	45
28	198		1,130	565	820	1,200	1,830		372	300	70	41
29	166		2,920	540	700	2,190	1,410	600	330	418	55	67
30	124	290	5,920	2,670	.....	1,480	900		290	172	50	2,040
31	110	.....	2,670	3,100	.....	1,340	.....	.....	.....	133	50	.....
1916–17.												
1	700	79	252	700	1,000	3,370	540	800	1,340	300	69	212
2	395	80	212	672		2,110	440	700	1,130	202	48	121
3	233	80	176	1,830		2,110	372	515	940	185	72	67
4	169	75	169	2,920		5,000	350	440	820	110	97	69
5	138	70	226	1,900		4,630	230		565	104	101	39
6	116	70	540	3,640	460	3,010	700	370	465	69	82	88
7	93	60	395	3,190		1,970	1,480	310	395	43	35	106
8		51	310	1,690		6,800	1,760	270	330	222	34	310
9	70	56	233	1,060		6,690	2,510	540	233	84	40	540
10	89	53		820		2,830	1,480	1,200	216	69	182	418
11	179	59		645		2,510	1,270	1,000	672	44	95	192
12	138	49		418		12,300	1,340	820	233	40	75	130
13	114	82				20,100	940	672	270	32	37	82
14	91	77				13,400	760	540	226	31	31	61
15	82	77	140		200	4,830	660	440	192	22	27	44
16	77	70		570		2,590	540	395	188	155	23	42
17	179	86				1,340	465	330	133	155	22	41
18	233	70				1,340	395	270	128	119	23	30
19	330	72				1,690	330	208	84	222	19	23
20	395	73			1,900	1,400	350	233	89	350	15	22
21	590	82	440	820	3,190	1,200	290	202	104	182	14	20
22	515	80	940	9,060	1,760	2,670	252	192	99	210	12	24
23	418	80	3,930	7,860	1,060	2,510	222	233	70		12	36
24	310	138	2,190	2,040		1,900	216	222	67	310	17	46
25	233	760	1,060	1,270	5,500	2,190	210	212	79	565	24	32
26	198	590	700	820		1,900	212	158	72	490	23	23
27	136	372	590	565		1,130	195	3,000	61		26	16
28	128	270	2,270	515	3,830	1,000	252	7,260	60		17	17
29		270	6,030	590	.....	700	440	6,360	240	180	14	14
30	110	230	1,620	700	.....	618	880	3,830	395		20	14
31	82	.....	1,270	590	.....	540	.....	2,350	.....		17	.....

Daily discharge, in second-feet, of Tygart River at Belington, W. Va., for the years ending Sept. 30, 1916–1918—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1917–18.												
1	14	440	645	250	1,270	1,270	321	644	407	1,450	85	213
2	14	310	590	250	985	1,200	282	498	321	904	63	407
3	13	205	490	240	700	940	321	452	246	570	62	213
4	14	128	372	210	700	880	694	385	207	430	43	156
5	13	119	330	210	490	1,000	644	302	156	407	40	106
6	14	110	270	210	820	1,550	522	321	73	264	87	87
7	19	95	219	220	2,750	1,830	430	210	183	264	108	87
8	13	82	179	270	3,010	4,230	430	990	797	230	186	98
9	8	70	150	340	7,380	1,760	2,790	3,460	475	130	178	85
10	13	46	120	490	4,930	1,760	2,870	1,660	246	110	146	82
11	13	48	100	700	3,550	1,830	2,000	960	154	80	264	65
12	17	46	80	760	2,190	1,060	1,780	670	110	82	264	48
13	13	49	70	1,450	2,110	5,370	1,440	520	92	92	282	59
14	20	48	60	1,400	2,190	17,400	1,100	3,050	90	59	407	106
15	15	48	60	1,240	1,620	12,400	3,810	1,440	63	73	694	119
16	15	48	50	1,130	2,350	4,010	2,870	1,130	59	73	407	90
17	13	36	50	1,300	1,900	1,920	2,230	730	63	82	213	106
18	13	40	40	910	800	1,190	1,370	660	1,440	59	119	282
19	18	30	40	600	610	797	959	342	694	108	321	1,250
20	30	30	30	420	5,590	644	644	321	363	282	498	694
21	77	30	40	330	1,900	546	595	302	342	142	246	797
22	158	34	60	290	1,130	644	1,130	342	522	106	170	745
23	75	35	80	260	1,130	850	1,310	1,560	363	73	112	452
24	55	40	90	230	618	694	1,020	1,500	321	58	90	321
25	99	36	100	230	2,830	694	959	2,800	213	47	78	204
26	252	46	1,020	210	5,590	644	1,370	6,420	904	42	60	183
27	270	49	1,130	1,170	7,260	595	1,130	2,940	1,130	32	53	132
28	672	58	660	3,840	2,190	595	850	1,620	183	32	46	94
29	418	65	430	7,680	.....	452	797	1,450	1,500	54	34	94
30	290	645	270	5,370	.....	385	694	745	2,900	59	53	98
31	672	.....	250	2,190	.....	321	.....	570	.....	66	98	.....

NOTE.—Discharge estimated because of ice, Dec. 6–16, 1915, Jan. 16–21, and Dec. 10–20, 1916, Jan. 13–20, Feb. 2–19, and Dec. 9, 1917, to Jan. 29, 1918. Discharge for following days estimated by comparison with records of flow for stations at Dailey, Fetterman, Midvale, and Hall: Feb. 18, 19, Apr. 14, May 7–13, 16–18, 24–29, June 30 and July 1, 1918. Discharge Nov. 5 and 15, 1917, and Feb. 2, 1918, interpolated. Braced figures show mean discharge for periods indicated.

Monthly discharge of Tygart River at Belington, W. Va., for the years ending Sept. 30, 1916–1918.

[Drainage area, 390 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
1915–16.					
October	5,260	77	577	1.48	1.71
November	4,530	55	603	1.55	1.73
December	8,100	.....	1,330	3.41	3.93
January	9,920	540	1,990	5.10	5.88
February	6,250	590	1,610	4.13	4.45
March	6,250	672	1,900	4.87	5.62
April	2,350	540	908	2.33	2.60
May	1,480	270	576	1.48	1.71
June	1,900	172	439	1.13	1.26
July	2,670	.....	394	1.01	1.16
August	645	50	211	.541	.62
September	2,040	22	289	.741	.83
The year	9,920	22	902	2.31	31.50

Monthly discharge of Tygart River at Belington, W. Va., for the years ending Sept. 30, 1916–1918—Continued.

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
1916–17.					
October	700	70	217	0.556	0.64
November	760	49	142	.364	.41
December	6,030	.....	809	2.07	2.39
January	9,060	418	1,580	4.05	4.67
February	.....	.....	1,450	3.72	3.87
March	20,100	540	3,750	9.62	11.09
April	2,510	195	669	1.72	1.92
May	7,260	158	1,110	2.85	3.29
June	1,340	60	330	.846	.94
July	565	22	175	.449	.52
August	182	12	42.7	.109	.13
September	540	14	96.0	.246	.27
The year	20,100	12	866	2.22	30.14
1917–18.					
October	672	8	108	0.277	0.32
November	645	30	102	.262	.29
December	1,130	30	260	.667	.77
January	7,680	210	1,110	2.85	3.29
February	7,380	490	2,450	6.28	6.54
March	17,400	321	2,240	5.74	6.62
April	3,810	282	1,260	3.23	3.60
May	6,420	210	1,260	3.23	3.72
June	2,900	59	487	1.25	1.40
July	1,450	32	208	.533	.61
August	694	34	178	.456	.53
September	1,250	48	249	.638	.71
The year	17,400	8	815	2.09	28.40

TYGART RIVER AT FETTERMAN, W. VA.

LOCATION.—At highway bridge at Fetterman, Taylor County, three-fourths mile above mouth of Otter Creek.

DRAINAGE AREA.—1,340 square miles.

RECORDS AVAILABLE.—June 3, 1907, to September 30, 1918.

GAGE.—Chain gage attached to downstream side of highway bridge; read by Joseph Weaver. Sea-level elevation of zero of gage, 957.86 feet.

DISCHARGE MEASUREMENTS.—Made from downstream side of the bridge or by wading.

CHANNEL AND CONTROL.—Channel straight above and below bridge. Both banks high. Control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 24.1 feet at midnight March 13 (discharge, about 45,400 second-feet); minimum stage recorded, 3.15 feet October 8–11 (discharge, 58 second-feet).

1907–1918: Maximum stage recorded, 29.1 feet July 25, 1912 (discharge, 57,600 second-feet); minimum stage recorded, 2.30 feet October 27–28, and November 4–10, 1912 (discharge, 12 second-feet).

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent, except as affected by ice. Rating curve well defined between 80 and 23,000 second-feet, poorly defined below 80 second-feet; extended above 23,000 second-feet. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for periods of ice effect. Records good except those for periods of ice effect which are poor.

The following discharge measurement was made by B. L. Hopkins:

April 27, 1918: Gage height, 5.75 feet; discharge, 3,040 second-feet.

Daily discharge, in second-feet, of Tygart River at Fetterman, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	65	1,450	1,850	750	3,910	4,290	920	1,930	1,610	2,790	348	2,100
2	65	1,100	1,610	650	2,610	3,340	865	1,690	1,100	1,850	255	2,020
3	65	920	1,450	600	2,026	2,970	865	1,450	865	1,450	348	1,030
4	65	760	1,230	650	2,270	2,610	1,300	1,300	710	975	255	665
5	65	578	975	680	1,690	3,150	1,770	1,160	620	865	244	535
6	65	455	810	710	1,380	4,670	1,380	1,030	535	1,030	200	455
7	65	380	710	760	3,150	6,000	1,300	975	3,340	665	155	380
8	58	315	620	920	7,940	7,560	1,380	6,380	3,340	535	138	315
9	58	315	500	1,200	11,300	6,380	7,940	9,700	1,690	455	120	285
10	58	285	350	1,700	17,600	6,000	9,120	5,240	1,030	380	155	200
11	58	285	300	1,900	11,100	5,620	7,560	3,530	710	348	620	255
12	65	285	250	2,610	6,780	5,240	7,750	2,610	535	315	455	200
13	65	200	200	4,860	6,000	16,200	5,810	2,270	455	380	810	228
14	65	200	200	4,670	5,430	41,600	5,620	7,160	380	328	810	255
15	65	200	200	4,290	5,240	28,800	6,000	8,340	315	315	1,380	200
16	65	155	200	3,910	5,240	13,400	7,360	4,480	255	303	1,100	191
17	90	155	180	4,480	3,910	6,190	5,620	2,970	1,610	255	710	348
18	90	155	160	3,150	2,610	3,910	3,720	2,100	3,150	255	495	865
19	138	155	160	2,100	2,270	2,790	2,790	1,530	2,440	315	380	1,530
20	535	155	170	1,450	16,400	2,100	2,270	1,770	1,380	255	455	2,610
21	380	155	200	1,160	15,700	1,930	2,610	1,450	1,030	267	665	2,610
22	455	138	267	1,030	6,780	2,790	5,240	1,230	865	418	455	2,610
23	535	138	348	920	3,910	2,610	4,100	1,300	1,690	315	380	1,770
24	535	138	535	760	3,340	2,270	3,150	2,610	1,030	255	285	1,160
25	620	148	920	760	6,780	2,100	2,790	7,560	710	418	228	760
26	1,100	228	3,530	710	22,900	1,930	2,610	20,200	1,030	255	200	620
27	1,230	348	3,910	4,100	18,800	1,850	2,970	13,400	3,150	200	178	535
28	1,380	440	2,270	21,900	7,560	975	3,340	5,430	1,690	178	155	455
29	1,690	665	1,450	25,600	.....	1,380	2,970	4,100	2,020	155	200	380
30	1,610	1,930	920	15,900	.....	1,160	2,270	2,610	4,480	620	178	315
31	1,300	.....	860	7,160	.....	1,030	.....	2,270	.....	810	578	.....

NOTE.—Discharge estimated because of ice Dec. 9-21, 30, 31, Jan. 1-5, 8-24, by means of observer's notes weather records, and comparison with records of flow at other stations on this river.

Monthly discharge of Tygart River at Fetterman, W. Va., for the year ending Sept. 30, 1918.

[Drainage area, 1,340 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,690	58	410	0.306	0.35
November	1,930	138	428	.319	.36
December	3,910	160	882	.658	.76
January	25,600	600	3,940	2.94	3.39
February	22,900	1,380	7,310	5.46	5.69
March	41,600	975	6,220	4.64	5.35
April	9,120	865	3,780	2.82	3.15
May	20,200	975	4,190	3.13	3.61
June	4,480	255	1,460	1.09	1.22
July	2,790	155	579	.432	.50
August	1,380	120	417	.311	.36
September	2,610	191	863	.644	.72
The year	41,600	58	2,510	1.87	25.46

MONONGAHELA RIVER AT LOCK 15, HOULT, W. VA.

LOCATION.—At Lock 15, at Hoult, 2½ miles below county highway bridge at Fairmont, Marion County, and 4 miles below mouth of West Fork. Buffalo Creek enters on left three-fourths mile above station.

DRAINAGE AREA.—2,430 square miles (measured on topographic maps).

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1918. Upper and lower gages at Lock 15 have been read under direction of United States Engineer Corps since May 1, 1904.

GAGE.—Upper vertical staff gage at lock. Lower section is set in recess in left lock wall just above upper gate; upper section, 61.5 feet from face of right lock wall, directly opposite lower section, was used until January 29, 1918, when it was carried away by ice. Read by Charles R. Hall, lockmaster.

DISCHARGE MEASUREMENTS.—Made from bridge at Fairmont or by wading on crest of dam at the lock. Flow of Buffalo Creek is added to discharge measured at bridge.

CHANNEL AND CONTROL.—One channel at all stages; straight half a mile above and below bridge. Control for station is crest of dam; permanent. Point of zero flow, gage height 6.9 feet, elevation of crest of dam. Leakage through lock and occasional opening of valves of lock may affect stage at which flow would be zero.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 21.1 feet at 5 a. m. March 14 (discharge, 91,200 second-feet); minimum stage recorded, 6.96 feet at 6 p. m. July 29, due to opening valves. Minimum stage recorded under normal conditions, 7.02 feet at 5 p. m. October 2 (discharge, 55 second-feet).

1915–1918: Maximum stage recorded same as for 1918; minimum stage recorded, 6.10 feet July 31, 1916, due to opening valves. Minimum stage recorded under normal conditions, 7.00 feet September 26, 1917 (discharge, 47 second-feet). Flood of 1888, before dam No. 15 was built, reached a stage represented by gage height of about 26 feet.

ICE.—Stage-discharge relation affected by ice when ice in pool above dam forms close to crest of dam.

DIVERSIONS.—Leakage through lock and water used for lockages. See "Accuracy."

REGULATION.—None under normal conditions. Pool No. 15 may be lowered at times in the interest of navigation.

ACCURACY.—Stage-discharge relation permanent except for effect of operations at lock and change in leakage through lock, the change depending on which gates are open; slightly affected by ice. Rating curve well defined to 62,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, and adding amount of water used for lockage. Rating table makes allowance based on measurement for leakage through upper gates, for under normal conditions upper gates are closed; gage reader records number of lockages and length of time upper gates are open. Daily discharge corrected for effect of lockage and change in leakage when upper gates at lock are open. Records good.

The following discharge measurement was made by B. L. Hopkins:

May 10, 1918: Gage height, 10.07 feet; discharge, 7,860 second-feet.

Daily discharge, in second-feet, of Monongahela River at Lock 15, Hoult, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	97	2,740	2,360	980	5,880	6,620	1,290	3,140	2,750	3,750	900	3,020
2	93	2,120	2,230	810	3,570	5,170	1,180	2,740	1,780	2,240	488	3,000
3	95	1,570	2,230	730	3,140	4,340	1,370	2,120	1,280	1,900	287	1,680
4	89	1,030	1,780	810	3,140	3,720	2,000	1,790	949	1,300	255	995
5	104	836	1,470	810	2,230	5,520	2,730	1,570	821	1,060	297	654
6	93	598	1,280	963	2,000	8,270	2,120	1,380	624	1,110	253	510
7	98	566	984	827	6,250	6,250	1,780	1,370	4,040	869	192	454
8	112	510	844	1,370	14,000	8,710	2,120	13,500	6,650	622	178	385
9	107	468	650	2,000	22,000	7,020	14,500	14,500	3,280	466	161	337
10	96	411	455	2,000	25,900	9,680	15,000	7,820	1,680	436	168	300
11	94	411	400	2,120	17,200	8,710	12,000	5,190	1,120	362	303	282
12	134	373	380	3,000	10,100	6,250	17,200	4,180	810	324	401	287
13	144	320	300	6,620	9,630	16,600	13,500	3,140	561	322	523	273
14	161	291	300	5,890	8,260	77,000	9,630	7,000	455	331	744	322
15	147	282	300	5,170	9,170	46,500	8,710	11,000	384	305	1,580	320
16	142	292	300	7,820	9,630	19,700	9,190	6,260	313	288	1,470	302
17	138	284	273	6,620	7,000	9,170	7,000	4,180	493	282	1,010	340
18	140	273	246	4,500	4,360	5,880	5,180	3,150	3,870	264	631	591
19	201	273	246	2,860	3,870	4,340	4,180	2,230	3,150	284	444	1,370
20	1,780	264	264	2,120	28,800	3,160	2,860	1,700	1,900	269	375	2,860
21	1,470	236	255	1,780	26,000	2,600	3,280	3,140	1,180	255	635	2,880
22	892	210	340	1,280	10,700	3,590	5,880	1,690	878	282	506	3,000
23	810	220	552	1,130	6,260	3,870	6,250	2,470	1,570	292	422	2,480
24	682	213	666	980	5,050	3,150	4,830	3,000	1,780	246	335	1,890
25	1,570	210	1,280	980	7,120	2,770	3,870	11,500	1,060	340	249	1,090
26	2,870	219	3,870	980	32,200	3,280	3,570	30,800	759	340	227	844
27	2,370	228	5,880	1,570	28,700	3,000	3,720	21,400	3,610	262	210	604
28	2,120	246	3,720	12,500	11,500	2,470	5,000	8,740	2,480	274	206	446
29	2,250	312	2,230	44,000	.....	1,780	4,340	9,180	1,590	168	198	393
30	2,010	1,580	1,130	24,600	.....	1,470	3,720	4,660	3,720	236	218	360
31	2,470	.....	1,020	10,600	.....	1,370	.....	3,880	.....	1,790	487	.....

NOTE.—Daily discharge, Jan. 8–10, estimated because of ice, by comparison with flow of stations on Tygart River. Wickets open Mar. 21, May 6, and July 29; discharge estimated.

Monthly discharge of Monongahela River at Lock 15, Hoult, W. Va., for the year ending Sept. 30, 1918.

[Drainage area, 2,430 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	2,870	89	761	0.313	0.36
November	2,740	210	586	.241	.27
December	5,880	246	1,230	.506	.58
January	44,000	730	5,110	2.10	2.42
February	32,200	2,000	11,600	4.77	4.97
March	77,000	1,370	9,420	3.88	4.47
April	17,200	1,180	5,930	2.44	2.72
May	30,800	1,370	6,400	2.63	3.03
June	6,650	313	1,850	.761	.85
July	3,750	168	686	.282	.33
August	1,580	161	463	.191	.22
September	3,020	273	1,080	.444	.50
The year	77,000	89	3,710	1.53	20.72

MIDDLE FORK AT MIDVALE, W. VA.

LOCATION.—A third of a mile above Midvale railroad station on Coal & Coke Railway, two-thirds mile below post office at Ellamore, Randolph County. Laurel Creek enters river on right 1¾ miles above station.

DRAINAGE AREA.—122 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 3, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on right bank; read by Anna Riley.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight 300 feet above and 100 feet below cable section. Banks are high and in most places wooded. Control slightly shifting.

EXTREMES OF STAGE.—Maximum stage recorded during year, 16.1 feet at 7.30 a. m. January 28 (stage-discharge relation affected by ice); minimum stage recorded, 1.25 feet at 7 a. m. August 8 and 30.

1915–1918: Maximum stage recorded same as for 1918; minimum stage recorded, 1.12 feet August 29, 1917 (discharge, 2.6 second-feet).

Floods of 1888 and 1912 reached gage height of about 18 feet.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—The change in rating curve indicated by discharge measurements made during 1918 and 1920 probably was caused by the high water in January, 1918. Stage-discharge relation seriously affected by ice. New rating curve not fully developed. Gage read to hundredths twice daily. Records good.

The following discharge measurement was made by B. L. Hopkins:

May 4, 1918: Gage height, 2.55 feet; discharge, 184 second-feet.

Daily gage height, in feet, of Middle Fork at Midvale, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.36	2.40	3.09	.....	3.22	3.66	2.26	2.88	2.28	2.68	1.62	2.32
2	1.29	2.16	3.00	.....	2.94	3.46	2.18	2.68	2.09	2.43	1.49	1.88
3	1.26	2.04	2.74	.....	2.92	3.23	2.56	2.61	2.02	2.16	1.42	1.66
4	1.26	1.92	2.56	.....	2.32	3.03	2.60	2.54	1.90	2.02	1.36	1.66
5	1.29	1.83	2.37	.....	2.98	3.36	2.50	2.42	1.80	1.88	1.32	1.60
6	1.31	1.76	2.23	.....	3.24	3.34	2.44	2.36	1.74	1.84	1.28	1.56
7	1.34	1.72	2.16	.....	3.60	5.02	2.46	2.34	2.64	1.72	1.27	1.60
8	1.34	1.62	2.07	.....	4.68	4.45	2.68	4.52	2.44	1.68	1.58	1.54
9	1.35	1.63	2.17	.....	6.56	3.97	4.74	4.08	2.08	1.62	1.60	1.48
10	1.36	1.64	2.24	.....	6.42	3.92	4.23	3.62	1.93	1.56	1.82	1.42
11	1.38	1.58	2.01	.....	4.89	3.58	3.76	3.26	1.82	1.52	1.76	1.37
12	1.42	1.60	2.04	6.85	4.42	3.48	3.70	3.00	1.74	1.46	1.63	1.36
13	1.52	1.64	2.02	.....	4.35	10.34	3.46	2.96	1.70	1.48	2.55	1.38
14	1.60	1.58	2.00	.....	3.82	7.99	2.36	5.29	1.65	1.58	2.10	1.36
15	1.52	1.52	1.98	6.34	3.98	7.15	4.86	4.30	1.56	1.48	1.92	1.34
16	1.48	1.56	1.92	5.86	3.58	5.00	4.38	3.58	1.51	1.42	1.75	1.30
17	1.40	1.54	1.85	5.58	3.06	4.14	3.82	3.12	1.64	1.40	1.60	1.47
18	1.40	1.52	1.90	5.11	2.59	3.47	3.44	2.82	2.54	1.64	1.53	3.00
19	1.48	1.52	1.89	4.46	2.80	3.13	3.14	2.63	2.06	1.60	2.08	2.70
20	1.94	1.52	1.93	4.14	7.00	2.88	2.98	2.72	1.88	1.70	1.79	2.60
21	1.82	1.52	1.99	3.76	5.03	2.96	3.36	2.44	1.72	1.52	1.63	3.16
22	1.66	1.55	2.12	4.15	4.04	3.20	3.56	2.48	2.18	1.42	1.52	2.50
23	1.60	1.62	2.18	4.04	2.96	3.06	3.45	3.42	2.08	1.36	1.43	2.24
24	1.62	1.73	2.38	3.78	3.62	2.98	3.32	3.24	1.88	1.32	1.44	2.03
25	1.80	1.58	6.06	3.73	3.88	3.06	3.33	6.63	1.80	1.28	1.42	1.88
26	2.12	1.58	7.44	4.68	8.72	2.94	3.26	6.50	4.79	1.44	1.36	1.78
27	2.91	1.62	.....	11.60	5.28	2.77	3.49	4.20	3.22	1.40	1.32	1.71
28	1.82	1.84	.....	16.00	4.17	2.65	3.24	3.62	2.60	1.36	1.30	1.63
29	1.40	3.43	.....	7.52	.....	2.52	3.20	3.07	2.84	1.30	1.26	1.60
30	3.02	3.24	.....	4.86	.....	2.39	2.99	2.78	2.72	1.32	1.27	1.56
31	2.72	.....	.....	3.98	.....	2.30	.....	2.50	.....	1.58	1.86	.....

NOTE.—Gage heights Oct. 28, 29, and Apr. 14, are apparently 1 foot too low. Stage-discharge relation affected by ice Dec. 9 to Jan. 28. Gage not read Dec. 27-31, Jan 1-11, 13 and 14.

BUCKHANNON RIVER AT HALL, W. VA.

LOCATION.—About 500 feet below ruins of an old milldam, a quarter of a mile above post office and county highway bridge at Hall, Barbour County, 1 mile from Baltimore & Ohio Railroad station. Pecks Run enters river on left 1 mile below station.

DRAINAGE AREA.—277 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 7, 1907, to May 25, 1909; April 15, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on right bank used since April 15, 1915; read by James Newcomb. From June 7, 1907, to May 25, 1909, a chain gage at county highway bridge one-quarter of a mile below was used.

DISCHARGE MEASUREMENTS.—Made from county highway bridge.

CHANNEL AND CONTROL.—Gage is about midway between beginning and end of rapids having approximately 10-foot fall. Bed of stream in rapids composed of large boulders, rocks, and gravel; practically permanent. Banks are high and wooded and are not overflowed except into an old mill race on left bank.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 14.7 feet at 7 a. m. March 14 (discharge not determined); minimum stage recorded, 1.70 feet at 6 a. m. October 7 (discharge, 8 second-feet).

1907–1909: Maximum stage recorded, 13.8 feet (gage at highway bridge) February 6, 1908 (discharge not determined); minimum stage recorded, 1.40 feet during several days in October and November, 1908 (discharge not determined).

1915–1918: Maximum and minimum stages occurred during year ending September 30, 1918.

Highest flood known reported to have reached a gage height of about 14 feet in 1888, referred to datum of present gage.

ICE.—Stage-discharge relation affected by ice during severe winters.

DIVERSIONS.—No water diverted above station except small quantity which may flow around gage through abandoned mill race above ordinary low stages and which is included in flow measured at county highway bridge.

ACCURACY.—Stage-discharge relation permanent except as affected by ice, December 28 to January 28 and February 3–8. Rating curve well defined between 40 and 4,500 second-feet; extended beyond these limits. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except for periods of ice effect for which it was ascertained by means of observer's notes, weather records, and comparison with records for other stations in this basin. Records good except those for periods of ice effect.

The following discharge measurement was made by B. L. Hopkins:

May 6, 1918: Gage height, 2.63 feet; discharge, 252 second-feet.

Daily discharge, in second-feet, of Buckhannon River at Hall, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	17	396	628	180	1,070	920	218	535	482	410	180	722
2	12	270	628	180	675	820	208	442	311	450	114	474
3	15	208	490	170	410	675	260	367	228	297	78	228
4	11	166	396	150	244	490	426	311	194	228	57	154
5	12	138	324	150	194	1,070	352	270	162	189	40	124
6	10	111	265	150	244	1,070	297	239	130	162	37	104
7	9	98	218	170	410	1,280	284	218	410	130	45	93
8	12	88	175	210	675	1,720	410	1,960	535	111	50	83
9	10	78	162	260	1,720	1,280	2,400	1,610	304	93	73	73
10	10	71	98	340	3,600	1,500	1 840	970	199	93	114	65
11	10	71	86	490	1,840	1,120	1,440	770	154	88	98	55
12	13	63	86	580	1,280	820	1,960	580	127	69	130	47
13	13	63	78	1,070	1,020	6,660	1,440	535	93	57	218	45
14	23	53	70	870	920	12,200	1,120	1,720	83	61	490	63
15	21	57	65	1,280	970	6,770	1,220	1,500	71	50	304	45
16	18	51	63	1,960	1,120	2,920	1,170	970	65	37	194	36
17	24	43	61	1,070	770	1,390	970	628	170	50	127	47
18	27	45	73	675	580	870	820	458	284	53	117	78
19	30	43	69	490	490	628	628	360	324	51	83	770
20	98	47	63	410	3,220	474	490	442	180	43	76	628
21	194	39	57	330	3,600	490	770	284	138	45	83	770
22	150	45	86	300	1,390	820	1,120	213	194	43	65	675
23	104	36	104	240	870	628	920	580	249	50	51	450
24	98	47	127	220	820	535	770	628	170	47	40	304
25	170	50	338	220	1,170	580	675	1,960	130	40	37	228
26	450	51	2,180	170	5,790	628	628	6,660	580	31	33	162
27	338	47	1,340	1,070	4,170	490	970	2,620	675	23	43	124
28	466	57	675	2,620	1,500	426	1,280	2,400	374	26	36	101
29	396	450	304	6,880	.....	338	920	1,280	442	43	30	88
30	338	722	218	4,070	.....	270	675	970	490	63	24	88
31	580	.....	180	1,500	.....	249	.....	675	.....	65	162	.....

NOTE.—Discharge, Dec. 14 and 15, estimated; gage not read. Discharge Dec. 28 to Jan. 28 and Feb. 3–8 estimated because of ice, from observer's notes, study of weather records, and comparison with records for other stations in basin.

Monthly discharge of Buckhannon River at Hall, W. Va., for the year ending Sept. 30, 1918.

[Drainage area, 277 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	580	9	119	0.430	0.50
November	722	36	123	.444	.50
December	2,180	57	313	1.13	1.30
January	6,880	150	919	3.32	3.83
February	5,790	194	1,460	5.27	5.49
March	12,200	249	1,620	5.85	6.74
April	2,400	208	889	3.21	3.58
May	6,660	213	1,070	3.86	4.45
June	675	65	265	.957	1.07
July	450	23	103	.372	.43
August	490	24	104	.375	.43
September	770	36	231	.834	.93
The year	12,200	9	596	2.15	29.25

WEST FORK AT BUTCHERVILLE, W. VA.

LOCATION.—At Weston & Clarksburg Electric Railway Co.'s trolley bridge, a quarter of a mile upstream from Butcherville, Lewis County, 3 miles north of Weston. Freemans Creek enters river on left 1 mile below station.

DRAINAGE AREA.—181 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 8, 1915, to September 30, 1918.

GAGE.—Chain gage fastened to upstream side of trolley bridge near center of span; read by Bess Ervin.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—One channel except at extreme high stages, when river overflows right bank and a little water passes through two small culverts in trolley embankment; straight for 500 feet above and curved for 1,000 feet below station. Stream bed composed of sand and gravel. Control is rock ledge; probably permanent. Growth of aquatic plants may cause backwater at gage during summer.

EXTREMES OF STAGE.—Maximum stage recorded during year, 24.0 feet at 4.30 p. m. March 13; minimum stage recorded, 3.28 feet at 8.30 a. m. August 14.

1915–1918: Maximum and minimum stages same as for 1918. Highest flood known is reported to have reached a stage represented by gage height of about 27 feet in 1888. Dam since washed out may have increased height of this flood.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation probably permanent; seriously affected by ice in December and January. Measurements of flow do not indicate noteworthy backwater from growth of aquatic plants. Rating curve not fully developed. Gage read to hundredths twice daily. Records excellent.

The following discharge measurement was made by B. L. Hopkins:

May 8, 1918: Gage height, 7.20 feet; discharge, 571 second-feet.

Daily gage height, in feet, of West Fork at Butcherville, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.74	5.64	5.50	4.57	5.74	6.02	4.36	5.48	5.56	5.36	4.82	7.44
2	3.66	5.28	5.34	.....	5.19	5.72	4.90	5.22	5.28	5.22	4.63	5.36
3	3.62	4.90	5.25	.....	5.11	5.48	5.07	5.06	5.04	5.07	4.38	5.06
4	3.64	4.72	5.08	4.51	5.04	5.50	5.90	5.90	4.81	5.20	4.22	4.70
5	3.62	4.64	4.94	.....	4.92	8.26	5.54	4.78	4.64	5.04	4.06	4.26
6	3.60	4.42	4.84	.....	4.84	6.81	5.26	4.69	4.46	4.89	3.94	4.14
7	3.56	4.30	4.68	8.16	6.59	6.20	5.04	4.64	7.90	4.56	3.86	4.15
8	3.56	4.28	4.50	7.50	7.84	5.80	7.32	6.92	5.66	4.30	3.76	4.14
9	3.58	4.24	4.48	6.24	11.22	6.54	10.81	5.43	4.93	4.16	3.64	4.06
10	3.60	4.25	4.40	5.62	8.86	7.83	7.84	5.32	4.74	4.05	3.53	4.04
11	3.65	4.22	4.34	5.18	7.02	7.05	9.84	5.32	4.64	3.98	3.48	4.00
12	3.80	4.20	.....	7.78	.....	6.30	9.76	5.20	4.50	4.02	3.40	4.34
13	4.10	4.14	.....	7.13	.....	21.28	8.48	5.43	4.32	4.28	3.34	4.91
14	4.10	4.10	.....	6.70	.....	.....	7.14	6.69	4.15	4.14	3.62	4.46
15	4.12	4.07	4.21	8.25	.....	12.40	6.56	6.00	4.00	4.00	4.65	4.27
16	4.01	4.10	.....	8.00	.....	7.80	5.95	5.44	3.99	3.89	4.44	4.20
17	3.94	4.08	.....	7.27	.....	6.42	5.74	5.16	4.32	3.86	4.22	4.14
18	3.94	4.05	4.07	6.56	5.37	5.99	5.65	4.91	5.28	3.84	4.10	4.49
19	4.42	4.02	4.11	5.64	5.69	5.46	5.54	4.76	4.76	3.71	3.96	4.34
20	6.22	3.49	.....	5.16	15.00	5.24	6.02	4.66	4.50	4.04	3.78	4.56
21	5.28	4.04	.....	4.98	9.42	6.40	8.00	4.42	4.36	3.97	3.76	5.86
22	4.87	4.04	4.32	4.86	6.54	6.63	8.42	4.24	4.50	3.78	3.72	4.70
23	4.88	4.06	4.48	4.79	5.64	6.22	5.96	5.60	4.48	3.60	3.66	4.74
24	6.08	4.02	4.78	4.71	6.38	5.68	5.72	6.19	4.32	3.42	3.62	4.68
25	7.72	3.98	6.92	4.62	7.58	6.76	5.47	11.62	4.19	3.36	3.56	4.48
26	6.55	3.97	6.66	4.96	16.30	6.16	5.26	16.98	7.48	3.44	3.46	4.32
27	5.70	4.04	5.78	8.46	9.66	5.74	9.03	8.98	6.62	3.54	3.44	4.22
28	5.61	4.62	5.48	14.62	6.58	5.39	7.14	13.86	5.50	3.61	3.88	4.16
29	5.43	5.48	5.25	15.78	.....	5.13	6.24	8.29	4.85	3.64	3.64	4.10
30	5.44	5.62	4.87	7.44	.....	4.87	5.78	6.26	4.44	3.72	3.48	4.04
31	5.62	.....	4.60	6.48	.....	4.58	.....	5.90	.....	5.02	5.22	.....

NOTE.—Gage not read Dec. 12–14, 16, 17, 20, 21, Jan. 2, 3, 5, 6, Feb. 12–17. Gage height at 5 p. m. Mar. 14, 17.32 feet; gage not read in morning.

WEST FORK AT ENTERPRISE, W. VA.

LOCATION.—At highway bridge at Enterprise, Harrison County, three-fourths mile above mouth of Bingamon Creek.

DRAINAGE AREA.—750 square miles.

RECORDS AVAILABLE.—June 2, 1907, to September 30, 1918, when station was discontinued.

GAGE.—Chain gage attached to bridge; read by R. M. Wharton. Sea-level elevation of zero of gage, 869.91 feet.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Channel at measuring section broken by one pier; smooth rock bottom; straight above and below. Control practically permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 21.75 feet at 7.50 a. m. March 14; minimum stage recorded, 0.98 foot at 7.15 a. m. July 22.

1907–1918: Maximum stage recorded, 25.35 feet January 22, 1917 (discharge not determined); minimum stage recorded, 0.6 foot September 10, 14, and 25, 1908 (discharge, 12 second-feet). Flood of 1888 reached stage represented by about 33 feet referred to datum of present gage.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent; probably affected by ice during greater part of December and January. A measurement made October 2, 1917, indicates a marked change in rating curve at low stages, or that operation of mill at the dam at Worthington about 3 miles below gage affects the gage readings. The gates of the milldam were open December 5–12, 1908, in order to drain the pond, but no effect was apparent on the gage readings. This may have been due to unreliable gage readings. The low-water discharge for this station as published in previous water-supply papers may at times be in error; this condition should be considered in using the data. Gage read to half-tenths once daily. Data inadequate for determination of daily discharge. Records uncertain.

The following discharge measurement was made by B. L. Hopkins:
May 9, 1918: Gage height, 5.90 feet; discharge, 3,010 second-feet.

Daily gage height, in feet, of West Fork at Enterprise, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.10	3.25	2.52	3.70	7.27	4.10	2.20	3.20	3.30	2.48	2.38	.....
2	1.10	2.55	.....	.....	.....	3.73	2.20	1.87	.....	2.13	2.11	2.00
3	1.03	2.28	2.23	.....	.....	.....	2.30	1.80	2.30	2.12	1.77	2.55
4	1.10	.....	2.20	2.23	5.37	3.87	2.35	1.82	2.05	1.93	.....	2.40
5	1.12	2.03	2.15	.....	4.85	3.90	2.30	.....	1.90	1.90	1.42	2.13
6	1.07	1.80	1.95	.....	5.23	4.00	2.32	1.97	1.82	1.85	1.32	1.73
7	.....	1.75	1.85	4.10	6.80	4.25	.....	2.30	5.16	.....	1.27	1.60
8	1.02	1.72	1.82	5.22	7.82	4.03	4.23	10.17	6.60	1.62	1.22	.....
9	1.05	1.62	.....	.....	9.88	3.95	6.95	6.12	.....	1.50	1.10	1.43
10	1.08	1.60	1.67	.....	.....	.....	6.47	4.12	2.68	1.42	1.08	1.40
11	1.12	.....	.....	4.58	5.20	4.10	7.01	3.77	2.30	1.40	.....	1.38
12	1.25	1.55	.....	5.25	4.92	4.20	9.27	.....	2.08	1.28	1.41	1.35
13	1.23	1.56	.....	.....	4.90	15.77	8.25	2.87	1.87	1.25	1.85	1.37
14	.....	1.55	1.41	.....	4.85	21.75	.....	4.00	1.72	.....	1.60	1.55
15	1.30	1.50	1.40	5.70	4.70	10.15	4.65	4.18	1.62	1.43	3.06	.....
16	1.22	1.53	.....	8.60	5.10	6.46	4.86	3.45	.....	1.42	2.35	1.50
17	1.13	1.54	1.47	.....	.....	.....	4.60	2.92	1.50	1.40	1.85	2.40
18	1.07	.....	.....	4.85	5.85	5.20	4.45	2.56	3.08	1.40	.....	1.92
19	2.15	1.52	.....	4.60	6.40	4.87	4.27	.....	2.20	1.30	1.60	2.10
20	3.05	1.50	.....	.....	13.65	4.65	.....	2.15	2.18	1.32	1.42	2.87
21	.....	1.50	1.56	.....	5.85	4.35	.....	2.02	1.87	.....	1.35	2.75
22	2.46	1.48	.....	3.32	4.87	4.15	4.45	1.98	1.82	.98	1.27	.....
23	3.23	1.60	.....	3.20	3.85	3.90	4.30	2.12	.....	1.18	1.30	2.37
24	3.55	1.75	2.06	.....	.....	.....	4.10	2.32	2.37	1.13	1.18	2.07
25	3.50	.....	.....	3.27	4.50	3.75	3.70	6.40	2.10	1.22	.....	2.00
26	3.10	1.95	.....	.....	13.60	3.68	3.45	.....	1.87	1.52	1.22	1.75
27	3.20	2.00	4.35	.....	8.57	3.25	3.00	8.85	1.80	1.35	1.20	1.80
28	.....	2.45	3.95	10.37	7.23	2.90	.....	4.86	1.92	.....	1.27	1.70
29	2.80	2.35	.....	24.65	.....	2.60	1.95	7.30	1.95	1.12	1.27	.....
30	3.10	2.23	.....	11.20	.....	2.40	3.10	4.20	.....	1.21	1.30	1.70
31	3.13	.....	.....	.....	.....	.....	.....	3.70	.....	3.13	1.92	.....

NOTE.—Gage not read on days for which no gage-height is given.

ELK CREEK NEAR CLARKSBURG, W. VA.

LOCATION.—At a footbridge near Clarksburg, Harrison County, 300 feet above Turkey Run and 6 miles above mouth of creek.

DRAINAGE AREA.—107 square miles (determined by Pittsburgh Flood Commission).

RECORDS AVAILABLE.—October 11, 1910, to September 30, 1918, when station was discontinued.

GAGE.—Vertical gage in two sections consisting of enameled gage scale attached to cypress backing. Section below 6.73 feet attached to downstream end of right abutment of footbridge. Upper section, 6.73 to 16.9 feet attached to an oak tree 5 feet downstream from low-water section. Prior to October 1, 1917, the gage was a wooden staff at downstream end of right abutment, braced to the oak tree. Sea-level elevation of zero of gage, 955.01 feet. Gage read by E. H. Smith.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading at section about 200 feet below bridge.

CHANNEL AND CONTROL.—Rocky and practically permanent. Banks high and not subject to overflow. Point of zero flow, about gage height 0.9 foot.

EXTREMES OF STAGE.—Maximum stage recorded during year, 14.4 feet at 6 p. m. January 28 (stage-discharge relation affected by ice jam); minimum stage recorded, 1.15 feet at 10 a. m. October 2 and 3.

1911–1918: Maximum stage recorded, 15.0 feet July 25, 1912; minimum stage recorded, 0.8 foot August 21–24, 1911.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent, except as affected by ice during greater part of December and January. Gage read to half-tenths daily. Data inadequate for determining daily discharge. Records good.

Discharge measurements of Elk Creek near Clarksburg, W. Va., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 1	Peterson and Hopkins	1.20	0.6
May 7	B. L. Hopkins	1.76	32.5
8	.....do	4.27	1,040

Daily gage height, in feet, of Elk Creek near Clarksburg, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.25	2.00	1.90	.....	2.50	2.50	1.95	1.95	2.10	2.00	1.80	2.95
2	1.15	1.90	1.90	.....	2.20	2.50	1.95	1.90	2.00	2.10	1.60	2.20
3	1.15	1.80	1.85	.....	2.20	2.30	2.00	1.80	1.85	1.85	1.50	1.95
4	1.30	1.75	1.80	1.70	2.05	2.20	2.40	1.75	1.75	1.75	1.45	1.85
5	1.30	1.70	1.75	.....	2.00	3.40	2.20	1.70	1.70	1.70	1.40	1.70
6	1.30	1.65	1.70	.....	2.00	2.90	2.10	1.70	1.65	1.65	1.40	1.65
7	1.30	1.60	1.65	3.40	3.90	2.70	2.00	1.70	3.20	1.65	1.35	1.60
8	1.25	1.60	1.60	2.40	3.00	2.60	2.20	6.20	2.90	1.60	1.35	1.60
9	1.30	1.55	1.70	2.00	4.40	2.50	4.70	3.00	2.40	1.55	1.30	1.55
10	1.30	1.55	1.70	1.90	4.40	3.20	3.40	2.54	2.10	1.53	1.30	1.50
11	1.30	1.50	1.70	1.90	2.90	2.70	3.60	2.53	1.90	1.50	1.30	1.45
12	1.30	1.50	1.65	4.10	2.70	2.50	4.20	2.25	1.80	1.55	1.30	1.45
13	1.40	1.50	1.65	3.00	2.60	7.40	3.70	2.15	1.70	1.53	1.90	1.90
14	1.40	1.50	1.60	2.80	2.50	5.40	3.10	2.70	1.65	1.50	1.95	1.80
15	1.40	1.50	1.60	5.00	3.40	4.20	2.70	2.40	1.60	1.50	2.70	1.70
16	1.40	1.50	1.55	4.00	2.70	2.90	2.45	2.20	1.56	1.58	2.10	1.60
17	1.35	1.45	1.55	2.80	2.60	2.60	2.35	2.00	2.80	1.50	1.80	1.70
18	1.35	1.45	1.55	2.20	2.40	2.40	2.25	1.90	2.60	1.50	1.65	2.40
19	1.50	1.40	1.55	2.05	2.30	2.20	2.10	1.85	2.40	1.65	1.55	2.20
20	2.40	1.40	1.55	2.00	7.60	2.10	2.00	1.76	2.00	1.55	1.50	2.40
21	2.00	1.40	1.60	1.95	3.60	2.10	2.40	1.74	1.80	1.50	1.45	2.60
22	1.80	1.40	1.60	.....	3.00	2.60	2.70	1.70	2.60	1.45	1.40	2.25
23	1.60	1.40	1.60	.....	2.60	2.40	2.50	1.90	2.40	1.40	1.40	2.00
24	2.00	1.40	1.70	.....	2.40	2.20	2.40	1.90	1.90	1.50	1.35	1.90
25	2.20	1.40	2.00	1.90	3.40	2.45	2.20	5.95	1.75	1.45	1.35	1.80
26	2.30	1.40	3.00	.....	7.30	2.30	2.10	3.90	1.80	1.40	1.30	1.70
27	2.00	1.45	2.00	.....	3.40	2.20	2.05	2.73	1.90	1.40	1.30	1.65
28	1.90	1.50	1.90	10.85	2.80	2.10	2.00	2.55	1.90	1.35	1.40	1.60
29	1.80	1.70	1.80	5.80	.....	2.00	2.00	2.20	1.80	1.35	1.45	1.55
30	2.20	1.80	1.75	3.90	.....	1.95	2.00	3.20	2.30	1.35	1.40	1.50
31	2.35	.....	1.70	2.80	.....	1.90	.....	2.30	.....	2.20	2.15	.....

NOTE.—Gage not read Jan. 1–3, 5, 6, 22–24, 26, and 27.

BUFFALO CREEK AT BARRACKVILLE, W. VA.

LOCATION.—At steel highway bridge 1,000 feet above covered highway bridge at Barrackville, Marion County, 2¾ miles northwest of Fairmont. Finch's Run enters on left 1,600 feet below station.

DRAINAGE AREA.—115 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 3, 1907, to December 31, 1908; May 8, 1915, to September 30, 1918.

GAGE.—Chain gage fastened to downstream handrail of bridge; read by E. M. Beall.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight about 100 feet above and below station. Banks high. Stream bed rocky; some gravel. Control not permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.02 feet at 6.45 a. m. February 26 (discharge, about 4,850 second-feet); minimum stage recorded 0.52 foot at 6.35 a. m. and 3.50 p. m. August 21 and at 6.50 a. m. August 22 (discharge, 0.2 second-foot).

1907–1908; 1915–1918: Maximum stage recorded, 14.22 feet January 22, 1917 (discharge, about 6,800 second-feet); no flow during greater part of September, October, and November, 1908. Flood of July, 1912, reached a stage represented by about 16 feet on present gage.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—The change in rating curve indicated by two discharge measurements made in 1918 probably was caused by the high water of February, 1918. Stage-discharge relation seriously affected by ice. Rating curve used October 1 to February 25 well defined below 1,600 second-feet; above 1,600 second-feet the curve is an extension. New rating curve used February 26 to September 30 fairly well defined between 100 and 400 second-feet; poorly defined below 100 second-feet and extended above 400 second-feet on basis of form of previous curve. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for periods of ice effect and periods when gage was not read. Prior to February 26, open-water records good; for periods of ice effect poor; after February 26, records fair except for days when gage was not read, for which they are poor.

Discharge measurements of Buffalo Creek at Barrackville, W. Va., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 3	Peterson and Hopkins	0.67	0.6
May 9	B. L. Hopkins	2.58	314
11	do	1.85	146

Daily discharge, in second-feet, of Buffalo Creek at Barrackville, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.4	84	38		90	207	26	129	102	8.4	14	97
2	.4	56	30		91	166	30	97	67	5.4	8.4	20
3	.4	42	28		105	120	62	88	50	6.2	5.4	9.8
4	.9	32	26		94	102	147	76	43	5.0	3.0	5.4
5	1.1	27	22		71	815	96	68	32	3.8	2.5	4.6
6	.7	23	19		73	318	73	60	25	4.2	2.0	3.4
7	.7	20	18		1,640	252	60	54	21	2.6	1.5	2.8
8	.9	19	14		1,040	166		2,000	33	2.3	1.3	2.5
9	.5	15	13		2,800	156		360	24	2.2	1.4	2.3
10	.5	11			1,310	405		207	18	2.1	1.1	2.0
							640					
11	.7	19			540	207		120	13	2.0	2.8	1.7
12	4.1	17			392	176		111	10	2.1	2.2	1.7
13	21	17			409	375		129	7.0	1.9	1.8	1.3
14	68	12			330	1,400	166	435	5.4	1.6	4.2	1.1
15	76	5.9		44	873	625	166	218	4.6	1.3	2.4	1.0
16	4.5	4.8	9		345	264	147	147	3.8	1.2	1.6	1.0
17	3.8	4.8			135	229	129	120	3.0	1.3	1.1	1.4
18	3.3	4.8			94	186	111	86	4.2	1.4	1.0	1.8
19	76	4.5			258	111	99	67	3.4	1.4	.7	1.6
20	245	4.5			2,500	99	80	60	4.2	5.0	.4	3.0
21	30	4.3			330	83	96	72	8.4	2.8	.2	5.8
22	42	4.1			159	73	96	59	5.8	2.8	.3	5.0
23	26	4.5			108	64	96	1,020	3.8	5.4	.7	3.4
24	55	4.5	106		97	57	86	229	3.8	2.4	.7	3.0
25	520	4.5	245		202	53	89	1,180	2.9	2.0	.8	3.0
26	193	4.5	130		3,490	50	78	815	2.8	1.7	.6	2.7
27	86	4.5	91		470	46	89	240	2.8	1.4	1.0	2.3
28	159	5.9	73		290	40	99	715	2.6	1.3	1.2	2.1
29	105	12	54		.....	36	97	240	2.3	1.1	.9	1.9
30	108	35	37	873	.....	32	129	218	13	2.6	1.0	1.7
31	143	.....	26	392	.....	29	.....	156	.....	13	3.8	.....

NOTE.—Discharge estimated, because of ice effect, Dec. 10-23, 29-31; Jan. 1-29, by means of observer's notes, weather records, and comparison with records at other stations in the Monongahela basin. Discharge, Apr. 8-13 and Sept. 24-25, estimated because of lack of gage readings, by means of weather records and comparison with records at other stations in the Monongahela basin. Braced figures show mean discharge for periods indicated.

Monthly discharge of Buffalo Creek at Barrackville, W. Va., for the year ending Sept. 30, 1918.

[Drainage area, 115 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	520	0.4	63.7	0.554	0.64
November	84	4.1	16.9	.147	.16
December	245	.....	35.4	.308	.36
January	873	.....	82.0	.713	.82
February	3,490	71	655	5.70	5.94
March	1,400	29	224	1.95	2.25
April	.....	26	206	1.79	2.00
May	2,000	54	309	2.69	3.10
June	102	2.3	17.4	.151	.17
July	13	1.1	3.16	.027	.03
August	14	.2	2.26	.020	.02
September	97	1.0	6.54	.057	.06
The year	3,490	.2	132	1.15	15.55

CHEAT RIVER NEAR PARSONS, W. VA.

LOCATION.—At Moss highway bridge, 2 miles north of Parsons, Tucker County, 2 miles below junction with Shavers Fork, and 5 miles below junction of Dry Fork and Blackwater River.

DRAINAGE AREA.—716 square miles (determined by Hydro-Electric Co. of West Virginia).

RECORDS AVAILABLE.—January 1, 1913, to September 30, 1918.

GAGE.—Chain gage near center of bridge on downstream guard rail; read by Mrs. E. C. Linger.

DISCHARGE MEASUREMENTS.—Made from downstream side of highway bridge.

CHANNEL AND CONTROL.—Rocky and probably permanent. Water is swift and turbulent at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 15.6 feet at 4 p. m. March 13 (discharge, about 33,000 second-feet); minimum stage recorded, 1.72 feet at 6 p. m. October 8 (discharge, 51 second-feet).

1913–1918: Maximum stage recorded, 17.98 feet March 12, 1917 (discharge, about 40,000 second-feet); minimum stage recorded, 1.52 feet September 6, 1917 (discharge, 29 second-feet).

ICE.—Stage-discharge relation affected by ice during severe winters.

REGULATION.—Some regulation above at various pulp mills and sawmills. Effect probably compensating, so that two gage readings a day give correct basis for determining daily discharge.

ACCURACY.—Stage-discharge relation probably permanent, except as affected by ice. Rating curve fairly well defined between 65 and 1,000 second-feet and well defined between 1,000 and 5,500 second-feet; beyond these limits curve is an extension and may be considerably in error. Gage read to quarter-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except for period of ice effect. Open-water records fair, except for extremely high stages; winter records roughly approximate.

The following discharge measurement was made by B. L. Hopkins:

May 2, 1918: Gage height, 3.55 feet; discharge, 1,280 second-feet.

Daily discharge, in second-feet, of Cheat River near Parsons, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	670	1,370	950		1,500	3,850	590	1,250	1,150	2,830	378	1,370
2	141	1,100	1,100		1,200	4,020	760	1,200	1,000	2,050	290	1,200
3	124	900	900		1,200	3,000	1,150	1,050	760	1,370	244	1,050
4	124	715	850		900	2,050	1,560	850	520	1,050	195	950
5	96	590	715		670	3,000	1,250	805	420	760	138	420
6	75	520	630		715	3,340	1,000	715	1,500	715	127	800
7	61	450	520		2,510	7,200	850	555	2,350	590	134	690
8	54	390	450		3,680	5,290	1,100	3,850	1,770	485	450	410
9	85	420			8,620	3,340	5,880	3,340	950	420	485	360
10	68	378			9,100	4,370	4,370	2,200	590	354	290	340
11	61	320			5,680	3,680	3,000	1,770	485	310	590	330
12	120	300			5,880	2,830	2,350	1,440	390	280	760	330
13	117	271			9,100	23,700	2,050	1,200	336	290	670	310
14	102	240		270	6,300	17,800	2,670	3,680	310	336	850	700
15	148	175			7,660	13,200	5,480	2,670	266	285	1,370	490
16	117	179	245		6,300	6,300	6,970	1,770	235	244	900	276
17	93	183			4,020	3,850	7,660	1,500	560	244	520	850
18	88	187			2,510	2,670	6,740	1,150	2,830	253	420	3,850
19	105	191			2,670	2,050	3,850	1,000	2,050	590	1,630	3,000
20	2,050	171			19,000	1,700	2,510	1,500	1,200	520	1,200	1,560
21	1,370	211			7,430	1,770	5,100	2,050	805	450	760	2,510
22	420	191			3,680	2,670	4,730	3,000	1,440	310	520	1,770
23	310	171			2,670	2,200	3,340	2,200	1,770	253	420	1,200
24	310	152			2,350	1,630	2,670	2,200	1,150	215	366	850
25	342	134	2,510		3,340	1,440	3,000	5,100	760	300	342	590
26	235	117	1,910	3,000	19,300	1,150	2,830	7,660	2,670	336	290	450
27	2,200	102	1,630	8,620	6,740	950	2,350	4,190	2,670	360	240	450
28	2,670	88	1,100	5,880	4,020	850	1,910	3,850	1,630	235	219	450
29	1,700	590	555	4,730	.....	760	1,500	2,050	11,200	187	148	366
30	805	670	360	3,000	.....	670	1,310	2,200	4,020	191	138	325
31	2,830	.....	300	2,050	.....	590	.....	1,500	.....	187	330	.....

NOTE.—Discharge estimated because of ice effect, Dec. 9–25 and Dec. 30 to Jan. 26 by means of observer's notes, weather records, and comparison with records for other stations in this river basin. Discharge, Nov. 16–18 and July 20, interpolated, and Sept. 6–15, estimated by comparison with records of flow for Shavers Fork at Parsons; observer's gage readings in error.

Monthly discharge of Cheat River near Parsons, W. Va., for the year ending Sept. 30, 1918.

[Drainage area, 716 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	2,830	54	571	0.797	0.92
November	1,370	88	383	.535	.60
December	2,510	.....	594	.830	.96
January	8,620	.....	1,100	1.54	1.78
February	19,300	670	5,310	7.42	7.73
March	23,700	590	4,260	5.95	6.86
April	7,660	590	3,020	4.22	4.71
May	7,660	555	2,240	3.13	3.61
June	11,200	235	1,500	2.22	2.48
July	2,830	187	548	.765	.88
August	1,630	127	497	.694	.80
September	3,850	.....	942	1.32	1.47
The year	23,700	54	1,730	2.42	32.80

CHEAT RIVER AT ROWLESBURG, W. VA.

LOCATION.—At Baltimore & Ohio Railroad bridge at Rowlesburg, Preston County, 300 feet above mouth of Salt Lick Creek.

DRAINAGE AREA.—960 square miles (includes drainage area of Salt Lick Creek).

RECORDS AVAILABLE.—July 19, 1912, to September 30, 1918. The United States Weather Bureau has collected gage-height records since 1884.

GAGE.—Mott tape gage attached to upstream side of bridge; read by J. F. Pierce.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge. Salt Lick Creek is measured separately and the discharge added to that measured at bridge.

CHANNEL AND CONTROL.—Channel is curved above and below bridge. Control consists of small boulders; probably permanent. Salt Lick Creek enters between the control and the gage. Stage at which flow would be zero was about 0.45 foot in September, 1917.

EXTREMES OF STAGE.—Maximum stage recorded during year, 13.6 feet during night of March 13; minimum stage recorded, 2.0 feet October 4–10.

1912–1918: Maximum stage recorded, 14.7 feet at 5 p. m. March 12, 1917; minimum stage recorded, 1.4 feet October 6–8, 1914.

The highest stage of which there is any record occurred, according to the records of the United States Weather Bureau, on July 10, 1888, when the water reached a stage of 22 feet.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation probably permanent, except as affected by ice. Rating curve not developed. Gage read to tenths daily. Records fair.

COOPERATION.—Gage-height record furnished by the United States Weather Bureau.

The following measurement was made by B. L. Hopkins:

April 26, 1918: Gage height, 4.45 feet; discharge, 3,410 second-feet.

Daily gage height, in feet, of Cheat River at Rowlesburg, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.2	3.9	3.3	2.9	3.8	4.7	2.9	3.4	3.4	4.4	2.3	3.2
2	2.1	3.6	3.7	2.9	3.4	5.0	2.9	3.4	3.2	4.2	2.5	3.4
3	2.2	3.3	3.5	2.9	3.3	4.6	2.9	3.4	3.0	3.6	2.4	2.9
4	2.0	3.1	3.2	2.9	3.3	4.1	3.4	3.2	2.9	3.3	2.3	2.7
5	2.0	3.0	3.2	2.9	3.3	4.1	3.5	3.1	2.8	3.0	2.3	2.5
6	2.0	2.9	3.2	2.9	3.3	4.7	3.3	3.0	2.7	3.1	2.3	2.5
7	2.0	2.8	3.2	2.9	3.8	4.6	3.0	3.0	3.6	3.0	2.1	2.4
8	2.0	2.8	3.0	2.9	5.3	5.5	3.1	3.9	4.4	2.8	2.1	2.7
9	2.0	2.8	3.0	2.9	6.2	4.6	5.6	5.3	3.7	2.7	2.9	2.5
10	2.0	2.8	3.0	2.9	8.3	5.1	5.5	4.3	3.2	2.6	2.6	2.4
11	2.1	2.6	3.0	2.9	6.4	5.0	4.9	4.0	2.9	2.6	2.6	2.4
12	2.1	2.5	3.0	2.9	6.5	4.4	4.5	3.7	2.8	2.5	3.2	2.3
13	2.1	2.6	3.0	2.9	7.3	9.0	4.2	3.5	2.7	2.5	3.0	2.4
14	2.1	2.6	3.0	2.9	6.5	12.0	4.0	5.2	2.6	2.5	2.9	2.3
15	2.2	2.5	3.0	2.9	6.6	8.6	6.6	4.8	2.6	2.5	3.0	2.6
16	2.1	2.5	3.0	4.3	6.6	6.5	6.9	4.1	2.5	2.5	3.4	2.5
17	2.1	2.4	3.0	4.2	5.2	5.2	6.4	3.8	3.4	2.4	2.9	2.5
18	2.1	2.4	3.0	4.2	4.4	4.5	6.2	3.5	5.6	2.4	2.7	3.3
19	2.3	2.4	3.0	4.2	4.0	4.1	5.2	3.3	3.9	2.5	2.5	5.1
20	2.5	2.4	2.8	4.2	9.7	3.8	4.4	3.3	3.8	2.8	3.6	4.0
21	3.7	2.3	2.8	4.2	7.5	3.6	4.6	3.8	3.2	2.9	3.5	3.8
22	3.0	2.4	2.8	4.2	5.3	4.2	5.9	3.7	3.1	2.7	2.8	4.2
23	2.7	2.4	2.8	4.2	4.4	4.1	5.1	4.2	3.9	2.5	2.4	3.6
24	3.3	2.4	2.8	4.2	4.1	3.8	4.5	4.0	3.5	2.4	2.5	3.3
25	2.8	2.4	3.9	4.2	4.2	3.4	4.2	3.8	3.2	2.3	2.4	3.1
26	3.0	2.4	5.0	3.8	9.6	3.6	4.4	7.8	3.0	2.3	2.4	2.6
27	3.5	2.4	3.8	5.1	7.1	3.5	4.2	5.3	4.4	2.4	2.4	2.8
28	4.5	2.4	3.6	6.6	5.4	3.3	3.9	4.4	3.7	2.5	2.3	2.7
29	4.3	2.4	3.2	6.0	.....	3.1	3.8	4.2	3.4	2.3	2.3	2.7
30	3.7	3.1	2.8	4.9	.....	3.1	3.6	3.7	5.4	2.3	2.2	2.6
31	4.7	.....	2.9	4.3	.....	3.0	.....	3.7	.....	2.4	2.3	.....

NOTE.—Stage-discharge relation affected by ice Dec. 10–24 and Dec. 30 to Jan. 26.

CHEAT RIVER NEAR MORGANTOWN, W. VA.

LOCATION.—At highway bridge at Uneva, Monongalia County, 10 miles above mouth of river. Parallel of 39° 40′ crosses the river at this bridge.

DRAINAGE AREA.—1,380 square miles.

RECORDS AVAILABLE.—July 8 to December 30, 1899; July 1 to December 29, 1900; August 21, 1902, to December 31, 1905; November 18, 1908, to December 31, 1917. Bridge and gage were torn out by an ice jam February 9, 1918.

GAGE.—Chain gage attached to bridge; read by C. F. Baker.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, October 1 to December 31, 1917, 4.70 feet at 8 a. m. and 5 p. m. October 28 (discharge, 5,550 second-feet); minimum stage recorded, 1.90 feet at 8 a. m. October 5 (discharge, 135 second-feet).

ICE.—Stage-discharge relation seriously affected by ice during severe winters. Ice forms sometimes to a thickness of several inches, and large ice jams may occur when this ice breaks up.

ACCURACY.—Stage-discharge relation practically permanent except as affected by ice. Rating curve fairly well defined above 175 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for period of ice effect. Records good except those for periods of ice effect, which are poor.

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Discharge measurements of Cheat River near Morgantown, W. Va., during the year ending Sept. 30, 1918.

[Made by Peterson and Hopkins.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 4	2.06	192
5	2.06	196

Daily discharge, in second-feet, of Cheat River near Morgantown, W. Va., for the period Oct. 1 to Dec. 31, 1917.

Day	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	195	2,860	1,630	11	163	600		21	2,450	397	
2	215	2,080	2,320	12	195	600		22	1,080	384	400
3	261	1,530	2,080	13	249	560		23	835	397	
4	210	1,290	1,450	14	237	520		24	640	397	
5	135	1,080	1.360	15	243	520	400	25	1,220	378	
6	180	950	1,360	16	273	480		26	1,730	371	
7	151	835	1,220	17	237	452		27	2,860	297	1,300
8	163	730	1,010	18	215	431		28	5,550	315	
9	167	685	640	19	200	410		29	4,510	640	
10	167	685	400	20	1,220	397		30	2,860	1,290	
								31	4,900	.....	

NOTE.—Discharge, Dec. 10–31, estimated because of ice, on basis of observer's notes and weather records. Gage read Jan. 1–28, but data inadequate for determining discharge.

Monthly discharge of Cheat River near Morgantown, W. Va., for the period Oct. 1 to Dec. 31, 1917.

[Drainage area, 1,380 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	5,550	135	1,090	0.790	0.91
November	2,860	297	752	.545	.61
December	.....	.....	938	.680	.78

BLACKWATER RIVER AT HENDRICKS, W. VA.

LOCATION.—At highway bridge at Hendricks, Tucker County, an eighth of a mile above mouth of river.

DRAINAGE AREA.—148 square miles (determined by West Virginia Development Co.)

RECORDS AVAILABLE.—October 13, 1911, to September 30, 1918, when station was discontinued.

GAGE.—Chain gage attached to upstream side of bridge; read by William Cochran and J. W. Garrett.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and stones; very rough. Control shifting. Right bank high. Left bank subject to overflow at high stages.

EXTREMES OF STAGE.—Maximum stage recorded during year, 6.42 feet at 8 a. m. February 26; minimum stage recorded, 1.56 feet at 7 a. m. and 5 p. m. September 30.

1911–1918: Maximum stage recorded, 8.37 feet March 12, 1917; minimum stage recorded, 1.49 feet October 15, 1916. Maximum flood occurred July 10, 1888; stage unknown.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation not permanent; affected by ice during greater part of December and January. Gage read to hundredths twice daily. Data inadequate for determination of discharge.

Discharge measurements of Blackwater River at Hendricks, W. Va., during the year ending Sept. 30, 1918.

[Made by B. L. Hopkins.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Apr. 30	2.35	202
May 12	2.28	172
13	2.26	163

Daily gage height, in feet, of Blackwater River at Hendricks, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.71	2.74	2.65	2.46	2.26	3.42	2.12	2.34	2.18	2.22	1.94	2.18
2	1.68	2.38	2.50	2.46	2.21	3.34	2.12	2.34	2.10	2.08	1.87	1.98
3	1.66	2.28	2.50	2.46	2.18	3.24	2.32	2.30	2.04	2.00	1.80	1.86
4	1.66	2.20	2.46	2.46	3.18	3.26	2.62	2.24	2.00	1.90	1.78	1.84
5	1.77	2.19	2.26	2.46	2.16	3.54	2.40	2.14	2.00	1.89	1.76	1.84
6	1.80	2.18	2.21	2.62	2.25	3.55	2.20	2.14	2.04	2.21	1.72	1.84
7	1.78	2.18	2.17	2.70	4.14	3.42	2.18	2.16	3.41	2.05	1.83	1.82
8	1.79	2.13	2.16	2.67	3.76	3.41	2.36	3.11	2.72	1.95	2.04	1.80
9	1.77	2.12	2.26	2.64	3.17	2.88	3.59	2.72	2.17	1.94	2.02	1.77
10	1.75	2.12	2.26	2.64	3.66	3.60	2.83	2.40	2.12	1.90	1.86	1.75
11	1.74	2.10	2.26	2.76	3.04	2.96	2.76	2.36	2.10	1.85	2.78	1.73
12	1.80	2.08	2.26	3.32	3.22	3.16	2.62	2.28	2.02	1.84	2.42	1.76
13	1.78	2.10	2.26	3.34	3.24	5.56	2.70	2.36	2.02	1.88	2.19	1.78
14	1.74	2.12	2.14	3.14	3.18	5.37	3.00	3.12	1.99	1.94	2.31	1.76
15	1.74	2.09	2.14	3.76	3.26	4.80	3.76	2.58	1.95	1.92	2.20	1.75
16	1.72	2.07	2.14	3.81	3.10	3.96	4.16	2.38	1.94	1.85	2.02	1.72
17	1.70	2.07	2.11	3.81	3.20	3.01	4.25	2.31	1.99	1.88	1.96	2.50
18	1.68	2.04	2.11	3.47	3.44	2.82	4.02	2.22	2.58	1.88	1.92	3.85
19	2.05	2.03	2.11	3.47	3.97	2.62	3.22	2.20	2.14	1.92	1.88	2.95
20	2.28	2.00	2.11	3.47	6.04	2.50	2.92	2.34	2.05	1.90	1.90	2.52
21	2.00	2.00	2.11	3.02	4.04	2.78	3.75	2.55	2.00	1.85	1.87	2.66
22	1.98	2.02	2.11	3.02	3.84	2.90	3.55	2.32	2.27	1.80	1.81	2.30
23	2.02	2.06	2.28	3.02	3.70	2.62	2.98	2.34	2.36	1.80	1.74	2.10
24	2.20	2.14	2.44	3.02	3.75	2.49	2.66	2.26	2.12	1.88	1.95	2.01
25	2.12	2.10	2.60	3.01	4.08	2.37	2.79	2.97	2.04	2.06	1.79	1.98
26	2.02	2.08	2.70	3.35	5.66	2.32	2.64	3.02	2.16	1.90	1.77	1.97
27	2.26	2.08	2.62	4.45	3.62	2.22	2.52	2.56	2.12	1.84	1.80	1.89
28	2.19	2.16	2.65	4.12	3.31	2.20	2.32	2.48	2.04	1.78	1.77	1.80
29	2.64	2.60	2.60	3.65	.....	2.18	2.34	2.33	2.04	1.76	1.62	1.91
30	3.73	2.70	2.47	2.89	.....	2.18	2.31	2.24	2.17	1.78	1.77	1.56
31	2.99	.....	2.46	2.44	.....	2.12	.....	2.18	.....	1.78	1.88	.....

SHAVERS FORK AT PARSONS, W. VA.

LOCATION.—At steel highway bridge 600 feet northwest of railroad station at Parsons, Tucker County, and half a mile above confluence with Dry Fork.

DRAINAGE AREA.—210 square miles (determined by Pittsburgh Flood Commission).

RECORDS AVAILABLE.—October 14, 1910, to September 30, 1918.

GAGE.—Standard chain gage attached to bridge, read by R. W. Evans. Sea-level elevation of zero of gage, 1,631.70 feet.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Channel rocky. Control, coarse gravel and rocks; probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.40 feet at 4.30 p. m. February 26 (discharge, 8,700 second-feet); minimum stage recorded, 2.60 feet at 9 a. m. October 14 (discharge, 25 second-feet).

1910–1918: Maximum stage recorded, 9.90 feet January 30, 1912, and March 12, 1917 (discharge, 12,300 second-feet); minimum discharge recorded, 1 second-foot October 1, 1914 (gage height, 2.0 feet). High waters of 1888 and 1907 reached a stage represented by approximately 12.5 feet, referred to present gage datum.

ICE.—Stage-discharge relation affected by ice during severe winters.

REGULATION.—Flow at low stages may be affected by storage of water at pulp mill dam about three-fourths mile above station.

ACCURACY.—Stage-discharge relation practically permanent except as affected by ice December 28 to January 27. Rating curve well defined between 40 and 10,000 second-feet; extended beyond these limits. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for period of ice effect for which it was ascertained by means of observer's notes, weather records, and comparison with records at other stations. Open-water records fair; records for period of ice effect poor.

The following discharge measurements were made by B. L. Hopkins:

April 30, 1918: Gage height, 3.84 feet; discharge, 461 second-feet.

May 1, 1918: Gage height, 3.79 feet; discharge, 445 second-feet.

Daily discharge, in second-feet, of Shavers Fork at Parsons, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	72	905	400	140	800	295	274	480	504	2,070	146	1,260
2	74	643	500	130	852	260	225	365	365	1,140	135	380
3	34	652	400	120	776	173	480	365	309	634	135	204
4	34	365	365	110	700	1,260	700	365	215	425	135	225
5	38	135	425	100	605	1,140	440	295	225	351	61	281
6	56	146	425	110	662	1,140	380	281	165	260	44	464
7	56	146	253	120	800	2,830	295	295	173	365	61	225
8	34	120	225	130	1,320	1,790	365	1,790	562	183	76	135
9	39	135	210	120	3,170	700	3,350	1,590	480	150	80	158
10	38	135	170	120	1,390	700	1,520	905	199	154	80	173
11	60	135	160	130	1,520	800	1,210	681	154	123	46	143
12	56	87	140	130	1,660	800	905	520	135	110	46	135
13	46	135	110	140	2,510	4,870	652	624	111	80	295	99
14	25	92	100	140	2,830	5,270	520	1,790	87	80	260	365
15	55	104	100	140	3,530	3,530	1,930	1,260	61	135	588	295
16	46	80	82	140	4,670	1,660	2,220	800	80	72	605	129
17	58	82	110	140	3,530	1,260	1,930	700	225	80	135	225
18	38	104	110	130	1,020	852	1,590	537	905	102	173	1,020
19	65	104	104	130	905	1,020	1,020	605	960	80	960	700
20	1,790	70	110	130	6,330	1,660	800	750	520	85	456	960
21	974	72	104	120	3,900	1,140	905	700	154	80	267	1,390
22	158	63	82	120	1,930	1,520	1,930	496	852	154	173	1,390
23	135	61	135	120	1,260	750	1,140	700	700	120	135	440
24	116	70	139	110	1,020	700	960	800	562	116	99	169
25	135	70	400	110	1,080	800	700	2,510	480	126	80	410
26	120	61	1,390	200	8,220	700	1,020	4,090	2,070	104	80	267
27	135	55	1,020	300	2,220	546	905	1,590	1,390	70	80	246
28	135	46	700	2,830	520	425	800	1,520	624	61	76	267
29	571	200	300	2,670	.....	295	681	800	2,830	80	80	253
30	750	300	170	1,660	.....	199	546	605	1,020	80	80	154
31	960	.....	150	852	.....	199	.....	554	.....	104	80	.....

NOTE.—Discharge, Oct. 21, Feb. 3, Apr. 11, June 13 and 14, interpolated, Dec. 9–15 estimated, because gage was not read; Nov. 29 to Dec. 3 and Dec. 25, estimated by comparison with records for Cheat River near Parsons (observer's readings were in error). Discharge, Dec. 28 to Jan. 27, estimated because of ice, from observer's notes, study of weather records and comparison with records for Cheat River near Parsons.

Monthly discharge of Shavers Fork at Parsons, W. Va., for the year ending Sept. 30, 1918.

[Drainage area, 210 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,790	25	223	1.06	1.22
November	905	46	179	.852	.95
December	1,390	82	293	1.40	1.61
January	2,830	100	376	1.79	2.06
February	8,220	520	2,130	10.1	10.52
March	5,270	173	1,270	6.05	6.98
April	3,350	225	1,010	4.81	5.37
May	4,090	281	947	4.51	5.20
June	2,830	61	571	2.72	3.04
July	2,070	61	251	1.20	1.38
August	960	44	185	.881	1.02
September	1,390	99	419	2.00	2.23
The year	8,220	25	644	3.07	41.58

BIG SANDY CREEK AT ROCKVILLE, W. VA.

LOCATION.—At highway bridge at Rockville, Preston County, 5 miles above mouth of creek and 6 miles below Bruceton Mills.

DRAINAGE AREA.—202 square miles (determined by West Virginia Development Co.).

RECORDS AVAILABLE.—May 7, 1909, to March 31, 1918, when station was discontinued.

GAGE.—Chain gage attached to downstream side of bridge; read by Levi Zweyer.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Channel bed composed of boulders and bedrock. Control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 12.8 feet at 7 a. m. February 26 (discharge, about 11,900 second-feet); minimum stage recorded, 3.30 feet at 6 p. m. October 3 and 4 (discharge, 12 second-feet).

ICE.—Stage-discharge relation affected by ice during severe winters.

REGULATION.—Gristmills at Rockville, Clifton Mills, and Bruceton Mills operated by water power, may produce fluctuations in stage during low water.

ACCURACY.—Stage-discharge relation practically permanent except as affected by ice. Rating curve well defined between 10 and 8,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for period of ice effect. Records fair except those for periods of ice effect, which are poor.

The following discharge measurement was made by Peterson and Hopkins:

October 6, 1917: Gage height, 3.45 feet; discharge, 13.7 second-feet.

Daily discharge, in second-feet, of Big Sandy Creek at Rockville, W. Va., for the period Oct. 1, 1917, to Mar. 31, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....	34	346	299			798	16.....	39	81	90		2,500	798
2.....	19	284	330			633	17.....	29	88	88		1,200	503
3.....	13	284	269			523	18.....	27	88	85		739	429
4.....	12	191	284			465	19.....	61	81	88		1,690	346
5.....	16	169	191		140	862	20.....	503	64	103		7,970	299
6.....	18	150	150			739	21.....	241	64	142		2,360	269
7.....	16	150	150			684	22.....	169	81	191		931	241
8.....	27	133	133	130		543	23.....	126	85	299	130	798	299
9.....	17	110	120		4,400	633	24.....	133	103	346		739	215
10.....	16	118	120		2,640	1,200	25.....	465	88			862	191
11.....	19	110	110		2,360	862	26.....	586	48			8,810	169
12.....	32	103	110		3,080	633	27.....	1,010	81	226		1,950	150
13.....	68	103	100		7,340	1,100	28.....	931	103			1,010	142
14.....	52	96	90		2,220	4,060	29.....	633	118			.....	133
15.....	61	81	90		6,920	1,690	30.....	739	169			.....	133
							31.....	465	.....			.....	126

NOTE.—Discharge, Dec. 9–16 and Dec. 25 to Feb. 8, estimated because of ice effect, by means of observer's notes and weather records.

Monthly discharge of Big Sandy Creek at Rockville, W. Va., for the period Oct. 1, 1917, to Mar. 31, 1918.

[Drainage area, 202 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,010	12	212	1.05	1.21
November	346	48	126	.624	.70
December	.....	85	179	.886	1.02
January	.....	.....	130	.644	.74
February	8,810	.....	2,200	10.9	11.35
March	4,060	126	641	3.17	3.66

LITTLE BEAVER CREEK BASIN.

LITTLE BEAVER CREEK NEAR EAST LIVERPOOL, OHIO.

LOCATION.—At steel highway bridge known as Grimms Bridge, 4 miles above mouth of creek and 4 miles northeast of East Liverpool, Columbiana County. North Fork enters creek on left about 3 miles above station.

DRAINAGE AREA.—505 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 17, 1915, to September 30, 1918.

GAGE.—Chain gage fastened to downstream side of highway bridge; read by G. W. Garn and Bessie Garn.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—One channel at all stages; at extreme high stages water flows around both bridge abutments. Channel straight for 100 feet above and 300 feet below station. Rapids about 600 feet below bridge act as primary control; probably permanent. Point of zero flow, gage height, 0.10±0.2 foot.

EXTREMES OF STAGE.—Maximum stage recorded, 11.2 feet at 8 a. m. February 20; minimum stage recorded, 1.78 feet at 6 p. m. August 22 and 7 a. m. August 26.

1915–1918: Maximum and minimum stages recorded same as for 1918 above. Highest known flood reached a stage represented by gage height about 20 feet.

ICE.—Stage-discharge relation affected by ice and ice jams during severe winters.

ACCURACY.—Stage-discharge relation permanent except as affected by ice. Rating curve not fully developed. Gage read to hundredths twice daily. Records excellent.

The following discharge measurement was made by Peterson and Hopkins:

October 9, 1917: Gage height, 2.50 feet; discharge, 70.8 second-feet.

Daily gage height, in feet, of Little Beaver Creek near East Liverpool, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.20	4.86	3.13	.....	2.95	6.20	3.13	4.15	4.96	2.72	2.44	2.72
2	2.20	4.07	3.10	.....	.....	6.44	3.19	3.87	4.25	2.42	2.26	2.46
3	2.32	4.04	3.04	.....	.....	5.22	3.27	3.68	3.77	2.46	2.17	2.40
4	2.87	3.82	2.92	3.92	3.00	4.64	3.59	3.58	3.50	2.44	2.23	2.49
5	3.07	3.67	2.88	.....	.....	4.92	3.34	3.45	3.32	2.41	2.23	2.46
6	2.78	3.58	2.85	.....	.....	5.00	3.18	3.35	3.48	2.32	2.10	2.89
7	2.62	3.48	2.84	3.34	.....	4.94	3.10	3.40	3.41	2.28	1.92	2.56
8	2.53	3.42	2.51	.....	3.25	4.60	4.40	3.32	3.25	2.20	2.32	2.37
9	2.50	3.30	2.57	.....	7.02	4.92	4.36	3.23	3.10	2.20	2.85	2.25
10	2.48	3.25	2.80	.....	7.15	6.35	4.02	3.38	3.08	2.18	2.70	2.16
11	2.40	3.21	2.86	3.31	6.78	5.12	4.32	3.52	3.08	2.15	2.58	2.10
12	2.38	3.14	2.85	.....	7.80	4.95	5.72	4.08	3.12	3.22	2.38	2.14
13	2.62	3.15	2.86	.....	8.74	4.72	5.68	6.26	3.11	3.10	2.30	2.46
14	2.60	3.15	2.86	3.15	6.69	5.68	5.65	5.99	2.94	2.78	2.12	2.32
15	2.52	3.15	2.86	.....	7.92	5.76	4.86	4.88	2.83	2.58	2.05	2.80
16	2.47	3.15	2.96	.....	6.03	4.72	4.42	4.44	2.79	2.40	2.09	2.40
17	2.44	3.15	2.95	.....	5.00	4.48	4.62	3.95	2.70	2.31	2.16	2.59
18	2.42	3.14	2.90	3.05	5.18	4.28	5.28	3.78	2.65	2.24	2.02	2.68
19	4.74	2.98	2.98	.....	5.62	4.08	4.34	3.57	2.58	2.22	1.90	2.50
20	5.68	2.92	3.23	.....	10.40	3.92	4.00	3.44	2.52	2.26	1.88	2.52
21	4.08	2.92	3.70	3.00	6.65	3.84	4.12	3.62	2.56	2.20	1.95	2.50
22	3.58	2.91	4.42	.....	5.29	3.77	4.32	3.56	2.76	2.16	1.79	2.43
23	3.50	2.98	4.16	.....	4.70	3.62	4.12	4.00	2.92	2.15	1.83	2.36
24	6.12	3.00	.....	.....	4.62	3.52	4.38	3.86	2.72	2.22	1.86	2.28
25	7.95	2.90	.....	2.95	4.70	3.42	4.16	4.93	2.62	2.40	1.86	2.24
26	5.92	2.86	.....	.....	5.72	3.36	3.96	5.72	2.54	2.46	1.80	2.16
27	5.00	2.90	.....	.....	4.75	3.26	3.80	4.31	2.48	2.36	1.82	2.12
28	4.86	2.90	4.68	2.95	4.40	3.26	4.75	3.85	2.44	2.32	1.83	2.08
29	4.54	2.88	.....	.....	.....	3.24	4.91	3.57	2.45	2.15	2.00	2.04
30	6.18	2.95	.....	.....	.....	3.19	4.60	4.04	2.38	2.65	2.54	2.03
31	5.76	.....	3.94	.....	.....	3.17	.....	5.90	.....	2.50	2.48	.....

NOTE.—Stage-discharge relation affected by ice Dec. 10 to Feb. 9; gage read once or twice a week Dec. 24 to Feb. 7.

YELLOW CREEK BASIN.

YELLOW CREEK AT HAMMONDSVILLE, OHIO.

LOCATION.—At covered highway bridge on Steubenville Pike, a fifth of a mile southwest of Hammondsville, Jefferson County. North Fork enters on left 1,000 feet below station.

DRAINAGE AREA.—169 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 13, 1915, to September 30, 1918.

GAGE.—Chain gage on downstream side of bridge about 25 feet from left end; read by W. J. Sprague.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—One channel, but at extreme high stages stream flows around both abutments; straight 1,000 feet above and curved 100 feet below station. Control not permanent. Point of zero flow, gage height about 1.4 feet September, 1915 and 1916, and October, 1917.

EXTREMES OF STAGE.—Maximum stage recorded during year, 9.61 feet at 8.45 a. m. February 20; minimum stage recorded, 1.28 feet at 7.10 p. m. August 28.

1915–1918: Maximum stage recorded, 10.75 feet December 29, 1915; minimum stage same as for 1918 above. Highest known flood reached a stage represented by gage height about 16 feet.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent except as affected by ice during December, January, and February. Rating curve not fully developed. Gage read to hundredths twice daily. Records good.

The following discharge measurement was made by Peterson and Hopkins:

October 8, 1917: Gage-height, 2.17 feet; discharge, 16.1 second-feet.

Daily gage height, in feet, of Yellow Creek at Hammondsville, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.10	3.79	2.59	4.47	2.65	3.72	2.44	3.16	3.48	1.92	1.52	2.82
2	2.09	3.54	2.52	4.70	.....	3.52	2.46	3.02	3.00	1.86	1.50	2.35
3	2.09	3.31	2.46	4.74	.....	3.36	2.47	2.94	2.72	1.84	1.48	2.04
4	2.27	3.10	2.45	4.77	2.42	3.28	2.52	2.90	2.65	1.81	1.46	1.74
5	2.50	2.98	2.42	4.82	.....	3.65	2.38	2.88	2.55	1.75	1.42	2.28
6	2.36	2.94	2.40	4.86	.....	3.56	2.26	2.88	2.48	1.71	1.36	2.40
7	2.24	2.89	2.35	4.88	.....	3.51	2.18	2.90	2.50	1.66	1.30	2.06
8	2.23	2.81	2.42	4.88	2.46	3.44	3.40	2.91	2.44	1.62	1.54	1.89
9	2.20	2.75	2.84	4.82	5.84	3.32	3.79	2.89	2.37	1.59	1.81	1.81
10	2.18	2.73	2.72	4.73	5.44	3.86	3.06	2.89	2.35	1.56	1.80	1.74
11	2.16	2.71	.....	4.60	5.16	3.65	3.42	2.99	2.42	1.60	2.27	1.68
12	2.21	2.68	.....	4.56	6.14	3.63	4.62	3.04	2.33	1.87	2.22	1.80
13	2.22	2.66	.....	4.28	6.39	3.50	4.20	5.83	2.24	2.02	2.18	1.99
14	2.20	2.59	2.58	3.69	4.53	3.96	3.96	4.63	2.18	1.92	2.14	1.96
15	2.26	2.58	.....	3.46	5.64	3.80	3.62	3.90	2.18	1.82	2.06	1.80
16	2.26	2.60	.....	3.30	3.78	3.51	3.40	3.47	2.10	1.71	2.00	1.90
17	2.24	2.58	3.30	3.20	3.13	3.40	3.38	3.17	2.03	1.64	1.94	2.02
18	2.20	2.58	.....	3.16	3.18	3.22	3.30	2.99	1.98	1.60	1.86	2.07
19	4.75	2.54	.....	.....	4.34	3.06	3.00	2.88	1.92	1.60	1.79	2.01
20	4.02	2.51	.....	.....	7.92	2.94	2.88	2.82	1.90	1.60	1.70	1.98
21	3.40	2.52	3.38	3.05	5.65	2.89	3.34	2.76	1.96	1.56	1.62	2.16
22	3.04	2.57	4.54	.....	6.79	2.80	3.43	2.81	1.99	1.54	1.52	2.10
23	2.85	2.58	4.46	.....	6.92	2.72	3.20	5.21	1.98	1.52	1.46	1.97
24	5.10	2.52	4.16	.....	4.66	2.66	3.36	4.05	1.94	1.50	1.41	1.81
25	5.36	2.34	4.02	3.00	3.76	2.70	3.22	4.28	1.93	1.70	1.36	1.75
26	4.18	2.42	3.96	.....	4.91	2.62	3.11	4.18	1.92	1.66	1.32	1.76
27	4.04	2.46	3.84	.....	4.12	2.54	3.04	3.82	1.92	1.60	1.31	1.72
28	3.97	2.54	3.82	2.98	3.80	2.54	2.90	3.23	1.88	1.56	1.29	1.70
29	3.79	2.52	3.85	.....	.....	2.50	3.82	3.07	1.84	1.52	1.93	1.68
30	4.79	2.54	3.93	.....	.....	2.46	3.42	4.72	1.84	1.55	2.54	1.64
31	4.10	.....	4.20	.....	.....	2.44	.....	4.60	.....	1.53	3.03	.....

NOTE.—Gage not read on days for which no gage heights are given.

MIDDLE ISLAND CREEK BASIN.

MIDDLE ISLAND CREEK AT LITTLE, W. VA.

LOCATION.—At highway bridge at Little, 6 miles southeast of Friendly, Tyler County. Stewart Run enters on left 500 feet below station.

DRAINAGE AREA.—458 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 7, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on left bank immediately below the bridge; read to tenths twice daily by E. F. Weigand.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading. Stay wire is used for measurements at high stages.

CHANNEL AND CONTROL.—One channel at all stages; straight for about 400 feet above and 250 feet below station. Primary control is at foundation of old milldam 250 feet below station; composed of bedrock, foundation timbers, small deposit of rock and sand; probably permanent. Point of zero flow, gage height 1.4 feet ±0.2 foot.

EXTREMES OF STAGE.—Maximum stage recorded during year, 18.7 feet at 7 a. m. March 14; minimum stage, 1.74 feet January 13, August 29 and 30.

1915–1918: Maximum stage recorded, 22.22 feet at 5 p. m. January 22, 1917; minimum stage, 1.74 feet January 13, August 29 and 30, 1918. Highest known flood occurred in August, 1875; gage height about 33.5 feet.

ICE.—Stage-discharge relation affected by ice during winters.

COOPERATION.—Base data furnished by United States Engineer Corps.

Determination of discharge withheld until additional data are obtained.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Middle Island Creek at Little, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.04	3.99	3.19	2.64	4.84	3.94	2.64	3.84	3.49	2.54	2.29	2.89
2	2.04	3.44	2.94	2.39	3.84	3.69	2.74	3.44	3.19	2.49	2.59	3.79
3	2.04	3.24	2.89	2.14	4.14	3.49	3.19	3.39	2.84	2.44	2.69	3.29
4	2.04	3.19	2.74	2.04	3.99	3.34	4.24	3.29	2.74	2.34	2.44	2.89
5	2.04	3.04	2.69	2.04	3.69	4.79	3.79	3.09	2.69	2.29	2.29	2.84
6	2.04	2.99	2.64	1.94	3.54	4.54	3.54	2.99	2.64	2.19	2.14	2.69
7	2.04	2.84	2.54	2.19	6.69	3.89	3.34	2.84	6.74	2.14	2.09	2.64
8	2.04	2.79	2.59	2.69	11.44	3.59	4.99	15.25	5.69	2.04	2.04	2.54
9	2.04	2.69	2.59	2.39	12.55	3.54	8.59	6.29	3.34	2.04	2.64	2.44
10	2.04	2.54	2.49	2.24	9.64	4.14	5.44	4.14	3.09	2.04	3.69	2.39
11	2.04	2.54	2.44	2.04	5.49	3.99	6.84	3.79	2.89	2.04	3.24	2.34
12	2.19	2.54	2.34	1.84	4.84	3.74	8.44	3.84	2.79	2.19	2.99	2.29
13	2.34	2.44	2.29	1.74	6.29	8.99	5.39	5.79	2.64	2.49	2.49	2.24
14	2.79	2.44	2.24	2.14	5.04	16.70	4.54	6.14	2.64	2.59	2.34	2.19
15	2.74	2.39	2.09	2.64	6.64	7.24	4.09	4.19	2.49	2.49	2.39	2.14
16	2.74	2.34	2.04	3.74	6.34	4.24	3.69	3.74	2.44	2.39	2.49	2.09
17	2.54	2.34	2.04	4.34	4.44	3.99	3.64	3.49	2.44	2.34	2.39	2.09
18	2.59	2.34	2.04	4.19	3.69	3.64	3.54	3.19	2.59	2.29	2.29	2.44
19	3.89	2.34	2.09	3.94	5.84	3.39	3.39	2.99	3.14	2.19	2.14	2.49
20	7.12	2.34	2.29	3.59	11.84	3.24	3.24	2.89	2.74	2.14	2.04	2.44
21	3.59	2.24	3.04	3.39	6.99	3.19	3.59	2.69	2.54	2.44	2.04	2.69
22	3.24	2.24	3.79	3.24	4.39	3.04	4.09	2.59	2.59	2.64	2.04	2.49
23	2.94	2.34	3.29	3.14	3.84	2.89	3.84	3.74	3.34	2.54	2.04	2.69
24	4.09	2.34	3.14	3.04	3.99	2.84	3.69	3.59	2.89	2.44	2.04	2.79
25	7.47	2.34	3.94	3.29	4.64	2.79	3.64	8.34	2.69	2.34	1.99	2.59
26	6.62	2.24	4.34	3.44	11.54	2.89	3.84	10.64	2.59	2.29	1.94	2.49
27	3.62	2.34	4.04	3.69	5.64	2.89	3.79	4.54	2.49	2.24	1.84	2.39
28	5.29	2.54	3.64	4.49	4.19	2.84	3.84	4.94	2.74	2.09	1.84	2.29
29	3.84	3.09	3.44	11.54	.....	2.74	3.74	3.69	2.84	2.09	1.79	2.24
30	5.34	3.34	3.04	9.14	.....	2.74	3.94	3.34	2.84	2.39	1.74	2.14
31	4.64	.....	2.89	6.64	.....	2.64	.....	3.09	2.69	2.24	1.89	.....

NOTE.—Stage-discharge relation may have been affected by ice during part of December, January, and February.

LITTLE MUSKINGUM RIVER BASIN.

LITTLE MUSKINGUM RIVER AT FAY, OHIO.

LOCATION.—A mile northwest of Fay, Washington County, Ohio, 7 miles from St. Marys, W. Va., and 12 miles from Marietta, Ohio. Bear Run enters on left half a mile above station. Covered highway bridge crosses river just above Bear Run.

DRAINAGE AREA.—259 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 14, 1915, to September 30, 1918.

GAGE.—Inclined and vertical staff on right bank about 400 feet below suspension footbridge; read by G. I. Smith.

DISCHARGE MEASUREMENTS.—Made from suspension bridge or by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight several hundred feet above and below bridge. Overflow at gage height about 13 feet; wide overflow at maximum stages. Bed of stream composed of mud, sand, rock and gravel; primary control at ford 50 feet below gage compact sand and gravel; fairly permanent. Point of zero flow, gage height 0.7 ± 0.2 foot May, 1915.

EXTREMES OF STAGE.—Maximum stage recorded during year, 15.50 feet at 8 a. m. February 10 and 5 p. m. February 20; minimum stage, 1.17 feet at 5 p. m. October 2 and 8 a. m. October 3.

1915–1918: Maximum stage recorded, 21.5 feet at 5 p. m. January 22, 1917; minimum stage, 1.17 feet at 5 p. m. October 2 and 8 a. m. October 3, 1917.

Highest flood known reached a stage represented by gage height about 23 feet.

ICE.—Stage-discharge relation affected by ice in severe winters.

COOPERATION.—Base data furnished by United States Engineer Corps.

Data inadequate for determination of discharge.

The following discharge measurement was made by Shick and Quattlebaum:

February 20; 1918: Gage height, 15.50 feet; discharge, 6,430 second-feet.

Daily gage height, in feet, of Little Muskingum River at Fay, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.20	3.32	2.46	2.49	3.22	3.40	2.12	2.70	2.70	1.56	1.33	3.44
2	1.18	2.90	2.29	2.34	2.92	3.24	2.46	2.58	2.45	1.48	1.32	2.25
3	1.18	2.61	2.17	2.25	2.80	3.02	4.12	2.44	2.28	1.41	1.32	2.04
4	1.20	2.40	2.09	2.18	2.82	2.94	3.37	2.33	2.14	1.40	1.33	1.75
5	1.24	2.26	2.02	2.14	2.66	3.45	2.86	2.26	2.06	1.40	1.32	1.66
6	1.26	2.17	1.98	2.20	2.59	3.34	2.60	2.22	2.04	1.39	1.30	1.62
7	1.28	2.10	1.90	3.02	5.40	3.14	2.69	2.32	2.18	1.34	1.30	1.56
8	1.35	2.06	1.83	3.35	9.40	2.96	3.69	13.58	2.45	1.33	1.35	1.48
9	1.34	1.99	1.68	2.94	14.05	3.05	4.55	4.40	2.09	1.40	1.40	1.42
10	1.30	1.92	1.65	2.69	13.15	4.30	3.96	3.58	1.98	1.38	1.58	1.42
11	1.30	1.88	1.69	2.55	7.75	3.69	7.30	4.18	1.88	1.37	3.38	1.40
12	1.45	1.83	1.58	3.01	8.45	3.34	9.18	4.10	1.84	1.36	2.01	1.42
13	1.47	1.84	1.53	3.29	9.30	10.75	4.90	7.08	1.74	1.38	1.74	1.71
14	1.56	1.78	1.55	2.97	5.24	12.45	3.82	8.30	1.69	1.48	1.56	1.80
15	1.56	1.73	1.62	2.85	8.02	4.68	3.35	4.10	1.65	1.58	1.42	1.56
16	1.46	1.68	1.62	2.87	4.75	3.64	3.11	3.34	1.60	1.52	1.42	1.52
17	1.44	1.64	1.62	2.70	3.63	3.26	3.10	3.02	1.61	1.56	1.42	2.76
18	1.44	1.62	1.64	2.52	3.12	3.06	3.09	2.82	1.58	1.46	1.36	2.65
19	3.27	1.62	1.63	2.42	5.62	2.84	2.83	2.64	1.60	1.42	1.32	2.15
20	5.30	1.62	1.95	2.26	15.05	2.72	2.85	2.52	1.56	1.37	1.30	2.14
21	2.94	1.60	3.74	2.18	4.96	2.63	3.31	2.50	1.53	1.34	1.28	2.30
22	2.42	1.56	5.11	2.23	3.55	2.56	3.19	2.46	1.56	1.32	1.27	2.00
23	2.33	1.54	4.20	2.23	3.25	2.48	2.90	2.84	1.52	1.30	1.41	1.65
24	3.41	1.54	3.78	2.27	3.61	2.40	2.78	2.73	1.52	1.30	1.29	1.58
25	8.03	1.56	4.72	2.24	4.15	2.34	2.68	12.55	1.50	1.30	1.24	1.40
26	6.10	1.52	4.10	2.26	11.00	2.29	2.61	4.54	1.48	1.32	1.23	1.23
27	4.16	1.54	3.37	2.40	4.75	2.22	2.57	5.25	1.50	1.72	1.31	1.23
28	5.45	2.10	3.09	2.77	3.78	2.14	2.55	4.30	1.48	1.50	1.30	1.30
29	3.72	2.64	2.66	4.20	.....	2.10	2.68	3.56	1.44	1.44	1.29	1.22
30	6.87	2.62	2.71	4.26	.....	2.06	2.89	3.11	1.39	1.43	1.28	1.20
31	4.32	.....	2.81	3.72	.....	2.04	.....	2.93	.....	1.36	4.10	.....

NOTE.—Stage-discharge relation may have been affected by ice during part of December, January, and February.

MUSKINGUM RIVER BASIN.

MUSKINGUM RIVER AT FRAZIER, OHIO.

LOCATION.—At highway bridge at Frazier, Muskingum County, 4½ miles below Zanesville. Brush Creek enters on right one-third mile below gage.

DRAINAGE AREA.—7,160 square miles (revised measurement).

RECORDS AVAILABLE.—June 1, 1915, to September 30, 1918.

GAGE.—Staff near upper corner of right abutment of bridge; read by D. A. Burns. Sea-level elevation of zero of gage, 663.29 feet.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading on crest of dam No. 9, about 4 miles below gage. Leakage past dam, through lock and power plants, should be included with flow over crest. The measurement of August 12, 1916, made by wading on crest of dam, includes the flow over crest (620 second-feet); discharge through upper gate of lock (5 second-feet); and discharge through headgate of Carter's mill (47 second-feet).

CHANNEL AND CONTROL.—River straight above and below. Control is crest of dam No. 9 at Philo, about 4 miles below gage. Except for leakage through lock and dam and leakage and flow to flour mill at left end of dam, and leakage and flow through gate at right end of dam leading to old canal for supply to railroad pumping station, the gage height of the crest of the dam, 8.83 feet, is the point at which flow would be zero.

EXTREMES OF STAGE.—Maximum stage recorded during year, 22.9 feet at 6 a. m. February 15; minimum stage, 9.1 feet August 21 and 22. Flood of March, 1913, reached a stage of 49.1 feet; highest stage ever recorded.

ICE.—Stage-discharge relation affected by ice jams at times.

REGULATION.—Leakage through the lock and the power plants at dam No. 9 and the operation of power plants at dams Nos. 9 and 10 may affect the low-water flow to some extent.

ACCURACY.—Stage-discharge relation permanent, except as the relation may be affected by leakage through dam No. 9, through the gates of the power plants and through the lock, and by the operation of the power plants at dam No. 9; probably not affected by ice. The flow from the area between the measuring section and the crest of dam No. 9 may be sufficient at times to affect the stage-discharge relation. This area, however, is small, and such conditions would be of rare occurrence and of small effect. Gage read twice daily to tenths. Records good.

COOPERATION.—Base data furnished by the United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Muskingum River at Frazier, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	9.3	11.95	9.4	9.5	9.5	13.45	10.1	10.95	11.7	9.5	9.8	10.15
2	9.3	11.45	9.4	9.2	9.5	14.95	10.3	10.75	11.8	9.5	9.7	9.85
3	9.3	11.05	9.5	9.2	9.5	15.05	10.5	10.6	11.25	9.5	9.5	9.6
4	9.3	10.9	9.5	9.2	9.5	13.35	10.35	10.45	11.0	9.5	9.4	9.5
5	9.3	10.5	9.55	9.2	9.5	12.85	10.2	10.35	10.65	9.5	9.3	9.4
6	9.3	10.4	9.6	9.2	9.5	12.6	10.25	10.0	10.45	9.5	9.3	9.55
7	9.3	10.25	9.6	9.2	9.5	12.45	10.3	10.05	10.35	9.5	9.2	9.9
8	9.3	9.9	9.5	9.2	9.5	12.15	10.35	10.45	10.2	9.5	9.2	9.75
9	9.3	10.0	9.4	9.5	10.15	11.9	10.25	10.1	10.35	9.4	9.15	9.6
10	9.3	9.95	9.4	9.5	12.4	12.3	10.5	10.2	10.25	9.4	9.3	9.5
11	9.3	10.0	9.2	9.5	14.9	12.9	10.75	10.35	10.0	9.4	9.4	9.4
12	9.3	10.0	9.2	9.5	16.9	12.6	11.2	10.45	10.0	9.4	9.5	9.4
13	9.3	9.8	9.2	9.5	19.65	12.45	11.85	13.55	10.0	9.5	9.5	9.4
14	9.3	9.8	9.0	9.5	20.6	14.2	12.15	17.0	9.9	9.5	9.4	9.3
15	9.3	9.8	9.0	9.5	21.95	14.0	11.9	15.95	9.9	9.4	9.4	9.55
16	9.3	9.8	9.0	9.5	20.65	13.7	11.5	14.55	9.8	9.4	9.4	9.7
17	9.3	9.7	9.0	9.5	18.35	12.85	11.5	13.65	9.9	9.3	9.3	9.65
18	9.3	9.7	9.0	9.5	15.45	12.7	10.85	12.6	9.8	9.2	9.3	9.65
19	9.35	9.6	9.0	9.5	13.8	11.7	10.7	11.6	9.7	9.2	9.2	9.85
20	9.4	9.7	9.0	9.5	17.8	11.4	10.8	11.5	9.7	9.2	9.2	10.0
21	9.95	9.4	9.0	9.5	18.4	11.05	10.8	11.0	9.6	9.2	9.1	9.8
22	10.5	9.4	9.1	9.5	17.4	10.8	10.9	10.9	9.6	9.2	9.1	9.8
23	10.45	9.5	9.3	9.5	15.95	10.8	11.15	11.45	9.6	9.2	9.2	9.65
24	10.25	9.4	10.2	9.5	13.95	10.6	11.05	12.95	9.6	9.2	9.2	9.6
25	10.45	9.5	11.1	9.5	13.5	10.6	11.0	12.45	9.6	9.2	9.25	9.5
26	11.45	9.3	11.0	9.5	15.8	10.45	10.9	13.25	9.6	9.4	9.35	9.5
27	11.5	9.3	11.0	9.5	14.4	10.5	10.8	12.7	9.6	9.5	9.3	9.4
28	11.45	9.3	10.5	9.5	13.8	10.4	10.55	12.45	9.6	9.4	9.3	9.4
29	11.15	9.25	10.5	9.5	.....	10.3	10.75	12.55	9.5	9.5	9.2	9.5
30	11.4	9.4	9.6	9.5	.....	10.2	10.95	11.8	9.5	9.5	9.2	9.4
31	11.8	.....	9.6	9.5	.....	10.2	.....	11.5	.....	9.55	9.55	.....

MUSKINGUM RIVER AT BEVERLY, OHIO.

LOCATION.—At Lock 4 at Beverly, Washington County. Wolf Creek enters on right immediately above station.

DRAINAGE AREA.—7,700 square miles (United States Engineer Corps).

RECORDS AVAILABLE.—June 1, 1915, to September 30, 1918.

GAGE.—Ceramic tile gage, graduated to tenths of a foot, on lower buttress of river wall of Lock 4, about 1,000 feet above the measuring section. Sea-level elevation of zero of gage, 602.60 feet (United States Engineer Corps).

DISCHARGE MEASUREMENTS.—Made from upstream side of highway bridge 1,000 feet below gage.

CHANNEL AND CONTROL.—Bed of stream gravel and masonry débris of old bridge piers; probably permanent. Stream curves slightly to the left from 1,000 feet above to 1,000 feet below the section. Control is crest of dam No. 3, 10.8 miles below. At gage height 5.2 feet or crest of dam No. 3 flow would be zero provided there was no leakage through dam, lock, or power plant at dam.

EXTREMES OF STAGE.—Maximum stage recorded during year, 24.4 feet at 6 p. m. February 15; minimum stage, 3.3 feet October 1–3.

Flood of March, 1913, reached a stage of 46.55 feet, the highest stage ever recorded.

ICE.—Stage-discharge relation not affected by ice.

REGULATION.—Leakage through dam No. 3, lock, and the power plant at the dam may affect the low-water flow to some extent.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice. Dam No. 3, about 11 miles below, the control for the gage, leaks so that the water falls below the crest during low water. Change in this leakage, leakage and flow through the power plant, leakage through lock, and inflow into pool 3 below the measuring section may all affect the stage-discharge relation at low and medium stages. When the stage of the Ohio at Marietta is about 39 feet or more, the stage-discharge relation is affected by backwater. Records of daily discharge withheld for additional information. Gage read twice daily to tenths. Records good, except as may be affected by described conditions at low and medium stages.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Muskingum River at Beverly, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.3	9.55	5.6	6.6	6.0	12.15	6.6	7.85	9.15	5.6	5.85	6.35
2	3.3	9.1	5.6	6.45	6.0	13.3	6.6	7.7	9.3	5.6	5.9	6.15
3	3.3	8.35	5.6	6.4	6.0	14.35	7.35	7.55	8.85	5.6	5.75	6.1
4	3.45	7.85	5.6	6.4	6.0	12.75	7.25	7.35	8.2	5.6	5.6	5.8
5	3.5	7.2	5.7	6.4	6.0	11.3	6.75	6.95	7.7	5.6	5.0	5.6
6	3.5	6.9	5.7	6.4	6.0	11.0	6.7	6.7	7.3	5.5	4.65	5.5
7	3.5	6.6	5.7	6.8	6.1	10.6	6.7	6.6	7.5	5.5	4.35	5.8
8	3.6	6.5	5.7	6.65	7.7	10.2	7.1	7.25	7.0	5.4	4.55	6.1
9	3.55	6.35	5.55	6.45	13.0	9.65	7.05	7.0	6.8	5.3	4.6	5.9
10	3.9	6.2	5.4	6.4	15.45	10.5	7.0	7.1	6.7	5.2	4.75	5.65
11	4.1	6.1	5.4	6.4	16.85	10.75	8.9	7.3	6.55	5.2	5.35	5.5
12	4.2	6.0	5.4	6.4	18.95	11.15	10.4	7.9	6.35	5.2	5.7	5.45
13	4.3	5.9	5.4	6.3	20.6	14.7	9.7	12.6	6.2	5.2	5.65	5.4
14	4.3	5.9	5.4	6.3	21.35	15.15	10.2	17.3	6.2	5.2	5.5	5.3
15	4.3	5.9	5.4	6.3	24.2	13.35	9.95	16.3	6.1	5.2	5.4	5.3
16	4.55	5.8	5.4	6.3	22.9	12.7	9.3	14.15	6.0	5.2	5.2	5.5
17	4.95	5.7	5.4	6.2	19.9	11.45	8.6	12.55	6.0	5.2	4.9	6.95
18	5.0	5.7	5.3	6.2	16.35	10.45	8.1	11.25	5.9	5.1	4.65	7.0
19	6.25	5.7	5.3	6.2	14.5	9.6	7.75	9.6	5.8	5.0	4.45	6.55
20	5.85	5.7	5.45	6.2	18.3	8.85	7.6	8.65	5.7	5.0	4.25	6.35
21	5.5	5.7	5.75	6.1	19.6	8.3	7.7	8.7	5.7	4.9	3.85	6.15
22	6.8	5.6	6.05	6.1	17.35	8.05	7.85	8.15	5.7	4.45	3.6	6.1
23	6.9	5.6	6.2	6.1	16.3	7.8	8.1	8.9	5.6	4.45	3.45	6.1
24	6.75	5.6	6.8	6.0	13.8	7.55	8.2	11.1	5.6	4.6	3.45	5.95
25	7.7	5.6	8.4	6.0	12.1	7.5	8.05	11.0	5.6	4.6	3.4	5.75
26	8.25	5.6	8.35	6.0	18.65	7.3	7.8	11.55	5.6	4.9	3.4	5.7
27	9.05	5.6	8.0	6.0	13.95	7.1	7.6	11.8	5.6	5.4	3.4	5.6
28	8.95	5.6	8.0	6.0	12.85	7.0	7.45	10.65	5.6	5.5	3.6	5.5
29	8.25	5.6	7.8	6.0	.....	6.9	7.3	10.55	5.6	5.3	3.95	5.4
30	9.45	5.6	7.05	6.0	.....	6.8	7.65	10.0	5.6	5.65	4.25	5.3
31	8.75	.....	6.7	6.0	.....	6.7	.....	8.9	.....	5.7	4.85	.....

LITTLE KANAWHA RIVER BASIN.

LITTLE KANAWHA RIVER AT GLENVILLE, W. VA.

LOCATION.—At three-span steel highway bridge at Glenville, Gilmer County. Stewart Creek enters on right 1½ miles above station.

DRAINAGE AREA.—385 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 1, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff attached to upstream side of right pier of bridge; read by Hollie Gainor. Gage was established by the United States Weather Bureau September 10, 1900 (read daily to tenths at 8 a. m.), repaired and its datum lowered 2.5 feet on June 1, 1915.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight for 100 feet above and 150 feet below station. Bed of river composed of mud, rock, sand, and gravel; control is probably fairly permanent. Point of zero flow, gage height about 1.0 foot June and September, 1915.

EXTREMES OF STAGE.—Maximum stage recorded during year, 31.7 feet at 5.40 p. m., March 13; minimum stage, 1.35 feet at 6 p. m. July 23.

1915–1918: Maximum and minimum recorded stages same as those for year ending September 30, 1918.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent; probably affected by ice during periods in December and January. Gage read to half-tenths twice daily. Data inadequate for determination of discharge.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Little Kanawha River at Glenville, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.52	4.05	4.60	2.88	4.92	4.92	3.42	4.45	3.92	4.20	3.68	6.40
2	1.48	3.98	4.30	2.72	4.28	4.65	3.32	4.32	3.15	4.10	2.98	3.95
3	1.48	3.88	4.20	2.62	4.28	4.55	4.18	4.28	2.95	3.20	2.90	3.88
4	1.62	3.78	3.88	2.55	4.28	4.72	4.38	4.15	2.75	2.85	2.82	3.68
5	1.58	3.68	3.55	2.50	4.12	7.15	4.12	4.00	2.58	2.68	2.78	3.38
6	1.52	3.52	3.30	2.98	4.08	5.30	3.78	3.75	2.50	2.52	2.65	3.08
7	1.48	3.42	3.12	6.55	5.30	7.20	3.72	3.62	2.68	2.45	2.45	2.80
8	1.48	3.32	2.98	6.02	5.35	6.40	7.08	4.52	2.58	2.40	2.30	2.55
9	1.58	3.22	2.82	4.30	8.45	5.38	11.05	4.92	2.58	2.25	2.18	2.48
10	1.62	3.18	2.70	3.68	8.85	6.45	6.85	4.52	2.48	2.08	2.10	2.65
11	1.60	2.95	2.58	3.30	6.15	5.02	7.78	4.32	2.40	1.98	2.05	2.18
12	1.58	2.80	2.48	6.00	5.15	4.78	9.80	3.92	2.38	1.92	5.20	2.10
13	1.52	2.58	2.38	5.40	5.02	24.40	7.50	3.95	2.38	1.85	4.70	2.08
14	1.50	2.42	2.30	5.05	4.60	27.75	5.95	5.70	2.38	1.82	4.50	2.05
15	1.42	2.32	2.25	7.30	5.78	14.05	5.18	5.18	2.40	1.78	3.55	2.00
16	1.42	2.22	2.20	7.80	4.90	6.60	5.00	4.60	2.35	1.75	3.12	2.05
17	1.40	2.12	2.15	5.58	4.30	5.30	4.88	4.18	4.75	1.80	2.98	2.85
18	1.48	2.02	2.08	4.85	4.20	4.72	4.78	3.88	5.00	1.75	2.88	3.22
19	2.95	1.92	2.02	4.22	4.12	4.35	4.45	3.72	3.85	1.70	2.80	3.12
20	4.18	1.85	2.08	4.08	14.55	4.15	5.35	3.62	3.35	1.65	2.72	4.05
21	3.72	1.80	2.12	3.88	7.35	4.78	6.95	3.48	3.25	1.58	2.62	3.75
22	3.62	1.82	2.05	3.72	5.35	5.08	6.08	3.45	3.10	1.52	2.55	3.82
23	3.45	1.80	2.12	3.62	4.68	4.60	5.20	5.08	3.00	1.48	2.48	3.20
24	3.78	1.72	2.22	3.48	5.30	4.30	4.88	4.40	2.35	1.52	2.38	3.05
25	6.55	1.65	4.40	3.38	7.90	4.82	4.48	14.92	2.20	1.52	2.28	2.92
26	4.85	1.58	5.88	3.38	19.65	4.80	4.32	23.65	7.10	2.42	2.22	2.82
27	4.35	1.58	4.55	7.50	9.35	4.45	7.50	6.28	4.80	2.38	2.18	2.68
28	4.25	1.70	3.80	15.90	5.48	4.10	6.20	11.50	3.85	2.30	2.22	2.52
29	4.15	3.10	3.40	19.15	.....	3.88	5.25	5.50	3.05	2.25	2.20	2.42
30	4.20	4.58	3.20	7.22	.....	3.72	4.70	4.80	2.95	3.85	2.22	2.32
31	4.12	.....	3.00	5.45	.....	3.55	.....	4.32	.....	6.25	5.10	.....

LITTLE KANAWHA RIVER AT LOCK 4, PALESTINE, W. VA.

LOCATION.—At Lock 4, Palestine, Wirt County, 30 miles from Parkersburg by Little Kanawha Railroad. Reedy Creek enters from left 1 mile above gage.

DRAINAGE AREA.—1,500 square miles (measured on map prepared by United States Geological Survey; scale, 1:500,000).

RECORDS AVAILABLE.—April 25, 1915, to September 30, 1918. The upper and lower gages at the lock have been read under direction of the United States Engineer Corps, since November 5, 1905.

GAGE.—Upper gage at lock; vertical staff on right bank bolted to right side of river wall of lock just above upper gates; an inclined section of gage extends above top of lock wall; read by James Burton, lockmaster.

DISCHARGE MEASUREMENTS.—Made at cable about 1,200 feet below gage or by wading on crest of dam.

CHANNEL AND CONTROL.—One channel at all stages. Crest of dam No. 4 is the control for the gage; lowest point in crest of dam is at 9.4 feet gage height, which is the point of zero flow except for leakage through dam, lock gates, and valves. Backwater submerges dam No. 4 during extreme floods on Ohio River.

EXTREMES OF STAGE.—Maximum stage recorded during year, 25.8 feet at 8 a. m. March 14; minimum stage, 9.45 feet August 27 and 28.

1915–1918: Maximum stage recorded, that of March 14, 1918; minimum stage 9.40 feet at 6 p. m. September 21, 1915.

Highest headwater as reported by lockmaster occurred in 1897, and was equivalent to a gage height of about 30 feet on the lower gage, which corresponds to a reading of about 24.4 feet on upper gage, assuming fall of 1 foot at dam.

ICE.—Stage-discharge relation probably not affected by ice.

REGULATION.—Flow may be affected at times by the manipulation of the pool above dam No. 5, about 9.5 miles above dam No. 4, and the occasional use of flashboards on dam No. 4.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice during year. Variable leakage through lock and dam may affect the stage-discharge relation at low stages. Data inadequate for determining daily discharge. Gage read to hundredths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

The following discharge measurement was made by H. S. Shick:

March 15, 1918 Gage height, 19.87 feet; discharge, 31,200 second-feet.

Daily gage height, in feet, of Little Kanawha River at Lock 4, Palestine, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	9.60	11.04	10.63	10.06	11.72	11.55	10.20	11.05	10.41	10.29	10.72	9.76
2	9.61	10.60	10.59	10.04	11.04	11.16	10.15	10.85	10.25	10.12	10.47	10.96
3	9.58	10.36	10.44	9.98	10.98	10.94	10.50	10.58	10.08	10.09	11.06	10.51
4	9.57	10.21	10.30	9.96	10.90	10.76	10.82	10.46	9.99	10.08	9.91	10.15
5	9.57	10.08	10.19	9.96	10.30	11.84	10.79	10.36	9.92	9.98	9.80	9.93
6	9.57	10.00	10.12	9.97	10.40	12.56	10.41	10.27	9.88	9.80	9.66	9.82
7	9.56	9.94	10.02	11.84	11.28	12.28	10.32	10.20	9.88	9.76	9.48	9.76
8	9.54	9.88	9.97	12.04	12.25	12.54	12.24	10.20	10.00	9.68	9.50	9.68
9	9.54	9.84	9.99	11.82	13.65	11.85	15.12	10.19	10.30	9.62	9.50	9.65
10	9.55	9.82	9.91	11.06	14.84	11.64	13.62	10.59	10.20	9.60	9.54	9.61
11	9.53	9.77	9.82	10.72	13.15	11.78	13.25	10.56	10.01	9.58	9.58	9.55
12	9.52	9.76	9.77	10.70	12.28	11.20	15.50	10.58	9.90	9.60	9.88	9.55
13	9.52	9.74	9.75	10.68	11.85	18.94	14.08	10.76	9.76	9.60	9.66	9.59
14	9.55	9.70	9.64	11.18	11.70	25.10	12.82	11.12	9.74	9.54	9.72	9.55
15	9.66	9.68	9.60	11.32	12.20	20.10	11.89	11.24	9.64	9.52	10.38	9.55
16	9.55	9.69	9.60	11.90	12.33	14.64	11.36	11.00	9.62	9.52	10.10	9.52
17	9.62	9.69	9.65	12.15	11.40	12.08	11.18	10.62	9.60	9.48	9.93	9.59
18	9.58	9.68	9.66	11.36	10.92	11.40	11.07	10.46	10.50	9.46	9.79	9.51
19	11.55	9.64	9.66	10.88	11.18	11.04	10.95	10.74	10.16	9.47	9.73	9.56
20	12.10	9.62	9.66	10.53	15.24	10.78	10.80	10.16	9.99	9.46	9.65	9.60
21	11.15	9.60	9.74	10.31	13.77	10.57	12.98	10.02	9.85	9.47	9.60	9.61
22	10.56	9.59	9.81	10.18	12.44	11.14	12.70	10.00	9.81	9.46	9.56	9.78
23	10.28	9.60	.....	10.03	11.41	10.87	11.90	10.14	8.90	9.46	9.54	9.86
24	10.54	9.62	.....	10.00	11.62	10.59	11.33	10.95	9.91	9.52	9.50	9.96
25	12.04	9.62	.....	10.00	12.50	10.66	11.04	10.62	11.05	10.05	9.50	9.86
26	12.32	9.60	.....	10.09	16.86	11.54	10.76	15.27	11.35	10.29	9.52	9.79
27	11.36	9.59	.....	10.61	16.41	10.90	10.95	15.86	10.58	10.00	9.46	9.74
28	11.26	9.60	.....	12.55	12.75	10.52	12.32	12.00	10.26	9.82	9.46	9.66
29	11.00	9.94	.....	18.20	.....	10.44	11.41	12.72	10.08	9.76	9.47	9.61
30	11.54	10.25	10.22	15.86	.....	10.34	11.36	11.16	.....	10.26	9.54	9.59
31	11.40	.....	10.10	12.35	.....	10.72	.....	10.62	.....	.....	9.83	.....

NOTE.—Gage not read Dec. 23-29.

SOUTH FORK OF HUGHES RIVER AT MACFARLAN, W. VA.

LOCATION.—About 80 feet above highway bridge half a mile east of Macfarlan, Ritchie County. Dutchman Run enters river on left 3,000 feet below station.

DRAINAGE AREA.—210 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 17, 1915, to September 30, 1918.

GAGE.—Vertical staff on right bank; read by A. H. Reynolds.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight 300 feet above and 1,500 feet below bridge. Bed of stream rock and mud. Control probably fairly permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year 24.0 feet at 6 p. m. March 13; minimum stage, 2.00 feet September 16 and 22.

1915–1918: Maximum stage recorded, 25.7 feet at 8 a. m. January 22, 1917; minimum stage 1.50 feet June 28, 29, July 2, and July 24, 1915.

Highest flood known reached a stage represented by gage height about 29 feet.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent; probably affected by ice part of December and January. Gage read twice daily to hundredths.

COOPERATION.—Base data furnished by United States Engineer Corps.

The following discharge measurement was made by H. S. Shick:

March 14, 1918: Gage height, 8.51 feet; discharge, 2.200 second-feet.

Daily gage height, in feet, of South Fork of Hughes River at Macfarlan, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.
1	2.60	4.00	3.30	2.45	6.40	3.90	2.86	4.15	3.00	2.40	2.43	2.80
2	2.60	3.78	3.30	2.94	6.40	3.86	2.85	3.70	3.00	2.40	2.53	2.69
3	2.60	3.70	3.10	2.94	4.30	3.41	4.48	3.50	2.68	2.38	2.56	2.59
4	2.60	3.69	3.10	2.94	4.30	3.70	4.46	3.47	2.60	2.38	2.33	2.44
5	2.62	3.55	2.90	2.92	4.20	4.71	4.39	3.26	2.47	2.38	2.30	2.35
6	2.64	3.06	2.90	2.90	4.20	4.38	4.13	3.10	2.50	2.30	2.29	2.30
7	2.64	2.99	2.90	6.10	7.60	3.97	3.15	3.08	2.60	3.30	2.20	2.30
8	2.56	2.93	2.80	6.45	7.88	3.71	7.25	3.06	2.72	3.29	2.27	2.29
9	2.55	2.90	2.90	4.95	11.17	3.53	6.98	3.19	3.02	2.71	3.40	2.22
10	2.56	2.86	2.90	3.60	8.45	3.71	4.80	3.06	2.90	2.40	3.40	2.20
11	2.58	2.80	2.90	3.70	4.63	4.33	7.70	3.03	2.60	2.40	3.28	2.18
12	2.57	2.70	2.90	3.70	5.10	5.09	8.25	3.00	2.56	2.42	3.26	2.14
13	2.70	2.70	2.90	3.70	5.15	20.17	5.81	3.55	2.50	2.50	3.28	2.15
14	2.70	2.70	2.90	3.70	5.65	12.75	4.67	4.78	2.55	2.30	3.35	2.08
15	2.70	2.70	2.90	5.10	6.00	7.10	4.10	4.27	2.60	2.32	3.27	2.05
16	2.82	2.70	2.90	4.50	5.05	5.92	3.78	3.93	2.60	2.35	3.33	2.10
17	2.76	2.60	2.90	4.40	4.26	4.10	3.66	3.05	2.60	2.37	3.15	2.25
18	2.67	2.60	2.90	4.30	3.87	3.76	3.69	2.86	2.45	2.36	2.20	2.20
19	6.55	2.60	2.90	4.20	3.65	3.48	3.46	2.78	2.30	2.30	2.20	2.20
20	6.63	2.60	2.90	3.20	12.80	3.42	3.35	2.70	2.30	2.34	2.20	2.45
21	5.88	2.60	2.80	3.20	4.36	3.28	5.15	2.69	2.28	2.79	2.20	2.40
22	4.83	2.60	2.80	3.30	4.30	3.24	4.61	2.60	2.30	2.50	2.20	2.02
23	4.32	2.60	3.50	3.30	4.34	3.20	4.10	3.30	2.36	2.42	2.15	2.15
24	4.47	2.60	3.50	3.30	4.47	3.24	3.77	3.28	2.39	2.37	2.10	2.23
25	7.10	2.60	3.73	3.00	4.20	3.78	3.67	8.98	2.46	2.38	2.12	2.35
26	5.45	2.60	3.60	3.00	11.41	3.48	3.75	7.50	2.50	4.80	2.06	2.41
27	5.10	2.60	3.60	3.90	6.55	3.12	4.31	4.30	2.49	3.98	2.10	2.50
28	5.02	2.60	3.43	9.85	4.41	3.20	4.34	4.15	2.59	3.88	2.10	2.50
29	5.35	3.45	3.20	13.40	.....	3.04	4.37	3.49	2.53	3.72	2.10	2.20
30	5.55	3.60	3.10	7.60	.....	2.97	4.56	3.46	2.41	3.38	2.10	2.20
31	4.70	.....	3.10	6.50	.....	2.85	.....	2.97	.....	2.46	2.35	.....

HUGHES RIVER AT CISKO, W. VA.

LOCATION.—At Cisko, 1 mile below junction of North and South forks and 6 miles south of Petroleum, Ritchie County.

DRAINAGE AREA.—453 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 29, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on right bank; read by S. J. Enoch.

DISCHARGE MEASUREMENTS.—Made from cable 40 feet below gage or by wading at the same section.

CHANNEL AND CONTROL.—One channel at all stages; straight for about 150 feet above and 500 feet below cable section. Bed of river is sand, gravel, mud, and boulders; control is probably permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 27.1 feet at 2 a. m. March 14; minimum stage, 2.21 feet August 26 and 27.

1915–1918: Maximum stage recorded, 30.25 feet at 3 p. m. January 22, 1917; minimum, 2.14 feet October 14 and 15, 1916.

Highest known flood previous to installation of gage reached a stage represented by gage height about 30 feet.

ICE.—Stage-discharge relation affected by ice during winters.

ACCURACY.—Stage-discharge relation probably permanent; probably affected by ice December, January, and February. Stages of Ohio River at Parkersburg of about 40 feet or more will probably cause backwater at the gage.

Data inadequate for determination of discharge.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Hughes River at Cisko, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.38	4.97	3.98	3.60	6.62	4.82	3.42	4.83	3.71	2.94	2.80	4.42
2	2.40	4.35	3.78	3.48	6.04	4.59	3.54	4.41	3.56	2.80	3.00	3.85
3	2.34	4.02	3.60	3.41	5.76	4.38	4.98	4.10	3.31	2.76	2.78	3.42
4	2.40	3.79	3.48	3.40	5.25	4.20	5.72	3.93	3.16	2.72	2.71	3.26
5	2.43	3.62	3.38	3.37	5.30	5.80	4.61	3.78	3.03	2.71	2.58	3.03
6	2.36	3.50	3.28	3.33	5.00	5.58	4.13	3.70	2.96	2.65	2.51	2.86
7	2.34	3.40	3.21	5.78	6.84	4.98	4.06	3.54	8.00	2.56	2.44	2.74
8	2.32	3.33	3.18	7.44	13.62	4.56	8.30	6.14	5.20	2.46	2.47	2.70
9	2.42	3.25	3.36	5.50	14.30	4.48	10.10	4.68	4.08	2.44	3.94	2.55
10	2.32	3.18	3.22	4.84	15.55	6.94	6.08	4.06	3.62	2.35	3.72	2.48
11	2.34	3.12	3.08	4.52	8.70	5.40	8.06	3.93	3.36	2.34	4.23	2.56
12	2.48	3.14	2.97	4.50	6.32	4.80	11.62	3.79	3.15	2.35	4.16	2.46
13	2.72	3.00	2.85	4.74	6.62	20.30	6.32	4.94	3.02	3.08	4.11	2.64
14	3.00	3.02	2.78	4.72	6.03	20.95	5.78	6.64	2.98	3.28	3.33	2.46
15	3.15	2.94	2.86	5.01	7.93	9.34	5.01	4.92	2.74	3.00	3.00	2.42
16	3.07	2.94	2.76	6.78	6.56	6.22	4.59	4.26	2.70	2.84	2.88	2.60
17	2.86	2.90	2.81	6.20	5.22	5.04	4.44	3.92	2.68	2.78	2.66	2.66
18	2.78	2.84	2.68	5.28	4.52	4.64	4.48	3.67	2.60	2.78	2.58	2.76
19	6.15	2.95	2.87	4.70	5.50	4.33	4.23	3.50	2.46	2.58	2.56	2.95
20	8.82	2.70	2.71	4.36	15.45	4.10	4.16	3.40	2.98	2.68	2.44	3.00
21	4.98	2.76	3.00	4.11	7.21	3.99	6.00	3.30	2.83	2.64	2.38	3.04
22	4.23	2.76	3.96	3.88	5.29	3.94	5.73	3.21	2.88	3.03	2.34	3.04
23	3.84	2.72	4.34	3.77	4.78	3.84	4.94	3.70	3.39	2.81	2.48	3.06
24	4.35	2.70	4.16	3.71	5.67	3.70	4.50	4.09	3.30	2.64	2.38	2.92
25	9.73	2.66	4.68	3.75	6.48	4.13	4.58	5.50	3.10	2.56	2.24	2.82
26	7.20	2.74	5.71	3.69	12.99	4.30	4.70	6.80	3.12	3.60	2.21	2.74
27	5.30	2.74	4.72	4.08	6.89	4.06	4.93	5.15	3.07	3.72	2.21	2.63
28	6.20	2.86	4.52	7.42	5.36	3.76	5.28	4.64	3.21	3.31	2.28	2.54
29	5.38	3.07	4.12	15.88	.....	3.62	4.82	4.28	3.13	3.00	2.33	2.50
30	7.65	3.92	3.84	10.05	.....	3.52	4.97	3.88	2.95	2.80	2.42	2.52
31	6.70	.....	3.78	7.80	.....	3.46	.....	3.92	.....	2.69	4.22	.....

HOCKING RIVER BASIN.

HOCKING RIVER AT ATHENS, OHIO.

LOCATION.—At single-span highway bridge at Mill Street, three-fourths of a mile from business section of Athens, Athens County. Margaret Creek enters on right 3½ miles above station.

DRAINAGE AREA.—944 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 3, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff at downstream end of right abutment; read by W. A. Casley.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Channel straight about 700 feet above and below station. Left bank overflows at gage height 17 feet and water passes around bridge. Bed of stream rocky with sand deposits near both banks. Ruins of old milldam 300 feet below gage act as control. Stage-discharge relation will change as dam decays.

EXTREMES OF STAGE.—Maximum stage recorded during year, 17.9 feet at 5 p. m., March 14; minimum stage, 2.65 feet August 22 and 23.

1915–1918: Maximum stage recorded, 17.9 feet at 5 p. m. December 18, 1915, and 5 p. m. March 14, 1918 (discharge, 12,600 second-feet); minimum stage 2.65 feet August 22 and 23, 1918.

Highest flood known reached a stage represented by gage height about 26 feet.

ICE.—Stage-discharge relation probably not materially affected by ice except during extremely cold weather.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice part of December and January. Gage read to half-tenths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Hocking River at Athens, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.90	3.55	3.10	3.57	3.70	5.53	3.60	3.93	3.43	3.00	2.95	3.23
2	2.93	3.30	3.10	3.47	3.50	4.93	3.75	3.83	3.33	3.10	2.83	3.05
3	2.95	3.17	3.05	3.67	3.45	4.63	5.30	3.67	3.25	3.00	2.80	2.95
4	2.97	3.10	3.05	.....	3.45	4.47	5.15	3.57	3.23	2.95	2.77	2.90
5	3.07	3.07	3.00	.....	3.45	4.67	4.47	3.53	3.17	2.90	2.75	2.83
6	3.00	3.05	2.95	3.53	3.55	4.67	4.15	3.45	3.15	2.85	2.75	2.80
7	3.00	3.00	2.95	4.87	4.13	4.53	3.93	3.43	4.15	2.83	2.75	2.85
8	3.00	3.00	3.00	5.33	5.65	4.37	4.15	3.80	3.50	2.80	2.73	2.80
9	3.15	2.97	2.90	4.45	11.75	4.30	4.43	3.80	3.23	2.80	2.70	2.80
10	3.17	2.95	2.85	4.27	14.45	5.03	4.17	3.60	3.13	2.75	2.77	2.75
11	3.05	2.95	2.85	4.07	14.55	4.60	5.33	3.45	3.37	2.75	2.87	2.75
12	2.95	2.95	2.85	4.00	14.55	4.47	9.50	4.65	3.17	2.83	2.90	2.77
13	2.90	2.95	2.80	3.95	15.40	12.35	7.55	8.35	3.07	2.85	3.25	2.80
14	2.95	2.95	2.80	3.95	14.10	17.62	5.80	11.25	3.00	2.85	3.10	2.83
15	2.95	3.03	2.80	3.97	11.75	14.95	4.80	6.45	3.00	2.85	2.87	2.85
16	2.90	3.05	2.80	3.93	8.25	8.20	4.40	4.87	3.05	2.80	2.77	2.80
17	2.90	2.95	2.80	3.80	5.97	5.70	4.30	4.27	3.15	2.80	2.75	2.97
18	2.85	2.90	2.80	3.70	4.93	4.97	4.45	4.00	2.97	2.80	2.70	3.10
19	3.85	2.90	2.87	3.67	6.63	4.65	4.10	3.87	2.95	2.85	2.70	2.97
20	3.50	2.90	2.93	3.55	14.00	4.37	3.93	3.90	2.90	2.80	2.70	3.00
21	3.25	2.90	3.05	3.55	9.35	4.33	4.45	5.03	2.90	2.80	2.70	3.00
22	3.07	2.90	3.35	3.45	6.35	4.23	5.97	4.65	2.90	2.75	2.65	2.95
23	3.00	2.95	3.65	3.45	5.00	4.03	5.03	3.75	2.85	2.75	2.67	2.87
24	3.03	2.95	3.55	3.40	4.77	3.93	4.55	3.67	2.85	2.75	2.75	2.83
25	3.43	2.90	3.43	3.40	4.53	4.03	4.43	4.05	2.90	2.90	2.75	2.75
26	3.40	2.90	4.60	3.35	12.65	4.03	4.20	4.47	2.95	3.30	2.80	2.75
27	3.27	2.90	3.90	3.35	10.98	3.90	4.23	3.77	2.95	3.35	2.85	2.75
28	3.33	2.93	3.60	3.80	7.75	3.80	4.10	4.00	2.90	3.20	2.87	2.75
29	3.47	3.00	3.83	4.20	.....	3.73	4.07	3.75	2.85	3.10	2.95	2.70
30	4.10	3.03	3.73	4.05	.....	3.65	4.10	3.70	2.85	3.13	2.93	2.70
31	4.23	.....	3.67	3.80	.....	3.60	.....	3.47	.....	3.07	2.90	.....

KANAWHA RIVER BASIN.

NEW RIVER AT EGGLESTON, VA.

LOCATION.—At highway bridge at Eggleston, Giles County.

DRAINAGE AREA.—2,920 square miles.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1918.

GAGE.—Chain gage attached to downstream side of bridge; read by J. A. Bishop.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge.

CHANNEL AND CONTROL.—Stream bed composed of rock covered with silt. Primary control is rock ledge about 1¼ miles below gage; permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.93 feet at 8 a. m. June 26 (discharge, 16,300 second-feet); minimum stage recorded, 2.58 feet at 8 a. m. December 9 and 8 a. m. and 5 p. m. December 10 (discharge, 815 second-feet); minimum discharge may have occurred during periods of ice effect in December and January.

1914–1918: Maximum stage recorded, 39.5 feet July 16, 1916 (discharge, about 152,000 second-feet); minimum stage recorded, 2.37 feet August 29, 1917 (discharge, 652 second-feet). The flood of 1878 reached a stage of about 40 feet on present gage.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent except as affected by ice. Rating curve well defined between 1,200 and 45,000 second-feet; extended beyond these limits. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for periods of ice effect. Records good except those for periods of ice effect, which are poor.

Discharge measurements of New River at Eggleston, Va., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 22	B. L. Hopkins	*a* 3.20	1,160
May 27	Hopkins and Fiedler	4.62	3,810

a Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of New River at Eggleston, Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	980	2,120	1,400		8,580	4,120	2,940	5,690	3,710	4,120	7,480	1,970
2	980	1,740	1,340		8,020	3,310	3,510	5,930	3,310	4,550	7,210	1,970
3	1,340	1,740	1,340		5,450	2,440	3,310	4,990	1,970	3,710	4,330	1,400
4	1,220	1,600	1,600		3,120	2,120	3,310	4,770	1,970	3,510	3,710	1,900
5	1,170	1,220	1,530			2,600	2,940	4,550	2,600	2,600	2,280	1,900
6	1,220	1,170	1,460		2,800	3,510	2,770	2,770	1,970	3,310	1,970	2,600
7	1,120	1,400	1,400			3,910	2,280	3,310	2,120	2,600	2,280	3,710
8	980	1,400	1,400			3,510	2,440	3,510	2,440	1,820	1,820	3,910
9	1,070	1,400	815		8,300	3,510	3,710	3,310	1,820	1,600	1,970	5,930
10	1,340	1,460	815		10,000	3,510	10,000	4,120	1,740	1,670	2,120	5,450
11	3,120	1,460			11,600	2,770	8,300	4,550	1,970	1,970	2,280	3,310
12	1,340	1,170			10,400	2,770	7,750	3,910	1,970	2,440	1,820	2,600
13	1,280	937			9,160	2,940	7,750	3,310	1,970	2,280	1,900	2,600
14	1,340	1,400			8,300	3,910	5,450	3,310	1,970	2,280	1,970	1,970
15	1,280	1,400		1,100	7,750	3,120	4,330	5,220	1,820	1,740	1,970	1,900
16	1,400	1,460			6,430	2,600	5,690	4,990	1,400	1,970	2,280	1,820
17	1,400	1,460			4,990	2,770	4,770	5,220	1,400	1,900	2,600	2,120
18	1,400	1,280			4,550	1,970	3,510	4,550	3,120	2,280	2,940	2,280
19	1,280	1,280			5,450	1,740	3,710	4,120	7,750	2,600	3,910	3,310
20	1,340	1,340			4,550	2,440	4,770	4,120	5,690	2,770	4,550	2,600
21	1,340	1,400	1,400		3,510	3,710	6,180	4,770	4,550	2,280	3,510	2,280
22	3,510	1,400			2,770	7,750	19,400	5,690	3,510	1,740	2,770	2,600
23	2,940	1,670			4,770	6,180	7,750	5,930	4,550	2,120	1,900	2,440
24	1,900	1,530			3,710	5,450	5,690	5,450	3,510	2,120	2,770	2,280
25	1,400	1,530			2,600	5,450	5,450	5,220	4,330	2,120	2,280	1,900
26	1,400	1,070			2,440	7,210	4,770	4,550	15,900	4,120	2,120	2,120
27	1,280	1,400			3,120	6,430	4,770	4,120	8,300	3,910	2,440	1,970
28	1,280	1,280			3,510	5,930	4,330	4,330	6,430	3,120	2,120	1,600
29	1,400	1,400			.....	5,690	3,510	4,120	4,770	3,120	2,120	1,900
30	1,970	1,400		13,700	.....	4,550	4,770	3,510	4,550	3,510	1,900	1,600
31	4,550	.....		10,400	.....	4,120	.....	3,710	.....	4,120	1,670	.....

NOTE.—Discharge, Dec. 11 to Jan. 29, and Feb. 5–8, estimated because of ice, by means of observer's notes, weather records, one current-meter measurement, and comparison with gage-height record for New River at Radford where ice effect was not so pronounced.

Monthly discharge of New River at Eggleston, Va., for the year ending Sept. 30, 1918.

[Drainage area, 2,920 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	4,550	980	1,600	0.548	0.63
November	2,120	937	1,420	.486	.54
December	.....	.....	1,370	.469	.54
January	13,700	.....	1,810	.620	.72
February	11,600	2,440	5,510	1.89	1.97
March	7,750	1,740	3,940	1.35	1.56
April	10,400	2,280	5,030	1.72	1.92
May	5,930	2,770	4,440	1.52	1.75
June	15,900	1,400	3,770	1.29	1.44
July	4,550	1,660	2,710	.928	1.07
August	7,480	1,670	2,810	.962	1.11
September	5,930	1,400	2,530	.866	.97
The year	15,900	.....	3,060	1.05	14.22

KANAWHA RIVER AT LOCK 2, MONTGOMERY, W. VA.

LOCATION.—At Lock 2, three-fourths of a mile below Chesapeake & Ohio Railway station at Montgomery, Fayette County. Morris Creek enters on left 300 feet below the gage.

DRAINAGE AREA.—8,470 square miles.

RECORDS AVAILABLE.—June 22, 1915, to September 30, 1918. Upper and lower gages at the lock have been read since December, 1887, under the direction of the Corps of Engineers, United States Army.

GAGE.—Upper gage at lock, vertical and inclined staff on right bank, short distance above upper lock gates; vertical section fastened to land wall of lock, inclined section at upstream end of paved slope; read by George Meyers, lockmaster. A chain gage fastened to downstream handrail near center of toll bridge at Montgomery is used in referring water surface at bridge when making discharge measurements.

DISCHARGE MEASUREMENTS.—Made from bridge at Montgomery or by wading on the crest of the dam.

CHANNEL AND CONTROL.—One channel at all stages; straight for 300 feet above and 800 feet below bridge. Bed of river composed of rock, sand, and mud. The dam at Lock No. 2 is control for all stages, as there is a fall of about 2 feet at the dam at the maximum stage. Except for the leakage through the dam and lock, point of zero flow is at lowest point in crest of dam, which is 17.9 feet above zero of upper gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 37.0 feet at 5 p. m. March 13 (discharge, 140,000 second-feet); minimum stage, 18.20 feet at 5 p. m. October 12 (discharge, 1,030 second-feet).

Highest stage recorded occurred May 23, 1901, at 6 a. m.; upper gage 49.65 feet, lower gage 47.70 feet (discharge, about 250,000 second-feet).

ICE.—Stage-discharge relation not affected by ice.

LEAKAGE.—At about gage height 19 feet on upper gage, leakage through the dam amounts to about 500 second-feet. Leakage through the lock gates amounts to about 110 and 260 second-feet, depending upon which of the two gates is closed.

ACCURACY.—Stage-discharge relation practically permanent except as may be affected by change in leakage through lock and dam; not affected by ice. Rating curve well defined throughout. Gage read twice daily to hundredths. Daily discharge ascertained by applying mean daily gage height to rating table, which is adjusted for leakage through dam and lock gates. Records good.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily discharge, in second-feet, of Kanawha River at Lock 2, Montgomery, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,970	12,800	5,800	3,270	30,800	20,500	10,300	16,800	8,800	20,500	7,300	3,430
2	1,970	9,800	5,800	3,950	23,000	18,800	9,300	15,300	7,300	16,800	9,300	5,300
3	1,900	5,800	4,800	3,270	18,800	18,300	7,800	14,800	6,300	14,300	11,300	5,800
4	1,640	5,300	4,580	2,860	16,800	14,800	8,800	13,300	5,800	11,300	7,300	3,950
5	1,640	4,350	4,150	2,860	14,300	18,360	8,800	12,300	4,150	9,300	5,300	2,860
6	1,770	3,950	3,590	2,740	11,800	28,600	8,800	10,800	4,800	7,300	4,350	2,990
7	1,770	3,270	3,430	5,800	12,300	45,800	7,800	9,800	4,800	4,800	3,590	2,990
8	1,580	2,740	3,430	5,800	17,800	48,400	11,800	9,300	4,800	5,800	2,740	4,800
9	1,580	2,740	3,590	4,800	23,600	30,100	39,000	10,800	5,300	4,800	2,740	5,300
10	1,510	2,990	2,990	4,580	55,400	22,400	51,000	9,800	4,800	3,590	2,640	7,800
11	1,450	2,740	2,530	3,590	59,800	19,900	41,500	10,800	4,150	3,270	3,270	8,800
12	1,270	2,640	2,270	5,300	51,900	16,800	37,300	10,800	3,270	3,950	2,990	5,800
13	1,900	2,530	2,120	11,300	45,800	75,800	33,100	10,800	3,590	3,770	3,130	4,580
14	2,270	2,530	2,190	10,800	47,600	120,000	27,800	19,900	2,990	4,150	4,800	3,770
15	1,970	2,350	2,270	8,800	44,100	82,900	32,300	21,700	2,530	3,770	4,350	3,590
16	2,190	2,530	2,530	8,300	45,000	40,700	30,800	19,400	2,640	3,770	4,350	3,270
17	2,190	2,530	2,530	7,800	37,300	25,700	29,300	16,300	2,740	3,270	4,150	3,270
18	1,640	2,440	2,350	7,300	23,600	18,800	25,000	13,300	3,130	3,270	5,300	2,860
19	1,510	2,530	2,120	4,800	16,800	14,800	21,100	11,300	3,950	3,950	4,580	8,300
20	2,040	2,350	2,270	4,580	17,800	12,300	17,800	10,800	10,300	6,800	9,300	12,800
21	5,300	2,350	2,350	3,770	39,800	11,300	27,100	10,300	11,800	7,800	7,800	10,300
22	4,150	2,120	2,860	3,590	31,600	15,800	37,300	12,800	7,800	6,300	6,300	9,800
23	4,350	2,040	2,740	3,590	20,500	27,800	35,600	14,800	6,300	4,800	4,150	8,300
24	3,590	2,440	2,440	3,130	17,800	20,500	26,400	14,300	8,800	3,590	3,950	6,800
25	5,300	2,440	3,270	3,270	16,300	20,500	21,700	12,800	7,800	3,590	3,270	4,800
26	4,350	2,350	7,800	3,590	21,100	21,700	19,400	15,800	23,600	5,300	3,270	4,580
27	4,580	2,190	8,300	4,800	43,300	19,900	18,800	16,800	64,200	4,350	3,430	3,770
28	6,800	2,190	6,300	50,200	30,100	17,800	24,300	16,300	27,100	6,300	3,270	3,590
29	6,300	3,590	6,300	85,600	.....	15,800	22,400	14,300	18,300	6,800	3,590	3,430
30	5,800	5,800	3,950	59,800	.....	12,800	17,300	12,300	19,900	5,800	3,770	3,130
31	8,300	.....	3,590	42,400	.....	11,300	.....	9,800	.....	6,300	3,590	.....

Monthly discharge of Kanawha River at Lock 2, Montgomery, W. Va., for the year ending Sept. 30, 1918.

[Drainage area, 8,470 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	8,300	1,270	3,050	0.360	0.42
November	12,800	2,040	3,550	.419	.47
December	8,300	2,120	3,720	.439	.51
January	85,600	2,740	12,100	1.43	1.65
February	59,800	11,800	29,800	3.52	3.66
March	120,000	11,300	28,700	3.39	3.91
April	51,000	7,800	23,700	2.80	3.12
May	21,700	9,300	13,500	1.59	1.83
June	64,200	2,530	9,720	1.15	1.28
July	20,500	3,270	6,430	.759	.88
August	11,300	2,640	4,810	.568	.65
September	12,800	2,860	5,260	.621	.69
The year	120,000	1,270	11,900	1.40	19.07

GREENBRIER RIVER AT ALDERSON, W. VA.

LOCATION.—At reinforced-concrete arch highway bridge at Alderson, Monroe County, half a mile above mouth of Muddy Creek.

DRAINAGE AREA.—1,340 square miles.

RECORDS AVAILABLE.—July 30, 1895, to June 30, 1906; May 10, 1907, to September 30, 1918.

GAGE.—Chain gage attached to downstream side of bridge near center of second span from left side of river; read by W. J. Hancock.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—The channel and control are composed of coarse gravel and are practically permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 22 feet during night March 13–14; minimum stage recorded, 1.70 feet at 6 p. m. October 10 and 8 a. m. and 6 p. m. October 11.

1895–1918: Maximum stage recorded same as for 1918 above; minimum discharge recorded, 46 second-feet September 30 to October 6, October 17, 24, 27–31, and November 7, 10, 11, 1904 (gage height, 1.40 feet).

ICE.—Stage-discharge relation occasionally affected by ice for short periods during severe winters.

ACCURACY.—Stage-discharge relation changed during year; may have been slightly affected by ice during December and January. New rating curve not fully developed. Gage read to hundredths twice daily. Records excellent.

Discharge measurements of Greenbrier River at Alderson, W. Va., during the year ending Sept. 30, 1918.

[Made by B. L. Hopkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Feb. 15	6.95	11,800	Apr. 15	6.16	8,840
15	7.15	12,400	May 15	3.97	2,750
16	8.49	16,400	June 23	3.64	2,060
18	4.64	5,330			

Daily gage height, in feet, of Greenbrier River at Alderson, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.96	3.48	2.16	2.77	3.78	4.70	3.35	4.15	3.21	5.16	3.58	4.36
2	1.90	2.96	2.15	2.66	3.38	5.05	3.26	3.90	3.06	4.72	3.34	3.52
3	1.85	2.70	2.18	2.53	3.25	4.48	3.28	3.72	2.94	4.14	3.03	3.21
4	1.84	2.55	2.15	2.65	3.18	3.90	3.46	3.58	2.85	3.70	2.83	2.96
5	1.82	2.42	2.14	2.58	3.08	4.75	3.41	3.48	2.75	3.39	2.69	2.79
6	1.77	2.34	2.15	2.55	2.98	5.49	3.31	3.38	2.76	3.18	2.57	2.88
7	1.75	2.27	2.13	2.52	2.99	6.40	3.24	3.30	2.84	3.03	2.52	3.16
8	1.72	2.22	2.09	2.49	3.93	6.05	3.36	3.29	2.98	2.90	2.43	3.22
9	1.72	2.18	2.06	2.41	4.10	4.70	7.40	3.34	2.89	2.80	2.37	3.11
10	1.71	2.14	1.92	2.39	6.53	4.28	6.75	3.85	2.79	2.74	2.33	2.96
11	1.70	2.10	1.87	2.44	7.08	4.12	5.85	3.64	2.68	2.68	2.32	2.83
12	1.73	2.06	1.83	2.53	6.70	3.82	5.68	3.50	2.54	2.64	2.37	2.72
13	1.74	2.04	2.06	2.68	7.00	8.02	5.24	3.42	2.45	2.70	2.42	2.64
14	1.74	2.02	2.04	2.70	8.00	18.62	5.00	3.52	2.44	2.72	2.64	2.58
15	1.74	1.99	2.06	2.88	7.12	8.52	6.18	3.80	2.41	2.66	3.13	2.56
16	1.74	1.98	2.10	2.82	8.14	6.56	6.28	3.90	2.38	2.58	2.91	2.65
17	1.74	1.96	2.09	2.81	5.78	5.35	5.58	3.68	2.62	2.63	2.65	2.58
18	1.74	1.94	2.08	2.74	4.58	4.58	5.02	3.50	2.86	2.69	2.64	2.71
19	1.74	1.92	2.03	2.68	4.02	4.18	4.64	3.64	4.00	2.93	2.87	5.73
20	2.04	1.91	2.08	2.61	6.08	3.91	4.35	3.52	4.00	3.60	3.15	4.25
21	2.67	1.90	2.06	2.65	8.30	3.85	6.45	3.62	3.43	3.39	3.16	3.77
22	2.56	1.90	2.05	2.57	5.45	5.88	7.05	3.65	3.25	3.03	2.89	3.73
23	2.34	1.88	2.17	2.54	4.42	5.30	5.55	4.00	3.62	2.82	2.73	3.56
24	2.25	1.87	2.25	2.49	3.98	4.58	4.82	3.95	3.36	2.68	2.64	3.33
25	2.22	1.84	2.40	2.48	3.88	4.46	4.55	3.76	3.15	2.59	2.89	3.14
26	2.16	1.84	2.56	2.47	7.28	4.38	4.55	5.20	9.00	2.52	3.03	3.00
27	2.18	1.84	2.83	2.62	7.92	4.15	5.44	5.22	6.50	2.99	2.81	2.88
28	2.27	1.83	3.01	5.36	5.26	3.92	5.66	4.34	4.68	2.76	2.68	2.79
29	2.40	1.82	2.94	6.63	.....	3.72	4.86	3.90	4.76	2.61	2.64	2.71
30	3.68	1.95	2.86	5.18	.....	3.56	4.38	3.70	6.33	2.58	2.62	2.64
31	4.40	.....	2.31	4.26	.....	3.42	.....	3.45	.....	3.10	2.59	.....

LITTLE COAL RIVER AT McCORKLE, W. VA.

LOCATION.—At McCorkle, Lincoln County, on Coal River branch of Chesapeake & Ohio Railway. Cobb Creek enters river on left 400 feet below station.

DRAINAGE AREA.—375 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 23, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on left bank just below McCorkle Hotel; read by F. M. Priestly.

DISCHARGE MEASUREMENTS.—Made from cable 40 feet above inclined section of gage or by wading.

CHANNEL AND CONTROL.—One channel at all stages; slightly curved above and below cable section. Bed of stream composed of loose sand; but control is probably fairly permanent. Flow of Cobb Creek affects stage at gage and should be included in station.

EXTREMES OF STAGE.—Maximum stage recorded during year, 24.0 feet at 6 p. m., January 28; minimum stage, 1.69 feet July 29. Highest known flood August 9, 1916, reached a stage of 28.57 feet (discharge, roughly, 24,000 second-feet).

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Changes in stage-discharge relation may be caused by floods; ice effect during part of December and January. Gage read to half-tenths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Little Coal River at McCorkle, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.70	3.02	3.28	3.15	5.54	3.72	3.26	3.39	2.62	2.72	2.74	2.74
2	2.52	2.92	3.38	3.10	4.54	3.52	3.22	3.29	2.54	2.62	2.54	2.69
3	2.35	2.88	3.30	3.00	3.96	3.36	3.24	3.14	3.06	2.54	2.36	2.56
4	2.40	2.80	3.15	3.00	3.66	3.32	3.49	3.09	2.76	2.44	2.29	2.52
5	2.42	2.72	3.02	3.00	3.56	3.94	3.44	3.06	2.62	2.42	2.24	2.34
6	2.38	2.65	2.95	3.12	5.74	4.84	3.36	3.00	2.59	2.26	2.19	2.34
7	2.30	2.60	2.85	5.80	5.19	5.94	3.42	2.99	3.66	2.22	2.14	2.36
8	2.31	2.56	2.85	5.30	3.39	5.36	7.53	3.06	3.64	2.19	2.16	2.49
9	2.22	2.52	2.85	4.25	3.92	4.49	9.20	3.49	3.06	2.16	2.06	2.42
10	2.15	2.49	2.68	3.65	4.86	4.06	6.02	3.29	2.86	2.14	2.24	2.32
11	2.20	2.45	2.68	3.42	4.49	3.69	4.86	3.22	2.69	2.16	2.64	2.22
12	2.42	2.45	2.70	3.55	4.14	3.56	5.69	3.22	2.62	2.24	2.59	2.17
13	2.35	2.45	2.78	4.90	3.82	9.57	5.86	3.24	2.44	2.29	2.44	2.16
14	2.40	2.41	2.78	5.25	3.59	8.45	4.96	3.82	2.36	2.14	2.34	2.10
15	2.34	2.39	2.72	6.02	3.64	6.42	4.42	3.86	2.34	2.06	2.39	2.09
16	2.28	2.32	2.68	5.62	3.64	4.72	4.06	3.62	2.29	1.99	2.42	2.04
17	2.22	2.30	2.65	6.05	3.59	4.12	3.86	3.38	2.24	2.09	2.36	2.09
18	2.20	2.30	2.65	5.00	3.44	3.84	3.74	3.19	2.46	2.09	2.34	2.14
19	3.62	2.28	2.60	4.45	3.36	3.59	3.56	3.12	2.32	2.16	2.34	2.26
20	3.95	2.25	2.60	4.00	5.52	3.46	3.52	3.34	2.24	2.29	2.29	2.46
21	3.35	2.24	2.62	3.70	5.44	3.39	3.64	5.09	2.16	2.14	2.26	2.46
22	3.05	2.20	2.70	3.60	4.42	3.39	4.09	4.02	2.14	2.12	2.22	2.42
23	2.92	2.20	2.68	3.60	3.99	3.34	3.96	3.59	2.12	2.02	2.19	2.39
24	3.05	2.20	2.78	3.55	3.74	3.32	4.16	3.32	2.06	1.89	2.14	2.34
25	3.25	2.25	3.02	3.58	3.62	4.86	3.99	3.12	2.09	1.84	2.14	2.26
26	3.38	2.25	2.88	3.52	3.99	4.92	3.86	3.09	3.89	1.82	2.06	2.22
27	3.35	2.28	3.15	4.90	4.19	4.26	3.79	3.04	3.29	1.76	1.94	2.16
28	3.18	2.45	3.50	20.27	3.96	3.86	3.62	2.94	2.96	1.74	2.02	2.14
29	3.02	2.72	3.32	9.00	.....	3.64	3.54	2.94	2.76	1.69	2.00	2.14
30	3.15	3.20	3.30	6.95	.....	3.46	3.46	2.82	2.69	1.92	1.96	2.14
31	3.18	.....	3.28	6.40	.....	3.36	.....	2.74	.....	2.79	1.99	.....

RACCOON CREEK BASIN.

RACCOON CREEK AT ADAMSVILLE, OHIO.

LOCATION.—About 200 feet above covered highway bridge at Adamsville, Gallia County, 5 miles southwest of Hocking Valley Railroad station at Bidwell. Indian Creek enters on right 1½ miles above station.

DRAINAGE AREA.—537 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 25, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on left bank 200 feet above bridge; read by Irene Call.

DISCHARGE MEASUREMENTS.—Made from covered highway bridge or by wading.

CHANNEL AND CONTROL.—Straight for about 500 feet above and 600 feet below bridge. Bed of stream composed of mud, sand, and gravel. Principal control at ruins of old milldam, 1,200 feet below bridge; probably permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 18.49 feet at 5 p. m. March 15; minimum stage, 1.81 feet at 7 a. m., September 1.

1915–1918: Maximum stage recorded that of March 15, 1918; minimum stage, 1.75 feet at 7 a. m. September 26, 1917 (discharge, 18 second-feet).

High-water marks indicate maximum stage of about 24.5 feet.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice part of December and January. Gage read to hundredths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Raccoon Creek at Adamsville, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.98	3.55	2.26	2.58	4.66	10.71	3.12	4.88	3.06	3.58	2.24	1.82
2	2.05	3.06	2.26	2.46	4.15	7.20	3.14	4.28	2.72	3.60	2.18	2.02
3	2.08	2.70	2.35	2.38	4.06	5.88	3.38	3.96	2.66	3.75	2.12	2.13
4	2.08	2.55	2.30	2.35	4.10	5.72	6.69	3.58	2.55	3.42	2.09	2.11
5	2.10	2.49	2.32	2.33	3.55	5.75	6.26	3.67	2.56	3.02	2.16	2.13
6	2.26	2.50	2.30	2.75	3.55	5.36	5.12	3.26	2.68	2.37	2.18	2.06
7	2.00	2.40	2.25	5.37	5.98	5.28	4.02	3.12	2.88	2.18	2.14	2.32
8	1.98	2.28	2.30	5.02	7.26	4.76	5.00	3.06	3.03	2.26	2.11	2.30
9	2.08	2.35	2.13	4.78	12.02	4.45	5.13	3.04	2.90	2.23	2.12	2.08
10	2.03	2.30	2.10	4.48	13.86	5.58	5.43	3.04	2.61	2.10	2.16	2.04
11	2.00	2.40	2.10	4.15	14.96	5.18	5.98	3.04	2.36	2.30	2.09	2.38
12	2.10	2.48	2.12	3.00	16.00	5.41	9.96	3.66	2.23	2.18	2.10	2.41
13	2.11	2.42	2.08	2.80	15.66	13.55	9.97	7.53	2.55	2.12	2.08	2.10
14	2.12	2.28	2.06	2.68	15.61	17.51	4.45	11.26	2.40	2.08	2.04	2.02
15	2.00	2.21	.....	2.58	15.24	18.47	4.88	11.00	2.24	2.14	2.03	2.00
16	2.08	2.28	.....	2.64	14.28	17.88	5.78	9.78	2.22	2.10	2.13	1.98
17	2.09	2.25	2.12	2.45	11.71	16.05	6.48	8.21	2.33	2.10	2.06	2.55
18	2.18	2.15	2.10	2.38	7.06	8.25	5.11	6.95	2.60	2.22	2.04	2.36
19	4.66	2.10	2.13	2.30	6.96	5.78	4.80	5.55	2.26	2.18	2.04	2.11
20	3.86	2.12	2.10	2.50	12.70	5.11	4.68	4.68	2.18	2.20	2.06	2.06
21	3.05	2.23	2.04	2.76	13.58	4.70	5.28	4.92	2.23	2.10	2.03	2.04
22	2.78	2.08	2.03	2.35	14.25	4.40	6.10	4.40	2.09	2.06	2.02	2.03
23	2.48	2.08	2.46	2.24	12.26	4.29	6.16	4.16	2.05	2.13	2.00	2.07
24	2.48	2.28	2.12	2.20	7.76	3.66	5.35	3.80	2.22	2.15	2.02	2.06
25	2.43	2.08	2.10	2.20	6.12	4.00	5.15	3.28	4.62	2.11	2.04	1.99
26	2.40	2.10	2.18	2.32	12.35	3.98	5.46	3.08	7.16	2.26	2.05	1.94
27	2.60	2.32	3.44	3.60	11.81	3.75	5.62	3.18	5.28	2.20	1.97	1.90
28	2.66	2.13	3.50	4.23	11.56	3.58	5.83	3.06	3.83	2.56	.....	1.84
29	2.60	2.18	3.38	5.32	.....	3.38	5.58	3.08	3.53	2.18	.....	2.02
30	4.06	2.25	3.15	5.56	.....	3.30	5.23	3.72	3.69	2.18	2.00	2.01
31	3.90	.....	2.62	5.00	.....	3.18	.....	3.55	.....	2.18	2.03	.....

NOTE.—Gage not read Dec. 15–16; gage readings in error Aug. 28–29.

GUYANDOT RIVER BASIN.

GUYANDOT RIVER AT WILBER, W. VA.

LOCATION.—At site of Hutchinson Lumber Co.'s suspension bridge at Wilber, three fourths mile below Manbar, Logan County. Rich Creek enters river on left 600 feet above station.

DRAINAGE AREA.—791 square miles (measured on map of West Virginia; scale. 1:500,000).

RECORDS AVAILABLE.—July 13, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on right bank; read by Allie Smith. Vertical section fastened to downstream corner of right timber crib pier; inclined section is about 10 feet downstream. Gage washed out by flood on January 28, 1918; replaced March 6.

DISCHARGE MEASUREMENTS.—Made from cable installed between towers of former bridge in February, 1916, or by wading.

CHANNEL AND CONTROL.—Channel straight for about 1,000 feet above and 500 feet below station. Bed of river composed of solid rock, boulders, and mud; control probably permanent. Point of zero flow, gage height 0.00 ± 0.5 foot.

EXTREMES OF STAGE.—Maximum stage recorded during year, 24.8 feet at 4 p. m. January 28; minimum stage, 1.60 feet October 9 and 11.

1915–1918: Maximum stage recorded that of January 28, 1918; minimum stage 1.10 feet September 26, 1917.

ICE.—Stage-discharge relation not affected by ice except during severe winters.

ACCURACY.—Stage-discharge relation probably permanent; affected by ice during part of December and January. Gage read to tenths twice daily; records fair.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Guyandot River at Wilber, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.02	3.40	3.40	3.80	.....	.....	4.22	4.55	3.20	7.35	3.80	4.90
2	2.80	3.52	3.90	3.80	.....	.....	4.80	4.25	3.00	6.70	3.60	5.70
3	2.60	3.30	3.82	3.80	.....	.....	4.70	4.05	3.05	6.40	3.50	5.40
4	2.20	3.02	3.80	3.80	.....	.....	4.38	3.80	3.20	5.85	4.70	4.80
5	2.02	2.85	3.60	3.80	.....	.....	4.10	3.75	3.40	5.25	4.40	4.05
6	2.00	2.52	3.40	3.80	.....	7.61	3.70	3.70	2.70	4.75	4.10	3.80
7	1.80	2.45	3.00	4.42	.....	13.61	4.00	3.65	2.60	4.35	3.80	3.40
8	1.65	2.42	3.00	4.45	.....	8.60	8.10	3.55	2.70	3.95	3.80	3.40
9	1.60	2.40	3.00	4.60	.....	7.20	10.95	3.45	2.60	3.90	3.90	3.40
10	1.80	2.22	2.85	4.65	.....	7.15	8.00	3.40	2.60	3.60	4.30	3.40
11	1.60	2.10	2.80	4.80	.....	5.55	6.25	3.55	2.60	3.52	4.50	3.60
12	2.02	2.00	2.80	5.00	.....	5.48	6.10	3.70	2.60	3.20	4.30	3.70
13	1.90	2.00	2.65	5.00	.....	6.45	6.15	3.55	2.60	3.00	4.05	3.60
14	1.80	1.82	2.60	5.00	.....	8.51	5.75	3.30	2.60	2.90	4.00	3.40
15	2.05	1.80	2.45	5.00	.....	7.75	5.50	3.20	2.60	2.90	3.90	3.40
16	2.02	2.02	2.25	5.00	.....	6.60	5.10	3.15	2.60	2.90	4.05	3.20
17	1.92	2.00	2.25	5.00	.....	5.90	4.95	3.20	2.61	2.90	3.90	3.20
18	1.82	1.85	2.10	4.60	.....	5.56	4.80	3.20	2.70	2.90	3.70	3.10
19	2.20	1.80	2.05	4.50	.....	5.45	4.55	3.25	2.60	2.90	3.70	3.00
20	2.42	1.65	2.00	4.80	.....	5.25	4.60	3.85	2.40	2.90	4.30	3.00
21	2.80	1.65	1.85	4.20	.....	4.40	7.90	4.40	2.40	2.90	4.90	3.25
22	3.00	1.80	1.82	4.00	.....	5.10	8.10	4.82	2.20	3.05	4.80	3.30
23	3.02	1.80	2.00	3.80	.....	5.65	7.32	5.30	2.20	3.30	4.60	3.15
24	2.92	1.85	2.18	3.40	.....	6.10	6.62	4.90	2.15	3.70	4.40	3.00
25	2.82	2.00	2.85	3.40	.....	7.85	6.22	4.45	2.10	4.10	4.15	2.95
26	2.90	2.05	2.72	3.40	.....	7.65	6.55	3.90	2.10	4.35	4.00	2.90
27	3.60	2.05	2.60	5.40	.....	7.38	5.65	3.80	3.40	4.70	4.50	2.90
28	3.70	2.08	2.40	21.40	.....	6.70	4.88	3.60	4.80	5.00	5.15	2.90
29	3.20	2.35	3.00	.....	.....	6.11	4.75	3.45	8.60	4.75	5.25	2.90
30	3.10	3.00	3.80	.....	.....	5.10	4.65	3.40	7.90	4.65	4.70	2.90
31	3.20	.....	3.80	.....	.....	4.90	.....	3.30	.....	4.15	4.40	.....

GUYANDOT RIVER AT BRANCHLAND, W. VA.

LOCATION.—At highway bridge at Branchland, Lincoln County. Fourmile Creek enters river on left 20 feet above bridge.

DRAINAGE AREA.—1,230 square miles (measured on map of West Virginia; scale, 1:500,000).

RECORDS AVAILABLE.—July 8, 1915, to September 30, 1918.

GAGE.—Chain gage fastened to handrail on upstream side of bridge near center of main span; read by John A. Broaddus.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed of stream is composed of rock, gravel, sand, and mud and is fairly permanent; character of control not determined.

EXTREMES OF STAGE.—Maximum stage recorded during year, 39.24 feet at 7.20 a. m. January 29; minimum stage, 2.72 feet at 7 a. m. June 22.

1915–1918: Maximum stage recorded, that of January 29, 1918; minimum stage, that of June 22, 1918.

Highest known flood reached a stage of about 44 feet by present gage.

ICE.—Stage-discharge relation affected by ice during cold winters.

ACCURACY.—Stage-discharge relation may change during floods; affected by ice part of December and January. Gage read to hundredths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Guyandot River at Branchland, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.23	4.78	4.78	4.18	14.76	6.54	5.67	5.42	3.60	4.00	4.35	4.22
2	3.89	4.60	4.96	4.62	10.32	5.87	4.96	5.13	3.49	3.96	3.64	4.09
3	3.67	4.37	4.94	4.64	8.02	5.38	4.94	4.87	3.71	3.82	3.38	3.78
4	3.54	4.10	4.82	4.49	7.06	5.20	5.14	4.62	3.42	3.70	3.24	3.68
5	3.46	3.94	4.56	4.32	5.91	6.42	4.97	4.47	3.22	3.51	3.12	3.50
6	3.40	3.84	4.38	5.39	5.46	12.43	4.81	4.42	3.19	3.38	2.99	3.36
7	3.36	3.70	4.21	7.29	5.76	15.57	4.78	4.31	3.68	3.22	2.93	3.42
8	3.28	3.66	4.14	8.53	5.86	19.60	9.82	4.30	3.99	3.12	2.84	4.15
9	3.24	3.60	3.88	7.39	6.96	12.21	20.18	4.25	3.58	3.08	3.22	3.92
10	3.22	3.56	3.74	6.54	8.66	8.98	15.47	4.26	3.40	3.10	3.72	3.76
11	3.21	3.52	3.86	5.70	11.34	7.56	12.77	4.22	3.30	3.05	3.43	3.75
12	3.23	3.48	3.85	5.35	9.04	6.78	.....	4.26	3.18	3.07	3.54	3.62
13	3.28	3.40	3.82	5.89	7.44	12.02	.....	5.46	3.11	3.03	3.52	3.49
14	3.28	3.42	3.85	6.76	6.56	16.20	.....	5.46	3.02	2.98	3.40	3.40
15	3.28	3.40	3.81	7.62	6.06	12.68	7.60	6.05	2.96	2.91	3.29	3.29
16	3.30	3.38	3.78	7.28	5.89	9.77	7.04	6.22	2.89	2.86	3.40	3.24
17	3.37	3.36	3.74	6.64	5.63	7.44	6.48	5.36	2.85	2.84	3.50	3.19
18	3.30	3.34	3.60	6.28	5.30	6.42	6.15	4.86	2.81	2.87	3.38	3.20
19	5.18	3.30	3.55	5.56	5.10	5.82	5.81	4.53	2.88	2.94	3.56	3.21
20	5.74	3.28	3.48	4.92	8.32	5.34	5.56	4.58	2.79	2.89	3.83	3.22
21	5.03	3.26	3.50	4.69	11.86	5.32	7.18	5.52	2.75	2.86	4.18	3.34
22	4.20	3.23	3.55	4.25	9.86	5.86	10.79	6.04	2.83	2.88	3.70	3.64
23	4.20	3.24	3.70	4.49	7.66	6.22	9.37	5.11	2.98	2.95	3.46	3.69
24	4.26	3.24	3.86	4.37	6.49	6.22	7.98	4.68	2.97	2.94	3.27	3.70
25	4.38	3.22	4.28	4.34	6.02	9.54	6.74	4.28	3.64	2.87	3.08	3.58
26	4.42	3.19	4.61	4.44	6.44	12.96	6.04	4.08	4.65	2.83	3.04	3.43
27	4.44	3.19	4.72	4.86	6.68	10.33	5.65	3.94	6.88	2.78	2.99	3.32
28	4.64	3.31	5.04	24.62	6.90	8.86	5.60	3.98	5.72	3.08	3.06	3.22
29	4.52	3.58	5.02	37.82	.....	7.67	5.84	4.08	4.70	2.94	3.39	3.14
30	4.83	4.10	3.43	21.36	.....	6.87	5.69	4.00	4.22	3.05	3.35	3.09
31	4.90	.....	4.22	17.46	.....	6.40	.....	3.79	.....	4.20	3.54	.....

NOTE.—Gage not read Apr. 12–14.

MUD RIVER AT YATES, W. VA.

LOCATION.—About 200 feet above highway bridge at Yates, Cabell County, 2 miles above Howell milldam, and 15 miles from Huntington.

DRAINAGE AREA.—318 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 19, 1915, to September 30, 1918.

GAGE.—Vertical and inclined staff on left bank; read by C. J. McDonie.

DISCHARGE MEASUREMENTS.—Made from single-span steel highway bridge below gage.

CHANNEL AND CONTROL.—One channel up to high stages, when right bank is overflowed around right abutment; straight for about 50 feet above and 75 feet below bridge. Primary control at ford, about 100 feet below gage; fairly permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 20.0 feet at 5.30 p. m. March 14; minimum stage 1.20 feet at 6 p. m. September 30.

Highest flood known reached a gage height of about 23 feet by present gage.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation probably permanent; affected by ice part of December and January. Gage read to hundredths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Mud River at Yates, W. Va., for the year ending Sept. 30, 1918.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.
1	1.79	3.60	3.51	3.69	8.40	3.98	3.14	3.20	2.39	3.16	1.46	1.49
2	1.83	3.14	3.08	3.59	5.80	3.75	3.04	3.04	2.31	2.98	1.44	1.48
3	1.86	2.85	2.85	3.52	5.49	3.55	4.92	2.92	2.22	2.56	1.42	1.54
4	1.88	2.72	2.84	3.49	5.49	3.46	4.34	2.82	2.20	2.35	1.43	1.54
5	1.81	2.58	2.62	3.25	5.28	6.68	3.65	2.74	2.35	2.20	1.44	1.48
6	1.66	2.55	2.52	4.00	4.82	6.50	3.22	2.65	2.29	2.14	1.42	1.55
7	1.66	2.42	2.49	8.80	5.98	6.09	4.22	2.59	2.96	2.08	1.40	1.58
8	1.64	2.42	2.50	9.77	7.62	5.10	8.80	2.52	4.66	2.04	1.41	1.52
9	1.58	2.32	2.95	6.28	10.95	4.50	12.60	2.48	3.38	1.96	1.42	1.49
10	1.47	2.28	2.64	4.90	9.25	4.20	7.18	2.74	2.83	1.98	1.54	1.46
11	1.50	2.25	2.60	4.45	6.90	3.81	7.30	2.82	2.59	1.92	1.48	1.44
12	1.64	2.18	2.49	4.80	5.78	4.52	9.45	3.06	2.42	1.98	1.44	1.44
13	1.81	2.19	2.38	5.02	5.34	15.05	8.85	6.00	2.30	1.91	1.44	1.44
14	1.86	2.21	2.32	4.40	4.70	19.40	6.25	8.85	2.20	2.04	1.46	1.37
15	1.96	2.18	2.31	5.20	4.94	16.55	5.09	5.32	2.13	2.04	1.49	1.34
16	2.04	2.14	2.29	7.28	4.40	7.85	4.55	3.84	2.07	1.92	1.44	1.33
17	2.09	2.12	2.24	6.20	3.98	5.45	4.14	3.40	2.04	1.89	1.46	1.38
18	2.04	2.14	2.21	4.95	3.60	4.74	4.02	3.11	2.04	1.96	1.54	1.34
19	7.20	2.16	2.29	4.74	3.52	4.18	3.70	2.92	2.00	1.81	1.47	1.30
20	7.53	2.02	2.32	4.25	8.52	3.85	3.64	2.82	1.94	1.86	1.43	1.40
21	4.90	2.04	2.52	3.94	9.70	3.65	6.68	5.83	2.04	1.80	1.39	1.40
22	3.37	2.06	2.66	3.89	5.75	3.64	5.41	3.81	2.06	1.82	1.38	1.36
23	2.98	2.05	2.66	3.82	4.58	3.52	4.22	3.25	2.00	1.80	1.38	1.52
24	3.14	2.05	2.66	3.58	4.12	3.46	4.03	2.88	1.94	1.73	1.54	1.52
25	3.79	1.99	4.80	3.40	3.98	4.41	3.86	2.74	3.18	1.60	1.50	1.46
26	3.77	1.99	6.80	3.60	5.80	6.30	3.78	2.68	6.84	1.56	1.49	1.42
27	3.32	2.06	4.99	4.60	5.32	5.08	3.62	2.63	4.33	1.54	1.48	1.36
28	3.25	2.51	4.69	11.12	4.35	3.90	3.50	3.46	3.24	1.54	1.46	1.32
29	2.99	3.74	4.20	16.10	.....	3.58	3.38	3.12	2.78	1.46	1.42	1.30
30	5.18	3.77	3.79	17.10	.....	3.38	3.38	2.77	2.52	1.62	1.39	1.24
31	4.29	.....	3.62	10.50	.....	3.22	.....	2.58	.....	1.50	1.44	.....

TWELVEPOLE CREEK BASIN.

TWELVEPOLE CREEK AT WAYNE, W. VA.

LOCATION.—At highway bridge 500 feet above railroad bridge of East Lynne branch of Norfolk & Western Railway at Wayne, Wayne County, three-fourths mile below junction of East and West forks.

DRAINAGE AREA.—291 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 1, 1915, to September 30, 1918.

GAGE.—Chain gage attached to upstream handrail about 90 feet from left abutment; read by Byron Smith.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Straight for about 80 feet above and 1,200 feet below bridge. Bed of stream composed of rock and sand. Principal control is Sampson's milldam; probably permanent, but at low stages the operation of the mill may affect the discharge relation.

EXTREMES OF STAGE.—Maximum stage, recorded during year, 20.48 feet at midnight January 28; minimum stage, 1.24 feet August 7 and 9.

Highest flood known reached a stage represented by gage height about 25 feet.

ICE.—Stage-discharge relation probably not materially affected by ice.

REGULATION.—None, except for backwater caused during low-water periods by operation of small power plant at Sampson's mill about a mile below gage.

ACCURACY.—Stage-discharge relation probably permanent; slightly affected by ice part of December and January. Operation of power plant at dam about a mile below gage may have slight effect upon stage-discharge relation at low stages, but this effect, if any, is small as the plant is only operated occasionally for a few hours at a time. Gage read to hundredths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Twelvepole Creek at Wayne, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.27	3.21	2.72	.....	5.64	4.32	3.57	3.19	2.04	3.56	1.44	1.87
2	2.20	2.84	2.19	.....	4.99	3.94	3.40	3.00	2.22	3.11	1.44	1.87
3	2.17	2.71	2.67	.....	4.54	3.68	4.77	2.92	3.25	2.94	1.40	2.04
4	2.13	2.63	2.58	.....	4.35	4.10	4.70	2.86	2.75	2.68	1.38	2.78
5	1.98	2.58	2.54	3.79	4.28	6.12	3.92	2.77	2.64	2.34	1.31	1.70
6	1.70	2.50	2.44	7.14	4.36	5.26	3.74	2.62	3.16	2.02	1.28	1.68
7	1.65	2.43	2.31	.....	5.09	4.89	4.50	2.54	4.20	1.95	1.25	1.62
8	1.56	2.39	2.18	.....	6.14	4.52	11.47	2.51	4.70	1.89	1.26	1.59
9	1.50	2.34	2.50	.....	7.64	4.12	9.18	2.49	3.45	1.91	1.24	1.54
10	1.45	2.28	.....	.....	7.24	3.86	6.82	2.47	3.18	1.94	1.42	1.46
11	1.51	2.18	.....	.....	5.69	3.79	5.87	2.60	2.86	1.87	1.44	1.40
12	1.81	2.11	.....	.....	5.54	3.72	5.70	2.99	2.41	1.85	1.38	1.42
13	1.75	2.05	.....	.....	5.84	12.44	5.44	6.42	2.20	1.82	2.49	1.56
14	2.08	2.05	.....	.....	5.60	9.79	5.20	7.87	2.06	1.80	1.94	1.58
15	2.00	2.11	.....	.....	5.38	6.46	4.90	5.40	1.93	1.77	1.73	1.49
16	1.90	2.07	2.50	.....	5.12	5.59	4.48	4.82	1.81	1.78	1.64	1.47
17	1.83	2.06	.....	.....	4.83	4.86	4.00	4.47	1.75	1.76	1.59	1.43
18	1.79	2.14	.....	.....	4.16	4.36	3.64	3.87	1.71	1.79	2.02	1.41
19	8.10	2.08	.....	.....	3.36	4.12	3.14	3.14	1.72	1.77	1.99	1.38
20	5.58	1.98	.....	.....	11.04	3.84	3.00	2.92	1.75	1.75	1.84	1.83
21	3.46	1.93	.....	.....	7.59	3.76	5.00	2.98	1.86	1.72	1.74	1.61
22	3.36	1.89	.....	.....	6.36	3.94	4.60	2.95	1.83	1.63	1.68	1.53
23	3.34	1.91	2.53	.....	5.04	3.72	4.57	2.92	1.82	1.50	1.72	1.66
24	3.56	1.95	2.81	.....	4.26	4.19	4.40	2.81	1.75	1.43	1.64	1.62
25	3.37	1.97	2.96	.....	4.62	7.94	4.24	2.78	5.36	1.51	1.55	1.57
26	3.29	1.94	3.00	.....	4.68	7.29	3.94	3.00	7.38	1.47	1.44	1.49
27	3.17	1.96	3.18	4.74	4.56	6.24	3.80	3.10	5.11	1.45	1.43	1.46
28	4.40	2.59	4.98	14.59	4.50	4.86	3.42	3.20	3.70	1.55	1.39	1.41
29	4.50	2.78	4.36	16.32	.....	4.22	3.47	2.84	3.05	1.52	1.41	1.35
30	5.40	2.87	3.96	9.02	.....	4.00	3.35	2.34	2.88	1.55	1.70	1.29
31	4.40	.....	.....	6.12	.....	3.78	.....	2.04	.....	1.49	2.04	.....

NOTE.—Gage not read Dec. 10-15, 17-22, Jan. 1-4, and 7-26.

BIG SANDY RIVER BASIN.

LEVISA FORK AT THELMA, KY.

LOCATION.—At Chesapeake & Ohio Railway bridge at Thelma, Johnston County, 2 miles below Paintsville. Buffalo Creek enters on right half a mile above station.

DRAINAGE AREA.—2,090 square miles (measured by United States Engineer Corps).

RECORDS AVAILABLE.—June 1, 1915, to September 30, 1918.

GAGE.—Vertical staff gage attached to right shore pier of bridge, portion of gage above 24 feet is cut in masonry steps on upper end of right abutment; read by John Stambaugh. Sea-level elevation of gage, 561.82 feet (United States Engineer Corps).

DISCHARGE MEASUREMENTS.—Made from boardwalk constructed on the lower downstream chord of bridge.

CHANNEL AND CONTROL.—Channel straight half a mile above and 300 feet below gage. Bed of stream sandy. Remains of cofferdams around piers, and piles at measuring section. Primary control about 2,400 feet downstream composed of rock which extends three-fourths of the way across stream; remainder is firm sand, fairly permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 40.7 feet at 6 p. m. January 29; minimum stage, 1.3 feet August 25 and 26.

ICE.—Stage-discharge relation probably not affected by ice except during extremely cold periods.

REGULATION.—Splash dams on tributaries and in main stream about 50 miles above used by timber companies may affect low-water flow to some extent.

ACCURACY.—Stage-discharge relation may change during high water; affected by ice during part of December and January. Gage read to half-tenths twice daily until May 31, 1918, and once daily thereafter.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Levisa Fork at Thelma, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.05	4.05	2.25	4.50	16.50	5.40	5.00	5.45	4.1	5.3	5.9	3.9
2	3.00	4.15	2.30	4.28	11.70	5.08	4.62	5.05	3.9	5.0	4.8	4.0
3	2.88	3.75	2.45	4.55	8.50	4.90	4.45	4.68	3.5	4.2	3.5	3.5
4	2.65	3.40	2.80	4.65	7.65	4.60	5.75	4.22	3.2	4.0	3.0	3.1
5	2.48	3.12	2.80	4.52	6.00	8.55	6.95	4.00	2.8	3.5	2.6	3.0
6	2.30	2.95	2.70	4.12	5.55	10.15	6.48	3.92	2.8	3.0	2.4	3.2
7	2.18	2.78	2.62	6.05	5.65	12.98	6.10	3.68	2.8	2.35	2.1	3.2
8	2.08	2.65	2.62	9.55	5.85	17.25	12.70	3.52	3.0	2.5	2.0	4.1
9	2.02	2.55	2.72	9.45	6.70	12.88	21.75	3.50	2.9	2.5	2.0	3.5
10	2.00	2.48	2.75	7.70	7.75	9.75	17.80	3.42	2.7	2.4	1.9	3.2
11	1.92	2.40	2.80	5.75	7.75	8.85	11.55	3.55	2.6	2.3	1.9	3.3
12	1.98	2.40	2.80	5.60	7.60	8.30	10.15	3.88	2.4	2.3	2.0	3.0
13	2.20	2.35	2.80	5.68	6.55	7.88	8.55	4.95	2.3	2.2	2.0	2.8
14	2.20	2.30	2.80	7.80	6.55	8.05	7.30	8.40	2.3	2.1	2.0	2.4
15	2.12	2.28	2.85	7.30	5.50	8.62	6.48	8.90	2.0	2.0	2.1	2.4
16	2.05	2.20	2.90	7.90	5.05	7.90	5.85	8.25	1.9	1.9	2.0	2.4
17	2.05	2.12	2.90	8.10	4.95	6.55	5.58	5.70	1.75	1.8	1.9	2.3
18	2.00	2.10	2.90	7.95	4.65	6.00	5.35	4.80	2.7	1.7	1.8	2.2
19	5.38	2.10	2.90	6.78	4.48	5.30	5.30	5.10	6.3	1.7	1.7	2.2
20	8.50	2.10	2.55	5.60	10.85	4.95	5.30	5.58	3.0	2.8	1.65	2.1
21	5.75	2.05	2.45	5.08	12.00	5.10	5.75	8.50	2.5	3.0	1.6	2.0
22	4.70	2.00	2.65	4.62	10.40	5.50	8.45	8.45	4.5	2.8	1.4	2.0
23	3.96	2.00	3.02	4.50	8.25	8.70	9.75	7.05	6.0	2.5	1.4	2.2
24	3.70	2.00	3.25	4.28	6.98	9.25	7.95	8.78	5.5	2.6	1.35	2.2
25	3.50	2.00	3.70	4.28	6.20	12.15	6.80	7.45	5.0	2.3	1.3	2.1
26	3.30	1.95	4.52	4.38	6.12	13.45	6.05	6.25	12.6	2.5	1.3	2.1
27	3.15	1.95	4.98	7.65	5.90	11.50	6.15	5.85	13.0	2.2	1.35	2.1
28	3.08	2.02	5.25	29.00	5.68	8.60	6.45	5.05	8.3	2.5	1.35	2.0
29	2.98	2.18	4.10	40.60	.....	7.15	6.42	4.65	6.0	2.6	2.1	1.9
30	3.80	2.20	3.58	28.35	.....	6.10	6.10	3.95	5.9	3.6	2.1	1.9
31	4.55	.....	4.08	22.00	.....	5.40	.....	4.22	.....	4.0	2.3	.....

TUG FORK AT KERMIT, W. VA.

LOCATION.—About 150 feet above United Fuel Gas Co.'s ferry at Kermit, Mingo County. Marrowbone Creek enters on right 2 miles below gage.

DRAINAGE AREA.—1,240 square miles (measured by United States Engineer Corps).

RECORDS AVAILABLE.—June 1, 1915, to September 30, 1918.

GAGE.—Vertical staff gage in three sections attached to trees on right bank of river; 0–20 feet, 160 feet above cable; 20–38 feet, 130 feet below cable; and 38 to 48 feet at cable; read by C. C. Preece. Sea-level elevation of zero of gage, 574.77 feet (United States Engineer Corps).

DISCHARGE MEASUREMENTS.—Made from car on ferry cable or by wading under cable.

CHANNEL AND CONTROL.—Channel straight above and below, bed of stream sandy; control about 150 feet below cable composed of solid rock which extends half way across from left bank and loose rock placed in river for fording, probably permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 38.8 feet, January 29; minimum stage, 2.00 feet October 11, November 26 and 27.

ICE.—Stage-discharge relation seldom affected by ice.

ACCURACY.—Stage-discharge relation practically permanent; probably affected by ice during part of December and January. Gage read to hundredths twice daily until May 31, 1918, and once daily thereafter.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Tug Fork at Kermit, W. Va., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.42	3.85	3.35	4.40	13.5	5.98	5.90	5.65	3.40	4.50	4.70	3.15
2	3.35	3.76	3.82	4.05	10.05	5.62	5.56	5.30	3.20	4.10	4.00	3.12
3	2.60	3.45	3.85	3.98	8.40	5.15	5.48	4.94	3.00	3.80	3.32	3.12
4	2.40	3.39	3.65	3.80	7.41	4.90	5.56	4.71	2.95	3.40	2.90	3.10
5	2.38	3.10	3.45	3.74	5.94	9.26	5.60	4.58	2.62	3.10	2.70	2.80
6	2.29	2.88	3.25	3.82	5.74	11.20	5.35	4.41	2.50	2.90	2.50	2.30
7	2.16	2.79	3.15	6.20	6.00	15.55	5.25	4.29	2.75	2.70	2.40	4.15
8	2.30	2.68	3.30	8.20	5.82	15.85	11.25	4.08	3.10	2.65	2.20	4.28
9	2.10	2.60	3.18	7.68	5.85	10.80	19.55	4.00	3.10	2.80	2.10	3.80
10	2.35	2.50	3.00	6.55	8.22	8.90	14.05	3.97	3.15	2.62	3.60	3.60
11	2.00	2.45	2.90	6.3	9.40	8.32	10.60	3.89	2.85	2.60	2.58	3.40
12	2.16	2.40	3.10	7.12	8.15	7.88	9.65	3.88	2.60	2.55	2.50	3.30
13	2.32	2.39	4.02	6.90	7.45	8.82	9.30	4.10	2.40	2.40	3.00	2.95
14	2.26	2.36	4.18	9.15	6.45	9.42	8.75	5.35	2.30	2.35	2.48	2.75
15	2.31	2.30	4.00	8.50	6.02	9.12	8.05	5.90	2.20	2.32	2.25	2.60
16	2.36	2.30	3.65	8.38	5.65	7.98	7.25	5.25	2.12	2.20	2.75	2.55
17	2.26	2.25	3.20	7.80	5.45	6.95	6.70	4.70	2.10	2.20	2.75	2.42
18	2.19	2.20	2.88	7.45	5.16	6.32	6.42	4.25	2.35	2.28	2.70	2.50
19	4.60	2.18	2.82	6.80	4.96	5.82	6.22	3.92	2.12	2.30	2.60	2.45
20	5.35	2.11	2.80	6.18	8.55	5.34	6.01	4.00	2.00	2.48	2.55	2.50
21	4.05	2.10	2.80	5.65	10.22	5.65	6.41	5.20	2.10	3.00	3.50	3.20
22	3.61	2.10	2.80	5.55	8.68	9.80	10.30	5.52	2.35	2.57	2.92	3.10
23	3.40	2.10	3.40	5.45	7.45	9.75	8.86	4.75	2.60	2.40	2.55	3.50
24	3.50	2.10	3.25	5.2	6.72	9.80	7.70	4.35	3.32	2.30	2.32	3.35
25	3.58	2.08	3.36	5.22	6.04	14.40	6.84	4.82	3.00	2.28	2.15	3.00
26	3.62	2.00	4.22	5.35	6.00	13.65	6.25	4.38	5.90	2.20	2.15	2.78
27	3.55	2.00	4.20	6.65	6.10	10.95	5.95	3.92	11.35	2.25	2.02	2.60
28	3.42	2.20	4.34	31.85	6.48	9.14	6.20	3.71	6.60	2.20	3.00	2.50
29	3.36	3.05	3.62	34.00	.....	8.15	6.26	4.65	4.95	2.55	3.60	2.40
30	3.76	3.10	4.72	15.25	.....	7.00	6.00	3.82	4.20	2.45	3.20	2.30
31	3.66	.....	4.40	19.75	.....	6.36	.....	3.38	.....	6.00	3.22	.....

BLAINE CREEK AT YATESVILLE, KY.

LOCATION.—At covered highway bridge one-fourth mile above Yatesville, Lawrence County. Morgan Branch enters on left 2 miles above station.

DRAINAGE AREA.—216 square miles (United States Engineer Corps).

RECORDS AVAILABLE.—June 1, 1915, to September 30, 1918.

GAGE.—Vertical staff gage in two sections attached to elm tree on right bank about 50 feet above bridge; read by Hattie M. Carter.

DISCHARGE MEASUREMENTS.—Made from board walk constructed on inside of bridge near top of siding. Wading measurements are made under bridge.

CHANNEL AND CONTROL.—Stream curved above and straight below bridge, right bank is overflowed at high stages, stream bed compact sand and gravel; control composed of bedrock extending halfway across stream, sand and gravel rest of way, probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 15.0 feet at 6 p. m. January 28 (discharge, 5,960 second-feet); minimum stage recorded, 0.90 foot October 8 and 9 (discharge, 10 second-feet.)

ICE.—Stage-discharge relation seldom affected by ice.

ACCURACY.—Stage-discharge relation probably permanent; not affected by ice. Rating curve well defined between 20 and 4,000 second-feet; extended beyond these limits. Gage read twice daily to hundredths. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily discharge, in second-feet, of Blaine Creek at Yatesville, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	252	252	24	800	525	277	192	150	34	290	54	24
2	150	204	43	730	375	227	150	132	96	227	43	21
3	96	114	30	465	331	204	555	110	54	114	34	21
4	66	88	39	375	317	304	555	100	96	66	30	24
5	27	88	42	405	331	465	345	96	60	60	27	21
6	17	66	44	465	345	465	264	86	34	54	24	19
7	15	60	39	525	405	465	264	80	80	43	21	19
8	12	73	43	465	590	405	1,530	86	264	66	24	17
9	12	48	38	525	1,530	304	1,120	83	192	60	27	17
10	15	34	59	405	1,200	277	590	69	54	54	43	21
11	24	48	80	465	800	252	495	74	34	43	34	19
12	80	38	30	465	590	252	405	82	30	48	27	19
13	38	30	28	405	405	880	360	360	27	43	30	17
14	96	48	30	435	331	880	290	1,040	27	38	27	21
15	66	38	33	695	277	1,200	264	405	24	34	34	27
16	66	38	35	960	227	525	239	239	21	30	27	17
17	80	48	28	880	181	405	239	264	19	34	38	21
18	48	30	35	800	170	277	264	495	21	30	54	43
19	2,770	38	33	625	264	304	204	252	21	34	43	21
20	1,200	30	28	360	1,710	277	192	465	21	27	34	54
21	465	27	33	360	880	317	435	465	17	28	30	27
22	331	24	123	405	660	405	375	239	96	27	27	24
23	252	24	192	405	590	304	277	160	114	30	24	27
24	123	24	204	405	405	317	239	141	38	29	24	27
25	123	24	405	405	375	800	215	105	34	30	21	21
26	123	27	960	405	465	525	192	123	1,400	38	21	19
27	27	24	800	1,200	465	405	204	141	345	660	24	21
28	43	36	660	4,420	331	304	181	88	192	114	27	17
29	88	41	730	4,070	.....	252	192	88	132	66	21	17
30	317	30	800	1,120	.....	239	170	88	114	80	24	21
31	304	.....	695	695	.....	215	.....	60	.....	54	27	.....

Monthly discharge of Blaine Creek at Yatesville, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 216 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	2,770	12	236	1.09	1.26
November	252	24	56.5	.262	.29
December	960	24	205	.949	1.09
January	4,420	360	811	3.75	4.32
February	1,710	170	538	2.49	2.59
March	1,200	204	411	1.90	2.19
April	1,530	150	367	1.70	1.90
May	1,040	60	205	.949	1.09
June	1,400	17	123	.569	.63
July	660	27	82.3	.381	.44
August	54	21	30.5	.141	.16
September	54	17	22.8	.106	.12
The year	4,420	12	256	1.19	16.08

SCIOTO RIVER BASIN.

SCIOTO RIVER AT WAVERLY, OHIO.

LOCATION.—At Norfolk & Western Railway bridge 1 mile southeast of Waverly, Pike County.

DRAINAGE AREA.—5,730 square miles (United States Engineer Corps).

RECORDS AVAILABLE.—March 23, 1916, to September 30, 1918.

GAGE.—Chain gage fastened to downstream side of bridge; read by W. G. Johnston. Sea-level elevation of zero of gage, 542.00 feet (United States Engineer Corps).

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge to which gage is attached, or from highway bridge 2,000 feet below gage.

CHANNEL AND CONTROL.—For stages over 12 feet the river spreads over the bottom lands, but all water passes under the bridge.

EXTREMES OF STAGE.—Maximum stage during year, 18.16 feet at 4.10 p. m. February 15; minimum stage, 0.77 foot at 7 a. m. August 26.

1916–1918: Maximum stage recorded, 21.9 feet March 29, 1916 (discharge, 97,800 second-feet); minimum stage, 0.77 foot at 7 a. m. August 26, 1918.

ICE.—Stage-discharge relation not affected by ice except during severe winters.

ACCURACY.—Stage-discharge relation probably permanent but no current-meter measurements have been made since October 18, 1916, to check the rating curve; ice effect during part of December, January, and February. Gage read to hundredths twice daily.

COOPERATION.—Gage-height record furnished by United States Engineer Corps.

Daily gage height, in feet, of Scioto River at Waverly, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	.....	2.15	1.17	1.79	2.82	6.18	2.91	4.23	2.65	1.66	.....	2.71
2	.....	2.24	1.18	1.79	2.84	6.11	3.03	3.80	2.45	1.81	.....	2.55
3	1.06	2.39	1.19	1.79	2.86	6.36	3.88	3.39	2.34	1.90	.....	2.11
4	.89	2.29	.....	1.79	2.86	6.71	4.01	3.18	2.25	1.66	1.35	2.25
5	.84	2.02	.....	1.79	2.76	6.66	4.11	2.96	2.09	1.57	1.26	1.93
6	.83	1.71	.....	1.97	3.31	6.76	.....	2.78	2.08	1.55	1.25	1.57
7	.93	1.54	1.18	2.25	4.61	6.16	.....	2.71	2.44	1.39	1.22	1.77
8	1.02	1.56	1.21	.....	6.61	5.84	.....	2.59	2.36	1.33	1.14	1.90
9	1.05	1.48	1.26	3.17	8.96	5.18	.....	2.59	2.36	1.51	1.10	2.01
10	.95	1.46	1.39	3.17	11.81	5.66	.....	2.59	2.27	1.52	1.07	1.86
11	.96	1.41	1.39	3.39	10.51	6.14	.....	2.57	3.87	1.49	1.32	1.65
12	1.01	1.33	1.39	.....	13.06	5.74	4.40	2.79	2.80	1.44	1.79	1.54
13	1.00	1.26	1.39	3.42	14.76	11.20	4.13	7.77	2.27	1.41	1.57	1.42
14	.99	1.28	1.39	3.39	17.14	17.91	3.87	10.70	2.15	1.39	1.25	1.33
15	.96	.....	1.39	.....	18.11	15.11	3.63	14.30	2.10	1.33	1.19	1.55
16	.96	1.31	1.39	2.97	16.88	10.30	3.35	11.60	1.93	1.27	1.25	1.51
17	.89	1.23	1.39	2.97	13.56	8.14	3.19	6.90	1.72	1.23	1.46	1.86
18	.97	1.11	1.39	2.97	7.86	6.51	3.30	5.85	1.59	1.19	2.24	2.58
19	1.02	.97	1.39	2.97	7.66	5.31	3.09	4.85	1.55	1.17	1.94	3.11
20	.87	1.13	1.39	2.97	8.26	4.54	2.93	4.05	1.56	1.19	1.15	3.23
21	1.11	1.06	.....	2.97	9.01	4.21	3.05	4.03	1.58	1.18	.95	3.15
22	1.42	1.07	.....	2.97	8.41	4.08	4.45	3.87	1.56	1.21	.98	3.02
23	1.44	1.08	.....	2.93	9.56	3.94	4.50	3.83	1.55	1.22	.93	2.91
24	1.49	1.09	.....	2.79	10.01	3.76	4.10	3.77	1.49	1.23	.90	2.58
25	1.48	1.09	1.79	2.77	10.27	3.68	3.90	3.70	1.49	1.35	.79	2.25
26	1.43	1.07	1.79	2.76	10.38	3.56	3.85	3.55	3.34	1.30	.78	2.03
27	1.48	1.03	1.79	2.76	10.61	3.28	3.95	3.45	2.93	1.27	.94	1.92
28	1.57	1.17	1.79	2.76	8.86	3.13	.....	4.10	2.70	1.50	1.29	1.92
29	1.66	1.17	1.79	2.76	.....	2.98	3.90	3.29	1.84	1.76	1.45	1.78
30	1.81	1.15	1.79	2.84	.....	2.92	.....	2.99	.....	.....	1.55	1.67
31	2.03	.....	1.79	2.85	.....	2.89	.....	2.86	.....	.....	1.60	.....

LITTLE MIAMI RIVER BASIN.

LITTLE MIAMI RIVER AT MIAMIVILLE, OHIO.

LOCATION.—At two-span steel highway bridge one-third mile southeast of Miamiville, Clermont County.

DRAINAGE AREA.—1,200 square miles.

RECORDS AVAILABLE.—June 21, 1915, to September 30, 1918.

GAGE.—Chain gage attached to downstream side of bridge; read by J. M. Barrere.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge, except at low stages, when they are made by wading.

CHANNEL AND CONTROL.—Channel clean of vegetation, except at high stages. Control probably permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 10.88 feet at 4 p. m. February 12; minimum stage, 1.30 feet at 6.38 p. m. November 19.

REGULATION.—Low-water flow regulated to some extent by operation of flour mill at Fosters crossing about 11 miles upstream.

ACCURACY.—Stage-discharge relation probably permanent; affected by ice during December, January, and February. Gage read to hundredths twice daily.

COOPERATION.—Base data furnished by United States Army Engineers.

No discharge measurements were made at this station during the year.

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Daily gage height, in feet, of Little Miami River at Miamiville, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.46	1.97	1.63	1.91	2.22	3.92	2.37	2.75	2.22	2.77	1.98	3.32
2	1.37	1.90	1.69	1.91	2.39	3.62	2.49	2.61	2.08	2.17	1.83	2.76
3	1.47	1.75	1.81	1.95	2.41	3.57	3.43	2.51	2.11	1.77	1.74	2.56
4	1.51	1.71	1.72	1.89	2.39	3.47	3.42	2.43	2.02	1.62	1.63	2.67
5	1.43	1.82	1.66	1.91	2.56	4.37	2.88	2.35	2.04	1.90	1.73	2.70
6	1.49	1.71	1.59	2.96	2.57	4.07	2.70	2.37	2.71	1.67	1.65	2.46
7	1.53	1.69	1.58	4.23	2.36	3.62	2.58	2.29	2.83	1.56	1.55	2.30
8	1.60	1.68	1.71	3.38	2.63	3.38	2.60	2.30	2.42	1.93	1.52	2.05
9	1.32	1.66	1.81	2.79	5.38	3.31	2.49	2.30	2.35	1.70	1.54	2.06
10	1.34	1.51	1.32	2.62	6.83	3.24	2.43	2.29	2.21	1.62	1.62	1.91
11	1.44	1.75	1.35	2.65	6.78	3.08	2.48	2.36	2.73	1.67	1.57	1.84
12	1.53	1.69	1.50	2.51	9.98	2.94	2.61	5.42	2.40	1.67	1.57	1.94
13	1.47	1.55	1.59	2.39	9.88	8.39	2.71	8.22	2.05	1.60	1.79	2.38
14	1.74	1.52	1.81	2.31	6.83	7.07	2.60	5.52	1.95	1.62	1.65	2.22
15	1.49	1.65	1.44	2.35	7.18	4.97	2.53	4.42	1.86	1.71	1.55	2.00
16	1.42	1.65	1.58	2.42	5.08	4.17	2.46	3.82	1.83	1.64	1.51	4.31
17	1.53	1.52	1.84	2.27	4.27	3.72	2.65	3.42	1.88	1.71	1.55	5.06
18	1.51	1.40	1.60	2.09	3.77	3.52	2.84	3.17	1.93	1.67	.....	3.76
19	1.62	1.31	1.99	2.24	4.87	3.27	2.65	.....	1.70	1.64	1.65	3.51
20	2.28	1.44	1.92	2.23	7.52	3.06	2.70	3.47	1.71	1.58	1.57	3.41
21	1.84	1.58	1.89	2.31	5.77	2.96	2.86	3.06	1.72	1.60	1.56	3.26
22	1.84	1.62	1.78	2.36	4.12	2.87	3.14	2.72	1.71	1.78	1.49	2.92
23	1.76	1.53	1.95	2.31	3.57	2.84	2.91	2.63	1.70	2.97	1.32	2.70
24	1.71	1.59	2.05	2.30	3.52	2.83	2.78	2.51	1.83	2.53	1.46	2.50
25	1.73	1.54	2.15	2.26	3.67	2.89	2.74	2.40	3.31	2.20	1.45	2.38
26	1.65	1.65	2.22	2.11	6.52	2.76	3.72	2.36	3.00	2.19	1.49	2.33
27	1.74	1.56	2.09	2.24	5.22	2.63	3.72	2.32	2.26	2.05	1.40	2.21
28	1.69	1.53	2.05	2.42	4.17	2.52	3.30	2.61	2.11	2.81	2.62	2.05
29	1.63	1.59	2.01	2.29	.....	2.50	3.15	2.49	1.99	4.11	2.91	1.86
30	2.01	1.73	1.91	2.23	.....	2.41	2.99	2.36	2.11	2.68	3.06	2.01
31	2.08	.....	1.87	2.14	.....	2.32	.....	2.43	.....	2.13	3.65	.....

NOTE.—Gage not read May 19 and Aug. 18.

LITTLE MIAMI RIVER AT PLAINVILLE, OHIO.

LOCATION.—At steel highway bridge half a mile above Pennsylvania Railroad station at Plainville, Hamilton County.

DRAINAGE AREA.—1,680 square miles.

RECORDS AVAILABLE.—July 10, 1914, to September 30, 1915; August 18 to September 30, 1918.

GAGE.—Chain gage attached to downstream side of bridge.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of heavy gravel and rock covered with layer of mud. Control is at a riffle about 600 feet below gage.

COOPERATION.—Base data furnished by United States Engineer Corps.

Data inadequate for determination of discharge.

Discharge measurements of Little Miami River at Plainville, Ohio, during the year ending Sept. 30, 1918.

[Made by U. S. Army Engineers.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Aug. 30	6.9	797
Sept. 11	5.85	161
13	6.1	202

Daily gage height, in feet, of Little Miami River at Plainville, Ohio, for the year ending Sept. 30, 1918.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1		8.75	11		6.05	21	5.30	7.30
2		8.50	12		5.80	22	5.30	7.05
3		7.95	13		5.95	23	5.30	6.75
4		8.70	14		6.10	24	5.30	6.40
5		8.80	15		6.05	25	5.30	6.25
6		8.60	16		8.40	26	5.30	6.00
7		8.00	17		9.30	27	5.30	5.85
8		7.10	18	5.40	8.20	28	7.65	5.80
9		6.60	19	5.40	7.80	29	7.40	5.75
10		6.20	20	5.30	7.20	30	7.20	5.70
						31	10.10	

EAST FORK OF LITTLE MIAMI RIVER AT PERINTOWN, OHIO.

LOCATION.—At single-span steel highway bridge at Perintown, Clermont County, 5 miles above junction of East Fork and Little Miami River.

DRAINAGE AREA.—459 square miles.

RECORDS AVAILABLE.—May 7, 1915, to September 30, 1918.

GAGE.—Chain gage attached to downstream side of bridge; read by G. W. Taylor.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge except at low stages when they are made by wading.

CHANNEL AND CONTROL.—Bed of river mostly rock; banks covered with trees and brush above a stage of about 5 feet; control rock and gravel; probably permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 18.2 feet at 8 p. m. February 11; minimum stage, −0.18 foot October 3–6.

1915–1918: Maximum stage recorded, 18.6 feet at noon December 27, 1916 (discharge, about 21,300 second-feet); minimum stage, −0.18 foot October 3–6, 1917.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation probably permanent; affected by ice during part of December, January, and February. Gage read to hundredths twice daily.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of East Fork of Little Miami River at Perintown, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	−0.16	0.53	0.00	0.48	0.66	1.79	0.86	1.56	0.42	2.73	0.92	2.74
2	− .17	.42	.00	.46	.80	1.54	.81	1.23	.43	2.40	.68	1.84
3	− .18	.37	.00	.31	.80	1.38	2.65	1.06	.42	1.50	.46	1.21
4	− .18	.31	.00	.16	.80	1.61	2.70	.95	.40	1.10	.38	1.16
5	− .18	.27	.02	.17	.80	2.60	1.88	.84	.40	.85	.33	1.31
6	− .18	.23	.01	2.01	.80	2.41	1.31	.80	3.40	.68	.29	1.34
7	− .16	.20	.00	6.60	.94	1.92	1.15	.78	1.76	.56	.25	1.14
8	− .16	.18	.00	6.40	1.30	1.63	1.04	.74	1.92	.49	.21	.93
9	− .16	.15	.00	6.20	12.80	1.72	.95	.68	1.47	.44	.15	.74
10	− .16	.11	.00	4.10	16.70	1.97	.94	.70	1.16	.38	.13	.61
11	− .16	.10	.00	2.30	17.35	1.72	.94	.77	.84	.33	.12	.50
12	− .15	.08	.00	1.38	15.65	1.41	.96	4.90	.68	.31	.31	.46
13	− .14	.05	.00	1.30	10.15	8.00	.96	12.85	.56	.29	.58	1.01
14	− .14	.04	.00	1.30	5.00	9.40	.96	4.70	.48	.24	.47	.79
15	− .14	.02	.00	1.24	4.60	3.95	.92	2.68	.40	.19	.49	.59
16	− .14	.02	− .04	1.24	3.25	2.33	.87	2.10	.33	.18	.61	.69
17	− .14	.00	− .04	1.22	2.25	1.76	1.07	1.66	.26	.16	.37	.81
18	− .14	.00	− .03	.80	1.80	1.54	1.55	1.45	.20	.14	.19	1.18
19	.03	.00	.00	.70	1.97	1.41	1.05	1.28	.18	.14	.17	1.27
20	.19	− .01	.02	.70	5.60	1.28	1.10	1.15	.18	.14	.16	.98
21	.14	− .04	.10	.66	3.80	1.18	3.65	1.05	.18	.14	.14	.71
22	.07	− .06	.22	.60	1.90	1.16	3.20	.97	.16	.41	.11	.60
23	.01	− .06	.31	.60	1.70	1.14	1.96	1.06	.13	.31	.07	.55
24	.00	− .06	.44	.60	1.53	1.30	1.72	1.19	.12	.21	.03	.48
25	.00	− .06	.22	.56	2.13	1.55	2.24	1.09	3.63	.39	− .01	.42
26	− .03	− .06	.24	.56	5.30	1.58	3.85	.97	5.38	1.00	− .02	.32
27	− .06	− .07	.39	.56	2.85	1.45	4.02	.83	2.48	1.03	.05	.24
28	.00	− .08	.54	.56	2.05	1.25	2.82	.73	1.91	1.31	2.84	.18
29	.07	− .03	.54	.56	.....	1.13	2.10	.64	1.64	1.52	1.87	.19
30	.12	.00	.52	.56	.....	1.02	1.88	.58	2.95	.79	2.37	.16
31	.65	.....	.52	.56	.....	.93	.....	.50	.....	.87	5.33	.....

LICKING RIVER BASIN.

LICKING RIVER AT FARMERS, KY.

LOCATION.—About 100 feet below Chesapeake & Ohio Railway bridge and 300 feet below two-span steel highway bridge three-fourths of a mile west of Farmers, Rowan County.

DRAINAGE AREA.—768 square miles (measured by United States Engineer Corps).

RECORDS AVAILABLE.—July 20, 1915, to September 30, 1918.

GAGE.—Combination vertical staff and slope gage on east bank of river; read by Mrs. S. P. Cassity.

DISCHARGE MEASUREMENTS.—Made from downstream side of two-span highway bridge 300 feet above gage.

CHANNEL AND CONTROL.—Bed of stream solid rock, straight above and below gage. Control is a rock reef about 1 mile below gage.

EXTREMES OF STAGE.—Maximum stage recorded during year, 21.3 feet at 7 a. m. January 30; minimum stage, 1.25 feet August 15 and 16.

1915–1918: Maximum stage recorded, 25.6 feet at 7 a. m. January 22, 1917; minimum stage, 1.1 feet August 17 and 18, 1917.

ICE.—Stage-discharge relation not affected by ice except during severe winters.

REGULATION.—The flow at low stages may be affected by storage of water for use of a sawmill at a movable dam a short distance above the gage. Dam is submerged at gage height 5 feet.

ACCURACY.—Stage-discharge relation probably permanent; affected by ice during part of December and January. Gage read to half-tenths twice daily; not checked since August 4, 1917.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Licking River at Farmers, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.80	4.32	2.72	3.55	18.60	4.32	3.65	4.68	2.50	2.42	1.78	1.85
2	2.70	3.55	2.60	3.38	13.05	4.05	3.92	4.20	2.42	2.38	1.72	1.80
3	2.12	2.90	2.38	3.82	9.75	3.88	5.10	3.82	2.35	2.28	1.68	1.92
4	1.88	2.78	2.20	3.82	8.65	3.75	5.32	3.68	2.45	2.22	1.62	2.18
5	1.78	2.60	2.05	3.88	8.28	5.02	4.60	3.18	2.32	2.12	1.50	2.30
6	1.72	2.45	2.05	3.30	7.25	6.48	3.62	3.05	2.50	2.08	1.45	2.05
7	1.62	2.38	1.98	8.35	6.80	7.18	3.70	2.98	2.82	1.98	1.52	2.05
8	1.50	2.20	2.05	8.62	10.02	6.50	5.30	2.85	2.72	2.20	1.50	2.10
9	1.42	2.18	2.12	7.92	16.15	6.48	8.45	2.70	2.68	2.45	1.40	2.00
10	1.55	2.50	2.22	7.15	17.20	4.55	9.40	2.98	2.58	2.72	1.35	1.92
11	1.52	2.50	2.28	6.22	14.85	4.65	7.15	2.90	2.48	2.78	1.30	1.82
12	1.62	2.35	2.12	6.05	12.72	4.38	5.75	3.08	2.32	2.52	1.35	1.72
13	1.72	1.95	2.22	6.00	8.70	7.15	4.80	6.60	2.20	2.10	1.32	1.82
14	1.88	1.88	2.12	5.50	5.45	14.00	3.90	13.20	2.05	1.68	1.30	1.72
15	1.95	1.78	2.10	7.22	5.05	8.82	3.95	8.78	1.92	1.55	1.25	1.60
16	1.82	1.70	2.00	9.95	4.88	6.45	3.88	6.58	1.82	1.78	1.25	1.80
17	1.72	1.65	1.95	8.68	4.78	5.32	3.70	5.10	1.72	1.68	1.30	2.48
18	1.72	1.60	1.98	7.45	4.72	4.70	3.42	4.20	1.68	1.82	1.35	2.00
19	3.70	1.50	2.00	6.68	5.05	4.88	3.28	4.02	1.78	1.88	1.70	2.18
20	7.38	1.48	2.25	6.28	8.58	4.88	3.60	3.90	1.92	1.68	1.62	2.15
21	1.68	1.70	2.58	6.38	11.38	4.78	11.25	5.40	2.05	1.58	1.55	2.00
22	4.85	1.68	2.82	5.70	10.58	4.68	7.75	5.80	2.82	1.48	1.48	2.08
23	3.28	1.68	2.72	5.18	6.25	3.68	5.48	6.20	2.38	1.38	1.42	1.98
24	2.80	1.58	2.85	5.25	5.42	4.32	4.85	6.05	2.25	1.38	1.38	1.88
25	2.75	1.52	4.10	5.32	5.12	5.75	4.55	6.45	2.80	1.48	1.32	1.78
26	2.45	1.60	5.25	5.65	5.52	7.65	10.18	6.00	5.65	1.52	1.28	1.68
27	2.18	1.45	5.42	8.25	5.38	6.72	12.28	4.30	3.25	1.62	1.30	1.58
28	2.48	1.38	4.65	13.80	4.95	5.48	6.58	4.00	2.20	2.15	1.42	1.52
29	2.68	2.20	4.00	20.70	.....	4.98	5.75	3.65	.....	1.45	1.72	1.48
30	3.52	2.68	3.42	21.28	.....	4.20	4.98	3.15	1.98	3.00	1.72	1.40
31	4.52	.....	3.52	21.12	.....	3.88	.....	2.72	.....	2.65	1.82	.....

NOTE.—Gage not read June 29.

LICKING RIVER AT CATAWBA, KY.

LOCATION.—About 200 feet below Catawba ford, one-fourth mile north of Catawba, Pendleton County. Kinkaid Creek enters from right, 1,000 feet below gage.

DRAINAGE AREA.—3,300 square miles.

RECORDS AVAILABLE.—July 14, 1916, to September 30, 1918.

GAGE.—Combination slope and vertical staff on south bank of river about 200 feet below the ford; read by G. A. Frank. Elevation of zero of gage is 498.37 feet above sea level, which corresponds approximately to 69 feet on the United States Weather Bureau gage on Ohio River at Cincinnati, Ohio.

DISCHARGE MEASUREMENTS.—Made from cable about 500 feet upstream from gage.

CHANNEL AND CONTROL.—Bed of river at cable is mostly ledge rock. The banks are heavily wooded above an elevation of about 7 feet on the gage. The control is a rock bar just below the mouth of Kinkaid Creek; probably permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 35.00 feet at 6 a. m. February 10; minimum stage, 0.80 foot at 6 a. m September 29.

1916–1918: Maximum stage recorded, that of February 10, 1918; minimum stage 0.80 foot September 28, 1917, and September 29, 1918.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation probably permanent; probably affected by ice during part of December and January. Gage read to hundredths twice daily. Gage has not been checked since August 2, 1917.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Licking River at Catawba, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.38	5.12	3.60	5.40	17.50	6.05	4.18	5.95	3.18	3.60	3.78	3.40
2	3.12	4.55	3.82	5.38	16.65	5.45	4.02	5.22	3.00	3.38	3.40	2.65
3	2.60	4.15	3.75	5.30	16.00	5.10	8.60	4.75	2.75	3.48	2.75	2.68
4	2.20	3.62	3.48	5.15	13.55	4.78	9.65	4.42	2.52	2.98	2.32	2.50
5	2.00	3.25	3.20	5.10	10.15	4.80	7.82	4.10	2.30	2.75	2.00	2.92
6	1.78	3.02	2.90	9.32	8.85	4.95	6.10	3.85	3.10	2.52	1.85	2.62
7	1.70	2.82	2.72	12.50	10.05	7.15	5.05	3.62	3.30	2.28	1.65	2.32
8	1.65	2.60	2.68	11.05	18.45	6.80	4.52	3.48	3.00	2.15	1.48	2.25
9	1.58	2.45	3.48	8.95	31.80	6.75	4.92	3.70	2.80	1.95	1.35	1.92
10	1.50	2.35	3.50	7.18	34.00	6.48	6.20	4.48	2.95	1.85	1.28	1.80
11	1.38	2.25	3.58	6.40	25.45	5.85	7.10	3.80	2.95	1.78	1.28	1.72
12	1.45	2.18	3.48	7.95	17.78	5.40	6.85	4.70	2.60	1.70	1.25	2.15
13	1.40	2.10	3.35	7.10	13.90	12.10	5.78	12.15	2.32	1.62	1.08	2.68
14	1.40	2.00	3.12	8.05	9.95	20.15	5.02	12.80	2.15	1.60	1.10	2.10
15	1.38	1.95	3.10	8.15	9.18	16.10	4.62	11.72	1.98	1.58	1.10	1.75
16	1.32	1.92	3.02	12.02	9.15	11.75	4.25	9.90	1.85	1.52	1.05	1.65
17	1.30	1.90	3.00	15.60	7.95	8.25	4.05	7.80	1.75	1.42	.95	1.68
18	1.58	1.90	2.80	15.25	6.62	6.78	4.20	5.82	1.62	1.38	1.00	1.58
19	1.72	1.88	2.82	12.75	7.72	5.82	4.22	5.10	1.48	1.35	1.30	1.50
20	1.88	1.82	2.95	10.20	17.50	5.22	4.00	5.30	1.42	1.95	1.38	1.38
21	5.80	1.80	4.08	9.40	14.02	4.88	7.40	8.65	1.40	1.62	1.25	1.22
22	6.18	1.72	6.38	8.70	12.40	4.55	11.10	10.00	1.38	1.45	1.12	1.18
23	5.42	1.68	6.08	7.58	10.78	4.42	10.75	6.72	1.68	1.35	1.10	1.15
24	3.95	1.62	6.00	7.20	8.60	4.30	7.25	6.00	1.70	1.30	1.05	1.32
25	3.38	1.58	5.62	6.72	6.75	4.75	7.50	5.65	2.50	1.22	1.00	1.18
26	2.95	1.68	4.90	6.75	8.68	5.40	7.50	4.88	6.18	1.85	1.02	1.12
27	2.72	1.78	5.25	7.05	7.02	6.35	10.25	5.50	5.80	3.22	1.10	1.05
28	2.60	1.55	5.72	9.65	6.70	6.60	11.45	5.08	5.42	3.20	2.15	.90
29	2.58	1.70	5.15	16.10	.....	5.75	9.55	4.55	5.65	2.60	1.65	.85
30	3.48	3.20	4.98	19.48	.....	4.95	7.02	3.82	4.05	9.98	2.05	.92
31	4.65	.....	5.75	18.70	.....	4.50	.....	3.50	.....	5.25	3.20	.....

SOUTH FORK OF LICKING RIVER AT HAYES, KY.

LOCATION.—At two-span steel highway bridge at Hayes, Pendleton County, 2½ miles south of Falmouth.

DRAINAGE AREA.—922 square miles (measured by United States Engineer Corps).

RECORDS AVAILABLE.—July 7, 1916, to September 30, 1918.

GAGE.—Chain gage attached to downstream handrail of bridge; read by J. K. Frazer. Sea-level elevation of zero of gage, 540.10 feet.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge.

CHANNEL AND CONTROL.—Bed of river composed of ledge rock; banks lined with vegetation. Control about 800 feet below gage; probably permanent. Backwater begins to affect the stage-discharge relation at this station when the main Licking River reaches a stage of about 28 feet on the gage at Falmouth.

EXTREMES OF STAGE.—Maximum stage recorded during year, 15.9 feet February 9; minimum stage, 0.24 foot October 5.

1916–1918: Maximum stage recorded, that of February 9, 1918; minimum stage, 0.20 foot at 6 a. m. September 6, 1917.

ICE.—Stage-discharge relation not affected by ice except during severe winters.

ACCURACY.—Stage-discharge relation probably permanent, except as may be affected by ice part of December and January. Rating curve not fully developed. Gage read to hundredths twice daily. As gage has not been checked since August 2, 1917, readings may be too large owing to elongation of gage chain.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of South Fork of Licking River at Hayes, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.41	0.76	0.93	2.63	6.08	2.49	1.54	2.12	1.47	1.13	2.55	2.35
2	.35	1.09	1.15	2.24	5.35	2.34	1.47	1.90	1.36	1.02	1.92	1.66
3	.29	1.26	1.34	2.16	5.10	2.18	3.33	1.74	1.22	1.01	1.58	1.45
4	.26	1.08	1.19	2.10	4.60	2.10	3.27	1.60	1.15	1.02	1.37	1.71
5	.24	.98	1.05	2.03	4.12	2.09	2.47	1.48	1.08	.97	1.19	2.06
6	.26	1.00	.99	4.92	4.22	2.18	2.03	1.39	2.12	.93	1.04	1.57
7	.47	.96	.93	5.18	5.85	2.87	1.80	1.33	1.80	.83	.88	1.43
8	.47	.84	1.15	5.68	11.72	2.57	1.67	1.24	1.82	.86	82	1.29
9	.39	.74	.97	4.05	14.10	2.38	1.54	1.31	1.39	.80	.72	1.09
10	.32	.70	1.16	3.04	10.72	2.11	1.51	1.24	1.21	.80	.74	1.01
11	.26	.75	1.11	2.58	7.00	2.00	1.51	1.32	1.06	.75	.71	.91
12	.33	.71	1.02	3.05	6.95	1.96	1.46	1.94	.95	.70	.67	1.06
13	.35	.62	1.13	3.85	5.15	5.88	1.39	5.15	.95	.64	.57	1.72
14	.36	.64	1.02	3.55	4.28	7.22	1.32	5.75	.89	.67	.77	1.07
15	.33	.60	.86	3.62	4.05	4.80	1.25	4.25	.82	.66	.67	.81
16	.30	.55	.83	3.62	4.22	3.68	1.23	3.11	.77	.54	.55	.86
17	.28	.53	.85	7.38	3.65	3.03	1.22	2.60	.73	.55	.44	.98
18	.27	.59	.82	6.08	3.11	2.73	1.14	2.31	.54	.57	.38	.81
19	.28	.53	.85	4.92	3.77	2.46	1.19	2.03	.49	1.03	1.10	.72
20	.33	.47	1.07	4.12	7.25	2.25	1.19	3.01	.46	1.13	.96	.64
21	.31	.49	1.72	3.80	6.02	2.12	2.38	5.88	.41	.78	.82	.66
22	.27	.47	2.67	3.58	4.38	1.98	2.86	5.98	.39	.67	.77	.66
23	.29	.50	2.61	3.29	3.58	1.89	3.14	3.95	.41	.63	.73	.75
24	.31	.41	3.11	3.30	3.14	1.81	2.40	3.08	.34	.58	.70	.76
25	.29	.42	3.00	3.13	2.85	1.93	3.24	2.62	.86	.56	.66	.60
26	.27	.49	3.00	2.99	3.72	2.22	3.16	2.28	1.58	.76	.58	.59
27	.26	.42	3.02	3.03	2.97	2.19	2.94	2.03	1.37	.72	.53	.49
28	.43	.45	2.48	3.78	2.71	1.99	3.08	1.96	2.15	.67	1.41	.39
29	.41	.52	1.97	7.88	.....	1.85	2.73	1.92	1.94	.59	1.71	.38
30	.70	.59	1.99	9.18	.....	1.71	2.40	1.70	1.33	6.62	1.33	.39
31	.81	.....	2.14	7.28	.....	1.62	.....	1.69	.....	3.82	2.21	.....

MIAMI RIVER BASIN.

MIAMI RIVER AT VENICE, OHIO.

LOCATION.—About 400 feet downstream from boundary line between Hamilton and Butler counties, at single-span highway bridge three-fourths of a mile southeast of Venice, Butler County. Indian Creek enters from right 1.4 miles above station.

DRAINAGE AREA.—3,790 square miles (measured by United States Army Engineers).

RECORDS AVAILABLE.—June 14, 1915, to September 30, 1918.

GAGE.—Chain gage fastened to downstream side of bridge; read by H. B. Watson.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—The control for medium stages is the remains of an old milldam about 1¼ miles below the gage. For stages below about 3 feet a riffle is formed by an unstable gravel bar under the bridge. This bar scours out during high water and reforms at low stages. All water flows under the bridge for stages less than 25 feet.

EXTREMES OF STAGE.—Maximum stage recorded during year, 18.72 feet at 7 a. m. February 13; minimum stage, 1.50 feet at 6 p. m. August 25.

1915–1918: Maximum stage recorded, 23.1 feet February 1, 1916 (discharge, 52,300 second-feet); minimum stage, 1.31 feet September 5, 1916.

The highest known stage corresponds to about 38 feet on the gage during the flood of 1913.

DIVERSIONS.—The Miami & Erie canal is fed by water taken from Miami River at Middletown and Miamisburg, Ohio. The canal at Lindenwald, near the point where it leaves the drainage basin, has a flow of about 100 second-feet, which is a considerable part of the low-water flow of Miami River.

REGULATION.—The flow during low stages is probably regulated to a large extent by power plants in Hamilton.

ACCURACY.—Stage-discharge relation practically permanent except for possible slight changes at low stage because of shifts in the gravel bar at the bridge; probably affected by ice during part of December, January, and February. Gage read to hundredths twice daily.

COOPERATION.—Gage-height record furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Miami River at Venice, Ohio, for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.59	3.60	1.89	3.11	.....	6.00	2.84	5.00	2.90	2.40	2.86	5.07
2	1.62	3.17	1.80	3.36	.....	8.58	3.00	4.30	2.76	2.46	2.52	3.53
3	1.60	2.72	1.76	3.61	.....	6.64	4.15	3.85	2.60	2.28	2.30	2.84
4	1.60	2.46	1.82	.....	.....	6.18	4.27	3.56	2.54	2.10	2.14	2.70
5	1.62	2.33	1.83	.....	.....	7.22	3.72	3.28	2.46	2.00	2.08	2.77
6	1.63	.....	1.84	5.36	.....	7.08	3.46	3.14	2.90	1.94	1.98	3.08
7	1.56	2.10	1.82	7.43	.....	6.23	3.14	3.05	3.32	1.92	1.89	3.02
8	1.57	2.05	1.78	5.16	.....	5.40	3.04	3.17	3.20	1.90	1.86	2.73
9	1.59	1.97	1.82	4.17	7.42	5.12	2.90	3.17	2.82	1.87	1.81	2.50
10	1.56	1.96	.....	3.82	8.13	5.07	2.80	3.12	2.64	1.82	1.78	2.30
11	1.58	1.90	.....	3.67	9.78	5.82	2.82	3.00	3.42	1.78	1.75	2.16
12	1.62	1.84	.....	.....	14.88	5.17	2.82	9.90	2.79	1.74	1.74	3.92
13	1.60	1.86	.....	.....	18.41	7.51	2.84	16.22	2.42	1.70	.....	3.94
14	1.56	1.83	.....	.....	15.80	9.98	2.80	12.28	3.24	1.69	1.84	3.48
15	1.55	1.82	.....	.....	13.82	9.60	2.63	8.38	2.14	1.65	1.90	3.14
16	1.58	1.82	.....	.....	10.46	7.23	2.67	6.72	2.09	1.64	1.80	5.85
17	1.60	1.80	.....	.....	7.58	6.04	3.95	5.63	1.98	1.62	1.76	5.93
18	1.62	1.76	2.11	.....	6.46	5.24	4.26	4.86	1.98	1.62	1.66	5.05
19	2.36	1.74	2.11	.....	7.53	4.76	3.56	4.38	1.92	1.62	1.63	5.78
20	2.44	1.77	1.68	.....	11.21	4.46	3.33	4.50	1.84	1.61	1.64	6.14
21	2.04	1.78	1.78	.....	8.52	4.13	3.62	4.12	1.78	1.58	1.62	5.09
22	1.96	1.77	1.80	.....	6.38	3.94	3.40	3.80	1.74	2.34	1.58	4.36
23	1.83	1.80	1.82	.....	5.70	3.80	3.26	3.72	1.70	3.02	1.56	3.78
24	1.76	1.78	2.08	.....	5.09	3.70	3.20	3.66	1.76	4.46	1.52	3.49
25	1.75	1.70	2.38	.....	5.06	3.84	3.10	3.66	2.19	3.31	1.50	3.26
26	1.76	1.78	2.45	.....	9.78	3.52	4.46	3.24	2.22	2.90	1.72	3.11
27	1.70	1.76	2.36	.....	6.46	3.29	6.63	3.18	1.86	2.88	3.28	2.97
28	1.63	1.84	2.25	.....	5.59	3.19	6.39	3.18	2.20	2.40	3.65	2.81
29	1.67	1.85	1.66	.....	.....	3.06	7.92	2.97	2.12	3.66	4.00	2.73
30	5.36	1.86	2.07	.....	.....	2.98	6.06	2.92	2.13	4.72	4.16	2.58
31	4.46	.....	2.23	.....	.....	2.95	.....	2.90	.....	3.92	6.39	.....

NOTE.—Gage not read Dec. 10–17, Jan. 4–5, 12–31, and Feb. 1–8.

WHITEWATER RIVER AT BROOKVILLE, IND.

LOCATION.—At two-span steel highway bridge three-fourths mile south of Brookville, Franklin County, and 2,000 feet below junction of East and West forks of Whitewater River.

DRAINAGE AREA.—1,180 square miles.

RECORDS AVAILABLE.—June 8, 1915, to September 30, 1918.

GAGE.—Chain gage fastened to downstream side of bridge; read by H. Koemer and Raymond Logan.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Control about 500 feet below gage is probably permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 9.53 feet at 7 a. m. May 13; minimum stage, 0.94 foot at 6 p. m. August 24.

1915–1918: Maximum stage recorded, 17.18 feet January 31, 1916 (discharge, about 54,000 second-feet); minimum stage, 0.94 foot at 6 p. m. August 24, 1918.

REGULATION.—Flow regulated to some extent by the Thompson-Norris strawboard mill at Brookville. Water is diverted from the West Fork about 10 miles above station and flows down the old Whitewater canal to the mill and is returned to the river a few hundred feet above junction of the East and West forks.

ACCURACY.—Stage-discharge relation practically permanent; probably affected by ice during part of December and January. Gage read to hundredths twice daily.

COOPERATION.—Gage-height record furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily gage height, in feet, of Whitewater River at Brookville, Ind., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.23	2.13	1.32	1.31	1.41	3.54	1.84	2.88	1.67	2.21	1.28	1.82
2	1.23	1.82	1.29	1.29	1.34	3.56	2.09	2.62	1.62	1.73	1.25	1.54
3	1.19	1.69	1.29	1.27	1.37	2.97	3.15	2.43	1.57	1.54	1.17	1.43
4	1.21	1.61	1.24	1.29	1.35	3.44	2.54	2.33	1.57	1.44	1.16	1.84
5	1.23	1.56	1.27	1.31	1.49	4.07	2.61	2.22	1.82	1.38	1.12	2.17
6	1.24	1.53	1.27	3.39	1.47	4.22	2.39	2.08	2.11	1.36	1.10	1.97
7	1.21	1.49	1.28	3.33	1.48	2.87	2.27	2.49	1.87	1.32	1.08	1.62
8	1.17	1.51	1.25	2.26	1.78	2.48	2.12	2.34	1.74	1.28	1.04	1.50
9	1.19	1.47	1.29	2.00	5.52	2.54	2.00	2.14	1.61	1.24	1.12	1.43
10	1.15	1.46	1.25	1.92	4.27	2.67	1.96	2.06	1.53	1.23	1.03	1.35
11	1.19	1.45	1.23	1.80	5.52	2.55	2.00	2.08	1.62	1 22	1.06	1.31
12	1.21	1.41	1.23	1.52	7.12	2.67	2.02	6.93	1.63	1.26	1.12	4.05
13	1.21	1.28	1.17	1.48	6.32	4.48	1.93	8.18	1.49	1.20	1.08	2.10
14	1.22	1.25	1.17	1.59	4.27	4.22	1.79	4.58	1.44	1.12	1.14	1.72
15	1.19	1.25	1.21	1.63	6.32	3.18	1.76	3.65	1.42	1.23	1.35	1.55
16	1.21	1.33	1.25	1.61	4.77	2.86	1.76	2.98	1.40	1.19	1.38	3.86
17	1.15	1.35	1.23	1.54	2.52	2.60	3.49	2.86	1.40	1.31	1.15	3.19
18	1.23	1.34	1.23	1.42	2.66	2.40	3.89	2.65	1.34	1.34	1.17	2.46
19	1.76	1.30	1.24	1.49	2.58	2.40	2.70	2.52	1 35	1.28	1.18	3.80
20	1.68	1.32	1.29	1.56	6.12	2.26	2.48	2.45	1.33	1.22	1.08	3.03
21	1.51	1.29	1.60	1.45	3.56	2.18	3.75	2.30	1.29	1.16	1.02	2.36
22	1.41	1.27	1.49	1.46	2.46	2.12	3.19	2.19	1.29	1.37	1.03	2.13
23	1.32	1.29	1.72	1.47	2.46	2.15	2.85	2.18	1.24	1.69	1.08	1.91
24	1.33	1.32	1.73	1.56	2.49	2.17	2.77	2.08	1.30	1.50	.98	1.75
25	1.33	1.29	1.74	1.45	3.60	2.35	2.64	1.99	1.66	1.47	1.01	1.68
26	1.30	1.28	1.68	1.51	3.97	2.16	2.68	1.92	1.71	1.57	1.86	1.62
27	1.27	1.23	1.65	1.43	3.68	2.12	4.28	1.89	1.49	1.97	1.40	1.49
28	1.29	1.26	1.78	1.52	2.84	1.94	4.51	1.80	2.42	2.00	2.58	1.52
29	3.18	1.37	1.62	1.54	.....	1.87	4.08	1.74	2.05	1.75	1.87	1.45
30	3.40	1.34	1.29	1.53	.....	1.86	3.31	1.81	1.81	1.78	3.38	1.41
31	2.36	.....	1.33	1.47	.....	1.84	.....	1.77	.....	1.42	2.59	.....

KENTUCKY RIVER BASIN.

DIX RIVER NEAR BURGIN, KY.

LOCATION.—At covered wooden highway bridge on Burgin and Buena Vista pike, 3¾ miles due east of Burgin, Mercer County. Kennedy's mill is a quarter of a mile above station.

DRAINAGE AREA.—395 square miles (86 per cent measured on topographic maps and 14 per cent on map of Kentucky, compiled by United States Geological Survey; scale, 1:500,000).

RECORDS AVAILABLE.—July 2, 1910, to July 16, 1911; October 1, 1911, to September 30, 1918.

GAGE.—Staff gage attached to right upstream wing wall of bridge near face of abutment; read by Frank Martin. Soundings taken at the measuring section indicate that the zero of the gage as replaced by the observer on February 15, 1913, is approximately 0.2 foot below zero of gage installed when station was established. Gage readings subsequent to February 15, 1913, refer to a datum which is about 0.2 foot below datum of original gage.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge, from a boat, or by wading.

CHANNEL AND CONTROL.—Probably permanent except during extreme floods. At stages above low water the growth of foliage on trees and brush at the control may affect the stage-discharge relation to a small extent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 19.0 feet at 5 p. m. January 28 (discharge, 14,500 second-feet); minimum stage recorded, 2.60 feet at 6 a. m. June 19 (discharge, 0.8 second-foot).

1910–1918: Maximum stage about 30 feet; date unknown. Minimum stage same as for 1918.

ICE.—Ice forms only during severe winters.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice during the year. Rating table well defined up to 455 second-feet and fairly well defined between 455 and 12,000 second-feet, above 12,000 second-feet, curve is an extension. Gage read twice daily to quarter-tenths. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

The following discharge measurement was made by Hopkins and Kidwell:

June 11, 1918: Gage height, 3.14 feet; discharge, 12.9 second-feet.

Daily discharge, in second-feet, of Dix River near Burgin, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	85	318	49	374	1,150	374	100	190	36	92	44	4.5
2	54	190	66	345	735	331	116	133	25	75	38	4.5
3	47	142	75	305	608	244	133	116	23	40	29	2.6
4	27	108	66	331	875	280	1,530	100	17	22	14	2.6
5	17	88	54	331	438	529	875	40	16	14	12	3.6
6	11	75	49	359	438	875	389	49	11	7.4	7.4	3.6
7	9.0	65	47	3,600	875	825	305	62	22	4.5	8.2	3.6
8	14	58	49	1,400	2,170	389	233	54	22	7.4	14	3.6
9	9.4	53	44	691	3,310	374	455	44	14	23	14	3.6
10	9.4	47	40	421	2,590	318	359	33	11	40	9.4	3.6
11	11	44	36	389	1,600	268	211	116	11	22	6.0	3.6
12	9.4	40	31	455	1,090	292	211	151	11	18	4.5	3.6
13	7.4	40	38	1,090	1,030	331	190	305	9.4	11	4.1	3.6
14	7.8	36	42	1,150	735	331	151	2,590	8.2	6.0	3.0	3.6
15	12	36	38	1,940	691	305	142	1,150	6.8	3.6	3.6	3.6
16	14	36	31	4,500	735	244	116	331	5.1	2.6	3.6	3.6
17	16	36	36	3,220	491	211	124	280	3.0	3.6	7.4	3.6
18	23	33	42	1,660	389	180	100	160	1.5	1.5	4.5	3.6
19	318	31	47	875	359	170	97	160	1.4	1.5	5.1	3.6
20	405	28	78	649	3,220	151	78	222	1.5	2.0	4.1	3.6
21	256	27	133	825	3,800	151	649	244	2.6	2.0	3.0	3.6
22	180	25	151	730	1,270	151	1,030	389	2.6	4.5	2.4	3.6
23	116	23	389	635	780	151	405	280	2.6	7.4	1.5	3.6
24	82	20	389	545	649	151	280	190	2.6	75	2.0	3.6
25	62	17	491	455	491	190	268	133	4.5	491	2.0	3.6
26	51	16	875	608	529	389	233	108	7.4	359	1.7	3.6
27	47	16	608	5,490	608	318	405	78	7.4	305	2.4	3.6
28	44	20	491	12,700	455	211	374	66	14	66	3.6	3.6
29	42	27	345	10,300	.....	190	268	54	25	70	2.6	3.6
30	491	44	318	2,420	.....	151	233	47	14	62	5.1	3.6
31	649	.....	374	1,800	.....	116	.....	40	.....	49	8.2	.....

NOTE—Gage not read Jan. 22-24; discharge interpolated.

Monthly discharge of Dix River near Burgin, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 395 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	649	7.4	101	0.256	0.30
November	318	16	58	.147	.16
December	875	31	178	.451	.52
January	12,700	305	1,950	4.94	5.70
February	3,800	359	1,150	2.91	3.03
March	875	116	296	.749	.86
April	1,530	78	335	.848	.95
May	2,590	33	255	.646	.74
June	36	1.4	11.3	.029	.03
July	491	1.5	60.9	.154	.18
August	44	1.5	8.72	.022	.03
September	4.5	2.6	3.59	.0091	.01
The year	12,700	1.4	364	.922	12.51

ELKHORN CREEK AT FORKS OF ELKHORN, KY.

LOCATION.—At footbridge at Forks of Elkhorn, Franklin County, three-fourths mile below forks of stream and 5 miles northeast of Frankfort.

DRAINAGE AREA.—415 square miles (measured by United States Engineer Corps).

RECORDS AVAILABLE.—April 26, 1915, to September 30, 1918.

GAGE.—Vertical staff in two sections on left bank; section reading 0 to 5 feet attached to elm tree 40 feet below bridge, other section attached to sycamore tree about 20 feet below bridge; read by L. I. McDaniel.

DISCHARGE MEASUREMENTS.—Made from footbridge.

CHANNEL AND CONTROL.—Bed of stream loose stone and bedrock; probably permanent. Control short distance below gage, composed of solid rock and boulders; permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.7 feet at 6 p. m. February 9 (discharge, 8,730 second-feet); minimum stage, 0.2 foot for long periods (discharge, 49 second-feet).

ICE.—Stage-discharge relation probably not affected by ice except during severe winters.

ACCURACY.—Stage-discharge relation probably permanent; not affected by ice during year. Rating curve well defined, 65 to 18,000 second-feet and fairly well defined at other stages. Gage read to tenths twice daily; record only fair. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

COOPERATION.—Base data furnished by United States Engineer Corps.

No discharge measurements were made at this station during the year.

Daily discharge, in second-feet, of Elkhorn Creek at Forks of Elkhorn, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	49	49	49	135	455	266	135	86	109	128	109	81
2	49	49	49	135	335	222	135	86	109	103	86	66
3	49	49	49	135	335	213	164	86	109	81	81	97
4	49	49	49	135	335	213	149	86	109	76	66	109
5	49	49	49	149	335	213	135	86	109	76	66	109
6	49	49	49	370	335	213	135	86	109	76	66	109
7	49	49	49	455	1,540	232	135	86	135	76	66	86
8	49	49	49	570	6,000	213	135	86	135	109	57	71
9	49	49	49	278	8,190	204	135	86	135	97	49	66
10	49	49	49	180	6,000	172	135	86	97	76	49	66
11	49	49	49	164	2,980	156	135	142	86	76	49	66
12	49	49	49	164	2,420	149	135	1,800	86	76	49	66
13	49	49	49	164	2,060	910	135	1,710	86	76	49	66
14	49	49	49	164	1,220	910	135	1,540	81	66	49	66
15	49	49	49	196	1,540	320	128	765	66	66	49	66
16	49	49	49	455	1,060	232	109	455	66	57	49	49
17	49	49	49	570	695	180	97	266	62	49	49	49
18	49	49	49	370	455	135	86	222	53	49	49	49
19	49	49	49	335	1,220	135	86	149	49	97	49	49
20	49	49	49	335	3,920	135	109	135	49	62	49	49
21	49	49	86	335	2,420	135	180	1,970	49	49	49	49
22	49	49	97	335	1,460	135	122	1,620	49	49	49	49
23	49	49	109	213	835	135	86	730	49	49	49	49
24	49	49	109	196	600	135	86	305	49	86	49	49
25	49	49	135	180	540	135	86	232	180	122	49	49
26	49	49	135	180	370	135	109	172	149	122	49	49
27	49	49	135	335	335	135	86	135	128	116	49	49
28	49	49	135	1,140	305	135	86	135	103	109	49	49
29	49	49	135	1,970	.....	135	86	135	86	122	49	49
30	49	49	135	1,380	.....	135	86	135	122	232	57	49
31	49	.....	135	835	.....	135	.....	135	.....	149	97	.....

Monthly discharge of Elkhorn Creek at Forks of Elkhorn, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 415 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	49	49	49	0.118	0.14
November	49	49	49	.118	.13
December	135	49	75	.181	.21
January	1,970	135	405	.976	1.13
February	8,190	305	1,720	4.14	4.31
March	910	135	223	.537	.62
April	180	86	119	.287	.32
May	1,970	86	443	1.07	1.23
June	180	49	93.5	.225	.25
July	232	49	89.6	.216	.25
August	109	49	57.4	.138	.16
September	109	49	64.2	.155	.17
The year	8,190	49	273	.658	8.92

EAGLE CREEK AT GLENCOE, KY.

LOCATION.—At county highway bridge half a mile south of Glencoe, Gallatin County.

DRAINAGE AREA.—445 square miles (United States Engineer Corps).

RECORDS AVAILABLE.—April 29, 1915, to September 30, 1918.

GAGE.—Vertical staff attached to upstream side of first pier from left abutment of bridge; read by Athaleen Connelly and Elphia Connelly.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Bed of stream sand and loose stone; probably permanent. Small island covered with trees about 250 feet below bridge. Point of control not determined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 17.0 feet at 5 p. m. February 9 (discharge, 17,600 second-feet); minimum stage, 0.1 foot October 3–11 and 14–18 (discharge, 1 second-foot).

ICE.—Stage-discharge relation probably not affected by ice except in very cold winters.

ACCURACY—Stage-discharge relation probably permanent; probably not seriously affected by ice during year. Rating curve fairly well defined below 15,000 second-feet, extended above this limit. Gage read twice daily to tenths. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair except those for December and January which may be too large because stage-discharge relation may have been affected by ice.

COOPERATION.—Gage-height record furnished by United States Engineer Corps.

The following discharge measurement was made by Hopkins and Kidwell:

June 21, 1918: Gage height, 0.61 foot; discharge, 5.2 second-feet.

Daily discharge, in second-feet, of Eagle Creek at Glencoe, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2	87	2	30	155	260	113	183	69	225	260	314
2	2	46	12	30	155	193	100	155	81	120	193	155
3	1	40	46	30	155	173	2,010	140	87	69	126	148
4	1	14	40	30	155	155	1,200	126	51	51	81	488
5	1	9	30	30	155	204	345	126	35	35	57	314
6	1	6	21	1,920	155	193	225	113	30	30	40	362
7	1	5	14	4,390	1,200	173	173	100	51	30	35	204
8	1	5	14	695	4,740	155	155	100	133	30	21	113
9	1	5	14	286	14,400	155	148	94	248	18	14	81
10	1	4	14	155	2,580	133	133	87	164	14	9	57
11	1	4	14	155	330	113	126	94	120	14	6	51
12	2	4	14	155	1,500	113	126	1,280	81	12	6	51
13	2	4	14	155	1,500	2,010	113	5,200	57	14	21	113
14	1	3	14	155	204	6,020	113	2,190	35	8	12	214
15	1	3	14	155	155	870	100	488	30	6	9	140
16	1	3	14	155	155	362	87	314	26	6	9	106
17	1	2	14	155	155	248	193	225	21	6	6	63
18	1	2	14	155	155	204	148	214	14	5	6	51
19	4	2	14	155	236	183	106	173	14	5	6	51
20	3	2	14	155	7,150	164	87	173	9	5	5	40
21	6	2	14	155	1,130	155	810	173	6	5	5	40
22	4	2	645	155	400	140	555	300	6	5	5	30
23	6	2	420	155	273	140	260	248	6	5	4	21
24	6	2	420	155	248	140	193	183	6	21	4	14
25	4	2	420	155	214	330	1,660	155	8	8	4	14
26	4	2	420	155	930	248	750	120	100	6	4	9
27	3	2	420	155	600	183	1,200	106	286	345	8	6
28	3	2	420	155	314	155	465	81	183	204	133	5
29	2	2	420	155	.....	133	300	75	300	120	126	5
30	286	2	420	155	.....	126	248	57	204	2,980	46	5
31	155	.....	420	155	.....	126	.....	46	.....	810	695	.....

NOTE.—Gage washed out Dec. 23 to Jan. 1; discharge estimated from weather records and comparison with records for other streams.

Monthly discharge of Eagle Creek at Glencoe, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 445 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	286	1	16.4	0.037	0.04
November	87	2	9.0	.020	.02
December	.....	2	154	.346	.40
January	4,390	30	350	.787	.91
February	14,400	155	1,410	3.17	3.30
March	6,020	113	450	1.01	1.16
April	2,010	87	408	.917	1.02
May	5,200	46	423	.951	1.10
June	300	6	82	.184	.21
July	2,980	5	168	.378	.44
August	695	4	63.1	.142	.16
September	488	5	109	.245	.27
The year	14,400	1	296	.665	9.03

GREEN RIVER BASIN.

GREEN RIVER AT MUNFORDVILLE, KY.

LOCATION.—At toll highway bridge at Munfordville, Hart County, 1 mile above Louisville & Nashville Railroad bridge.

DRAINAGE AREA.—1,790 square miles (measured on map of Kentucky compiled by United States Geological Survey; scale, 1:500,000).

RECORDS AVAILABLE.—February 27, 1915, to September 30, 1918.

GAGE.—Chain gage attached to upstream handrail of bridge; read by Chester Williams.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading 100 feet below the bridge.

CHANNEL AND CONTROL.—The control for low stages is at a riffle used as a ford immediately below the bridge and is believed to be permanent; control at high stages is also believed to be permanent. Discharge relation may be affected to some extent at high stages by differences in the foliage on the brush and trees in the flood plain.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 33.04 feet at 5.25 a. m. January 31 (discharge, 28,500 second-feet); minimum stage, 2.65 feet at 5.30 a. m. July 18 (discharge, 72 second-feet).

1915–1918: Maximum stage recorded, 44.48 feet at 5.20 a. m. December 18, 1915 (discharge, 42,400 second-feet); minimum stage, that of July 18, 1918.

Highest known stage about 54 feet; date unknown.

ICE.—Ice seldom forms at this station.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice during parts of December and January. Rating curve well defined below and fairly well defined above 1,700 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Station maintained in cooperation with the Kentucky Geological Survey, J. B. Hoeing, State geologist.

Discharge measurements of Green River at Munfordville, Ky., during the year ending Sept. 30 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 13	B. L. Hopkins	4.31	1,250
June 19	Hopkins and Kidwell	2.99	204

Daily discharge, in second-feet, of Green River at Munfordville, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	490	1,800	358	800	15,700	2,180	788	1,200	475	397	712	230
2	429	1,200	365	700	5,400	1,880	1,580	975	445	305	638	312
3	365	975	397	700	4,050	1,880	6,960	712	712	230	413	275
4	298	788	365	700	3,150	1,880	7,800	638	1,120	245	328	320
5	260	712	365	700	2,250	2,250	5,320	825	638	230	320	445
6	238	675	350	800	2,320	4,120	3,080	788	592	208	305	675
7	215	638	350	3,380	3,220	4,950	2,480	712	675	136	189	568
8	202	512	350	5,880	5,880	3,520	1,950	600	825	95	176	429
9	189	468	335	5,400	8,140	3,150	1,580	675	560	189	176	365
10	189	437	298	3,300	8,740	2,180	1,200	1,120	482	290	176	290
11	208	421	275	1,950	7,720	2,020	1,280	2,250	405	222	176	268
12	290	421	270	1,900	5,250	1,950	1,200	2,020	268	156	170	215
13	358	389	270	1,900	4,280	1,580	1,050	2,780	252	128	136	156
14	320	373	270	2,250	3,750	1,420	975	4,420	290	141	136	136
15	275	358	270	2,920	3,220	1,280	938	6,620	268	170	136	136
16	282	350	260	5,960	2,700	1,120	1,200	4,280	238	150	132	123
17	413	342	260	6,440	2,480	1,050	975	2,180	202	141	150	176
18	305	320	260	6,530	2,180	1,280	1,050	1,280	202	132	170	222
19	245	312	270	4,500	1,950	1,050	1,280	1,280	189	132	429	128
20	260	312	280	2,780	7,040	938	1,880	1,580	170	132	675	123
21	268	298	300	2,180	13,000	938	2,400	2,020	170	132	275	102
22	938	298	500	1,720	14,900	938	3,450	3,220	170	132	230	90
23	373	298	700	1,580	7,550	900	2,480	4,500	170	132	196	90
24	335	282	1,050	1,580	4,580	1,050	1,880	2,020	170	132	202	90
25	320	268	1,580	1,500	3,520	1,420	1,650	2,020	170	320	141	90
26	328	268	2,400	1,500	2,850	1,500	1,720	1,880	429	552	141	82
27	328	252	2,700	7,640	2,700	1,350	2,020	1,050	712	1,500	150	90
28	358	260	2,320	16,700	2,480	1,200	1,880	825	397	2,850	150	90
29	900	320	1,420	25,400	.....	1,120	1,500	788	475	1,500	105	90
30	1,050	335	1,050	27,900	.....	938	1,350	592	712	3,000	141	90
31	1,580	.....	900	27,900	.....	862	.....	512	.....	1,500	100	.....

NOTE.—Discharge Dec. 12–13, 31, Jan. 1–6, and 13, estimated because of ice effect.

Monthly discharge of Green River at Munfordville, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 1,790 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,580	189	407	0.227	0.26
November	1,800	252	489	.273	.30
December	2,700	260	682	.381	.44
January	27,900	700	5,650	3.16	3.64
February	15,700	1,950	5,400	3.02	3.14
March	4,950	862	1,740	.972	1.12
April	7,800	788	2,160	1.21	1.35
May	6,620	512	1,820	1.02	1.18
June	1,120	170	419	.234	.26
July	3,000	95	503	.281	.32
August	712	100	244	.136	.16
September	675	82	217	.121	.14
The year	27,900	82	1,620	.905	12.31

WABASH RIVER BASIN.

VERMILION RIVER NEAR DANVILLE, ILL.

LOCATION.—In sec. 22, T. 19 N., R. 11 W., at Chicago & Eastern Illinois Railroad bridge 3 miles south of Danville, Vermilion County, 1¾ miles above Stony Creek, and 3 miles below mouth of North Fork.

DRAINAGE AREA.—1,280 square miles.

RECORDS AVAILABLE.—November 12, 1914, to September 30, 1918.

GAGE.—Chain gage attached to downstream side of bridge; read by William Taylor.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Soft mud and sand; may shift.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.0 feet at 6 a. m. April 27 (discharge, 5,920 second-feet); minimum stage recorded, 2.21 feet October 17 (discharge, 26 second-feet).

1915–1918: Maximum stage recorded, 18.9 feet January 31, 1916 (discharge, 12,800 second-feet); minimum stage recorded, 2.00 feet November 20 and 23 to 25, 1915 (discharge, 15 second-feet).

ACCURACY.—Stage-discharge relation assumed to have changed February 13; affected by ice December 7 to February 13. Rating curves used prior and subsequent to February 13 fairly well defined above 50 second-feet. Gage read to hundredths once daily; readings somewhat unreliable. Daily discharge ascertained by applying daily gage height to rating table except for period of ice effect. Records fair except for very low stages and period of ice effect, for which they are poor.

Discharge measurements of Vermilion River near Danville, Ill., during the year ending Sept. 30, 1918.

[Made by H. C. Beckman.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 20	2.60	86	June 26	3.50	421
20	2.60	92	Aug. 30	2.47	69

Daily discharge, in second-feet, of Vermilion River near Danville, Ill., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	52	373	71			1,530	98	4,480	720	1,160	94	.....
2	43	329	71			1,380	126	4,000	669	1,460	81	.....
3	37	250	69			1,300	152	3,520	619	1,530	73	.....
4	36	216	66			1,230	179	2,880	594	1,600	63	430
5	35	179	64			1,160	201	2,580	570	1,380	53	669
6	32	154	62	35		1,100	216	2,430	546	1,300	47	876
7	31	144			230	1,040	302	2,360	669	1,230	44	1,160
8	30	134				985	343	2,280	771	1,230	42	985
9	30	125				930	408	2,200	876	1,380	39	771
10	35	118				876	430	2,130	930	1,460	36	644
11	37	116				823	475	2,130	985	1,530	.....	475
12	33	107				771	498	2,060	930	1,380	.....	302
13	31	98				720	522	2,130	876	1,300	.....	235
14	30	92	65		2,660	644	570	2,280	771	1,230	.....	186
15	29	88			2,640	594	594	2,430	594	1,160	.....	179
16	27	84			2,620	546	619	2,500	570	1,040	.....	172
17	26	80			2,600	522	669	2,660	522	985	.....	152
18	32	78			2,580	498	930	2,730	475	876	.....	152
19	54	77			2,500	475	1,100	2,730	430	823	.....	149
20	62	75			2,430	475	1,230	2,500	386	720	.....	146
21	66	73		30	2,360	452	1,530	2,360	322	619	.....	146
22	71	71			2,360	430	1,980	2,280	282	498	.....	152
23	62	73			2,280	430	2,730	2,130	322	386	.....	159
24	52	78			2,200	386	3,360	1,900	386	322	.....	166
25	48	82			2,130	343	4,720	1,680	452	262	.....	172
26	59	86	55		2,060	322	5,280	1,530	546	216	.....	179
27	71	84			1,980	282	5,920	1,380	594	172	.....	186
28	114	80			1,830	246	5,600	1,230	771	152	.....	193
29	269	77			.....	223	5,120	1,040	876	140	.....	160
30	396	73			.....	186	4,880	985	1,040	123	.....	126
31	418	.....			.....	81	.....	876	.....	108	.....	.....

NOTE.—Discharge interpolated Feb. 15–17, Mar. 10, and Sept. 29, because of no gage-height record; discharge, Dec. 7 to Feb. 13, estimated because of ice, from gage heights, observer's notes, and weather records. Braced figures show mean discharge for periods indicated.

Monthly discharge of Vermilion River near Danville, Ill., for the year ending Sept. 30, 1918.

[Drainage area, 1,280 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	418	26	75.7	0.059	0.07
November	373	71	123	.096	.11
December	.....	.....	61.9	.048	.06
January	.....	.....	31.6	.025	.03
February	2,660	.....	1,360	1.06	1.10
March	1,530	81	677	.529	.61
April	5,920	98	1,690	1.32	1.47
May	4,480	876	2,270	1.77	2.04
June	1,040	282	636	.497	.55
July	1,600	108	896	.700	.81
August 1–10	94	36	57.2	.045	.02
September 4–30	1,160	126	345	.270	.27

EMBARRASS RIVER AT STE. MARIE, ILL.

LOCATION.—In sec. 30, T. 6 N., R. 14 W., at highway bridge at north end of Main Street, Ste. Marie, Jasper County, 450 feet downstream from Cincinnati, Indianapolis & Western Railroad bridge and 2½ miles upstream from mouth of Hickory (or North Fork) Creek.

DRAINAGE AREA.—1,540 square miles.

RECORDS AVAILABLE.—October 20, 1909, to December 31, 1912; August 24, 1914, to September 30, 1918.

GAGE.—Chain gage attached to bridge; read by V. C. Wuerth.

DISCHARGE MEASUREMENTS.—Made from downstream side of highway bridge at ordinary stages; during high water made also from downstream side of five wooden trestles on Cincinnati, Indianapolis & Western Railroad bridge, northwest of highway bridge.

CHANNEL AND CONTROL.—Measuring section is at a pool; control is about 1,800 feet below gage; may shift.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 18.6 feet February 14 and April 30 at 4 p. m. (discharge, 7,240 second-feet); minimum stage recorded, 1.97 feet October 15 to 17 (discharge, 55 second-feet).

1909–1912; 1914–1918: Maximum stage recorded 21.2 feet June 6, 1917 (discharge, 14,000 second-feet); minimum stage recorded, 1.1 feet September 5 to 9 and October 19, 1914 (discharge, 1 second-foot).

Flood of spring of 1908 reached a height of 22.5 feet on the present gage.

ACCURACY.—Stage-discharge relation changed during high water in February; seriously affected by ice December 6 to February 12. Rating curve used to February 13 fairly well defined; curve used after that date fairly well defined between 102 and 5,030 second-feet; above 5,030 second-feet it is based on an extension of curve for main river channel and estimated overflow. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table except for period of ice effect. Open-water records good, except for very high stages and for extremely low stages in August, for which they are fair; records for period of ice effect, poor.

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Discharge measurements of Embarrass River at Ste. Marie, Ill., during the year ending Sept. 30, 1918.

[Made by H. C. Beckman.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 10	2.05	63
June 24	2.62	143
Aug. 29	2.82	188

Daily discharge, in second-feet, of Embarrass River at Ste. Marie, Ill., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	91	1,060	136			1,530	386	6,780	365	2,860	238	1,500
2	91	1,060	136			2,740	365	6,040	642	2,740	220	344
3	91	1,030	136			2,300	365	5,440	692	3,100	211	742
4	85	780	130			2,100	344	4,560	545	2,060	194	817
5	79	661	124			1,900	894	3,180	498	1,820	365	4,740
6	73	554		270		1,700	1,100	2,380	452	1,640	169	5,510
7	67	458			1,550	950	868	1,980	430	1,010	161	3,810
8	65	422				842	817	1,820	692	3,580	145	2,180
9	62	369				792	742	1,940	452	5,650	145	1,670
10	60	335				717	667	2,100	408	6,220	138	1,280
11	57	335				617	593	2,020	365	5,300	130	980
12	57	335				545	521	4,260	365	3,860	123	2,260
13	55	287	70		6,580	545	521	6,220	324	3,060	109	1,670
14	55	272			7,240	545	475	5,230	285	1,820	102	692
15	55	257			6,680	521	452	4,410	285	1,320	96	498
16	55	242		150	6,130	521	408	3,180	238	1,100	116	521
17	55	227			5,880	521	1,280	3,020	220	894	96	2,820
18	57	212			4,110	521	3,340	2,580	202	792	89	2,820
19	73	212			2,780	475	2,740	2,780	194	767	81	2,020
20	85	212			2,140	452	3,220	2,540	186	717	498	3,020
21	110	198			1,980	430	5,750	1,940	177	642	408	1,900
22	257	184			1,530	408	6,220	1,530	169	521	211	1,320
23	335	184			1,280	386	5,720	1,280	153	452	123	792
24	212	184			1,280	365	5,040	1,160	145	452	96	667
25	184	177			1,160	365	4,620	1,070	920	408	177	545
26	184	170	225	55	1,070	408	4,560	980	3,810	365	169	521
27	170	170			980	452	4,980	868	2,820	344	194	408
28	184	156			920	430	5,440	667	1,600	304	169	386
29	257	150			.....	365	6,680	593	3,060	304	116	365
30	955	143			.....	344	7,240	452	4,460	304	123	324
31	805	.....			.....	324	.....	452	.....	247	2,180	.....

NOTE.—Discharge, Dec. 6 to Feb. 12, estimated because of ice, from gage heights, observer's notes, and weather records. Braced figures show mean discharge for periods indicated.

Monthly discharge of Embarrass River at Ste. Marie, Ill., for the year ending Sept. 30, 1918.

[Drainage area, 1,540 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	955	55	162	0.105	0.12
November	1,060	143	368	.239	.27
December	.....	.....	135	.088	.10
January	.....	.....	155	.101	.12
February	7,240	.....	2,510	1.63	1.70
March	2,740	324	810	.526	.61
April	7,240	344	2,540	1.65	1.84
May	6,780	452	2,690	1.75	2.02
June	4,460	145	838	.544	.61
July	6,220	247	1,760	1.14	1.31
August	2,180	81	238	.155	.18
September	5,510	324	1,570	1.02	1.14
The year	7,240	55	1,140	.740	10.02

WEST BRANCH OF WHITE RIVER NEAR NOBLESVILLE, IND.

LOCATION.—In sec. 16, T. 19 N., R. 5 E. second principal meridian, at steel highway bridge known as Conners Bridge, 4½ miles northeast of Noblesville, Hamilton County.

DRAINAGE AREA.—900 square miles (measured on map compiled by United States Geological Survey; scale, 1 : 500,000).

RECORDS AVAILABLE.—May 13, 1915, to September 30, 1918.

GAGE.—Chain gage attached to upstream side of bridge; read by Marvin Scearce.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Coarse sand and gravel, strewn with boulders; probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of records, 15.0 feet at 7 a. m. February 1, 1916 (discharge, 18,700 second-feet); minimum stage, 1.08 feet at 5 p. m. August 15, 1918 (discharge, 85 second-feet).

During the flood of March, 1913, the water reached a stage of about 21.5 feet on the present gage (discharge not known).

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation practically permanent, except for periods of ice effect and from July 8 to August 31, 1915, when there probably was backwater from obstructions. Rating curve used July 8 to August 31, 1915, poorly defined; curve used for remainder of time well defined between 290 and 11,000 second-feet and fairly well defined beyond these limits. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating tables, except for periods of ice effect and periods when gage was not read. Records good except for periods of ice effect and for July 8 to August 31, 1915, for which they are poor.

COOPERATION.—Gage-height record furnished by Noblesville Heat, Light & Power Co., Noblesville, Ind.

Discharge measurements of West Branch of White River near Noblesville, Ind., during the year ending Sept. 30, 1918.

[Made by H. C. Beckman.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 15	3 37	1,020	June 21	1.47	148
16	2.92	743	July 2	1.73	215
17	2.62	589			

Daily discharge, in second-feet, of West Branch of White River near Noblesville, Ind., for the years ending Sept. 30, 1915–1918.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept
1915.						1915.					
1	.....	1,560	273	345	414	16	330	1,900	1,650	971	239
2	.....	1,480	291	312	392	17	506	1,080	2,660	693	223
3	.....	1,640	255	345	350	18	350	734	2,260	650	239
4	.....	1,320	273	2,460	330	19	273	612	1,420	527	436
5	.....	940	291	3,080	330	20	255	584	1,730	527	371
6	.....	734	273	1,080	330	21	291	532	1,280	1,730	310
7	.....	642	255	875	330	22	310	459	1,020	2,860	273
8	.....	800	2,860	737	310	23	330	371	828	2,460	239
9	.....	1,010	4,810	450	291	24	273	310	875	1,570	209
10	.....	436	4,260	450	291	25	239	291	527	923	209
11	.....	532	1,730	608	273	26	255	273	450	828	209
12	.....	459	1,140	1,730	255	27	255	330	414	693	734
13	150	459	923	3,410	239	28	414	414	379	608	1,810
14	160	330	737	1,980	239	29	2,170	310	379	527	1,160
15	150	2,080	1,140	1,020	239	30	1,990	273	414	450	702
						31	1,900	.....	379	414	.....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915-16.												
1	612	291	506	1,720	17,700	642	1,720	584	557	459	150	160
2	557	273	482	10,300	10,500	584	1,240	532	506	1,010	150	150
3	557	255	459	15,700	3,300	584	1,160	557	482	1,010	141	141
4	482	239	436	10,500	1,810	459	1,160	767	557	940	160	141
5	414	239	414	4,330	1,640	459	940	870	671	905	195	141
6	392	255	371	4,210	1,640	612	940	734	767	835	209	150
7	350	239	350	2,560	1,160	940	905	905	2,360	273	195	239
8	310	239	350	1,640	1,080	1,320	767	1,010	3,190	255	183	171
9	330	223	350	1,560	940	940	671	2,260	1,990	255	255	171
10	273	223	330	1,400	506	870	642	1,900	1,720	239	291	150
11	255	223	330	1,560	557	800	642	1,240	1,480	239	330	150
12	239	310	350	3,080	584	734	612	905	1,160	239	392	132
13	239	330	371	6,090	1,320	642	584	702	905	223	273	124
14	414	330	310	5,790	940	702	532	870	835	273	209	132
15	940	310	414	1,990	940	702	506	734	940	350	195	124
16	940	291	350	1,240	1,160	642	482	671	870	273	183	124
17	734	255	506	940	1,010	642	459	557	835	223	171	132
18	800	310	1,560	1,810	1,240	584	459	482	835	223	506	124
19	1,720	2,080	1,560	3,740	1,160	584	459	436	870	239	330	124
20	1,240	2,970	1,080	4,450	940	557	459	392	734	223	209	124
21	1,010	2,260	532	3,740	870	557	532	392	2,170	371	171	115
22	940	1,560	800	2,760	800	584	642	459	2,760	532	160	115
23	734	1,240	584	2,560	940	940	671	767	2,560	273	532	115
24	506	1,010	506	1,900	1,320	1,240	612	642	1,560	223	506	115
25	459	835	584	1,320	1,400	1,320	557	459	671	209	414	124
26	414	702	1,560	1,240	1,400	1,160	532	414	734	183	255	124
27	371	642	1,080	1,320	940	4,090	584	392	767	183	414	132
28	350	612	1,080	2,170	870	5,220	734	371	642	150	255	150
29	310	612	1,080	2,860	734	4,830	734	459	557	160	239	141
30	310	506	1,080	8,120	.....	3,190	734	734	506	150	183	150
31	291	.....	612	16,300	.....	1,990	.....	905	.....	150	171	.....

Daily discharge, in second-feet, of West Branch of White River near Noblesville, Ind., for the years ending Sept. 30, 1915–1918—Continued.

Day.	Oct.	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1916–17.												
1	141	124	141	506		642	2,260	1,990	2,860	1,010	310	160
2	141	124	150	459		532	2,970	2,860	1,900	1,320	278	160
3	141	124	150	414		506	1,900	2,860	1,320	940	247	160
4	132	124	141	436		532	2,460	3,080	1,160	557	215	160
5	132	124	150	642		532	2,660	3,300	1,640	371	183	160
					650							
6	124	124	150	4,830		482	4,090	3,970	2,460	392	183	150
7	124	124	150	4,570		414	4,960	2,170	3,080	414	183	150
8	124	115	150	2,760		371	3,740	1,810	1,900	414	171	273
9	115	132	141	1,560		584	2,170	1,640	1,640	436	171	160
10	115	124	141	1,240		940	1,240	1,320	3,080	482	150	160
11	115	115	150	1,080		1,010	1,160	1,240	2,970	482	171	160
12	115	132	310	905		2,660	1,010	1,160	1,990	436	160	160
13	115	141	1,080	702		4,450	835	1,010	1,320	459	160	160
14	124	132	584	532		8,760	702	905	1,240	532	160	160
15	124	132	459			7,480	671	671	940	2,080	171	160
					670							
16	124	132				3,740	642	612	800	1,900	171	160
17	124	124				1,990	557	584	734	1,560	160	141
18	124	132				1,900	642	557	612	1,560	150	124
19	132	612				1,640	1,080	506	557	905	150	124
20	150	612				1,010	1,720	482	506	642	141	124
21	150	612			2,970	1,320	1,480	506	532	557	141	124
22	150	835			2,660	1,320	1,320	642	482	436	150	132
23	141	3,080		630	1,010	1,400	1,080	1,160	459	371	141	132
24	141	1,900	390		671	2,460	1,480	1,010	459	330	150	141
25	141	1,240			612	2,660	1,990	800	436	310	141	132
26	132	124			557	1,990	2,560	702	436	612	141	132
27	124	132			835	2,260	2,970	1,640	905	506	141	132
28	132	132			800	2,360	2,260	2,080	2,080	436	132	132
29	124	124			.....	1,160	1,900	2,660	1,560	404	141	124
30	124	150			.....	1,240	1,480	3,080	1,240	373	150	124
31	124	.....			.....	1,010	.....	3,300	.....	341	160	.....
1917–18.												
1	124	940	150			557	532	1,010	371	223	141	160
2	124	734	557			557	1,900	800	255	195	132	132
3	124	532	490			702	2,660	671	239	171	124	124
4	124	506	424			1,240	2,660	557	239	171	115	150
5	124	482	357			584	1,640	506	223	160	108	940
				240	170							
6	124	436	291			642	1,240	436	209	150	108	584
7	124	350				734	940	414	223	141	100	330
8	124	255				940	734	392	291	132	94	209
9	124	223				1,240	584	350	273	132	94	160
10	124	209				1,010	532	350	223	132	100	150
11	124	195			8,600	1,010	506	330	436	124	100	160
12	124	209			5,360	1,320	459	392	436	124	94	183
13	124	209			6,690	2,360	436	436	291	124	94	506
14	124	195	250		4,700	3,740	392	1,640	239	115	94	255
15	124	183			3,410	3,300	350	1,010	209	115	87	209
				160								
16	124	171			2,560	2,070	350	734	183	124	94	209
17	124	171			1,990	835	734	584	171	132	108	506
18	183	171			1,320	835	870	506	160	150	115	702
19	835	160			905	835	1,010	459	160	141	108	506
20	800	160			800	734	767	436	150	132	100	436
21	584	160			1,080	612	940	392	150	124	94	350
22	310	160			1,320	557	1,080	392	141	115	183	273
23	209	160			734	482	1,080	414	141	115	141	239
24	195	150			734	482	800	414	132	132	115	209
25	209	150			702	482	642	506	141	115	115	195
26	209	150	280	130	702	532	532	532	141	115	100	183
27	209	150			671	506	767	532	141	124	100	160
28	223	150			612	482	2,260	482	255	115	100	150
29	642	150			.....	436	1,560	371	255	239	209	132
30	1,160	150			.....	436	1,160	459	239	291	371	141
31	1,160	.....			.....	371	.....	532	.....	171	209	.....

NOTE.—Discharge estimated Jan. 15–19, 1916, Dec. 16, 1916, to Jan. 3, 1917, Jan. 15 to Feb. 20, 1917, and Dec. 7, 1917, to Feb. 10, 1918, because of ice, from gage heights, observer's notes, and weather records; interpolated for July 29 to Aug. 4, Oct. 1–6, and Dec. 3–5, 1917, and Aug. 5, 1918, because of no gage-height record.
Braced figures show mean discharge for periods indicated.

Monthly discharge of West Branch of White River near Noblesville, Ind., for the years ending Sept. 30, 1915–1918.

[Drainage area, 900 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
1915.					
May 13–31	2,170	150	558	0.620	0.44
June	2,080	273	763	.848	.95
July	4,810	255	1,170	1.30	1.50
August	3,410	312	1,140	1.27	1.46
September	1,810	209	399	.443	.49
1915–16.					
October	1,720	239	564	.627	.72
November	2,970	223	662	.736	.82
December	1,560	310	657	.730	.84
January	16,300	940	4,160	4.62	5.33
February	17,700	506	2,050	2.28	2.46
March	5,220	459	1,260	1.40	1.61
April	1,720	459	722	.802	.89
May	2,260	371	745	.828	.95
June	3,190	482	1,170	1.30	1.45
July	1,010	150	364	.404	.47
August	532	141	259	.288	.33
September	239	115	140	.156	.17
The year	17,700	115	1,060	1.18	16.04
1916–17.					
October	150	115	130	.144	.17
November	3,080	115	394	.438	.49
December	1,080	141	332	.369	.43
January	4,830	414	1,010	1.12	1.29
February	2,970	.....	833	.926	.96
March	8,760	371	1,910	2.12	2.44
April	4,960	557	1,870	2.08	2.32
May	3,970	482	1,620	1.80	2.08
June	3,080	436	1,380	1.53	1.71
July	2,080	310	696	.773	.89
August	310	132	170	.189	.22
September	273	124	149	.166	.19
The year	8,760	115	874	.971	13.19
1917–18.					
October	1,160	124	291	.323	.37
November	940	150	267	.297	.33
December	557	150	285	.317	.37
January	.....	.....	175	.194	.22
February	8,600	.....	1,590	1.77	1.84
March	3,740	371	988	1.10	1.27
April	2,660	350	1,000	1.11	1.24
May	1,640	330	550	.611	.70
June	436	132	224	.249	.28
July	291	115	147	.163	.19
August	371	87	124	.138	.16
September	940	124	288	.320	.36
The year	8,600	87	486	.540	7.33

LITTLE WABASH RIVER AT WILCOX, ILL.

LOCATION.—In SW. ¼ sec. 3, T. 2 N., R. 8 E., at highway bridge at Wilcox, Clay County, 6 miles southeast of Clay City and a quarter of a mile below mouth of Big Muddy Creek.

DRAINAGE AREA.—1,130 square miles.

RECORDS AVAILABLE.—August 22, 1914, to September 30, 1918.

GAGE.—Chain gage attached to bridge; read by Mrs. Kate Holman.

DISCHARGE MEASUREMENTS.—At ordinary stages made from downstream side of highway bridge, which is at a pool; during high water made also from bridge across drainage ditch and overflow section about half a mile east of highway bridge.

CHANNEL AND CONTROL.—Heavy clay, probably permanent; control section is about 100 feet below bridge. Point of zero flow was determined August 22, 1914, to be at a stage represented by a gage height about 1.2 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 22.8 feet at 6 a. m. April 23 (discharge, 6,770 second-feet); minimum stage recorded, 1.81 feet at 6 a. m. October 6 (discharge, 5.2 second-feet).

1914–1918: Maximum stage prevailed August 22, 1915 (gage inaccessible, discharge estimated at 10,000 second-feet); minimum stage recorded, 1.70 feet August 23, 1914 (discharge, 4 second-feet).

ACCURACY.—Stage-discharge relation practically permanent; seriously affected by ice December 9 to February 8. Rating curve well defined between 63 and 420 second-feet, fairly well defined below 63 second-feet and between 420 and 3,360 second-feet, and poorly defined above 3,360 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table, except for period of ice effect. Records good except for very high stages and for period of ice effect, for which they are poor.

Discharge measurements of Little Wabash River at Wilcox, Ill., during the year ending Sept. 30, 1918.

[Made by H. C. Beckman.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 22	2.47	30.2
22	2.47	29.9

Daily discharge, in second-feet, of Little Wabash River at Wilcox, Ill., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.
1	7.0	390	21			809	56	4,070	98	1,140	13	1,360
2	7.0	347	21			1,460	46	3,880	108	971	11	1,740
3	5.6	184	20			1,620	46	3,640	108	405	11	1,060
4	6.0	108	18			1,080	56	2,900	98	161	11	436
5	6.0	71	16	135	10	773	56	1,420	80	161	13	1,600
6	5.2	52	16			1,080	80	468	80	139	12	3,160
7	6.6	43	16			845	63	308	71	184	12	3,760
8	6.6	37	16			484	63	280	63	468	10	3,820
9	7.0	32			1,480	319	63	452	76	791	10	3,360
10	7.0	27			3,360	232	56	2,900	134	2,410	12	2,900
11	7.0	26			3,940	196	49	4,140	134	2,590	13	1,560
12	7.0	24			4,140	161	49	4,350	84	2,590	13	484
13	7.0	24			4,210	144	49	5,650	76	2,560	11	308
14	6.0	21			4,560	134	49	5,260	76	1,770	10	172
15	6.0	21	12		4,700	484	46	4,350	84	1,500	10	208
16	6.0	25		100	4,000	256	49	3,580	46	1,220	10	184
17	6.0	32			3,310	172	516	4,070	39	755		580
18	8.0	28			2,620	134	971	2,620	39	614		2,560
19	8.0	24			1,920	113	5,050	1,360	39	144		2,500
20	18.0	20			719	103	4,700	971	26	139		2,260
21	28.0	20			719	95	6,450	2,470	26	84	200	3,310
22	39.0	18			564	87	6,690	3,520	22	84		2,940
23	49.0	16			405	79	6,770	2,590	30	80		1,920
24	12.0	15			268	71	6,530	1,100	30	98		631
25	56.0	15			232	62	6,370	452	30	220		308
26	12.0	13	35	9	232	54	5,970	347	10	134	701	232
27	12.0	14			232	46	5,490	232	648	103	1,240	791
28	12.0	16			220	71	4,280	184	935	71	773	150
29	63.0	24			.....	63	4,840	161	935	12	172	150
30	76.0	22			.....	63	4,490	150	791	14	71	139
31	648.0	.....			.....	46	.....	118	.....	12	172	.....

NOTE.—Discharge interpolated Oct. 20–22, Nov. 9, Dec. 3, Feb. 16–18, and Mar. 21–25, and estimated Aug. 17–25, because of no gage-height record. Discharge, Dec. 9 to Feb. 8, estimated because of ice, from gage heights, observer's notes, and weather records. Braced figures show mean discharges for periods indicated.

Monthly discharge of Little Wabash River at Wilcox, Ill., for the year ending Sept. 30, 1918.

[Drainage area, 1,130 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	648	5.2	37.1	0.033	0.04
November	390	13	57.0	.050	.06
December	.....	.....	21.7	.019	.02
January	.....	.....	79.0	.070	.08
February	4,700	.....	1,500	1.33	1.38
March	1,620	46	366	.324	.37
April	6,770	46	2,330	2.06	2.30
May	5,650	118	2,190	1.94	2.24
June	935	10	167	.148	.17
July	2,590	12	698	.618	.71
August	1,240	10	165	.146	.17
September	3,820	139	1,490	1.32	1.47
The year	6,770	5.2	749	.663	9.01

SKILLET FORK AT WAYNE CITY, ILL.

LOCATION.—In sec. 18, T. 2 S., R. 6 E., at Southern Railway bridge 1 mile east of Wayne City, Wayne County, and 4 miles below mouth of Horse Creek.

DRAINAGE AREA.—481 square miles.

RECORDS AVAILABLE.—August 16, 1908, to December 31, 1912; June 22, 1914, to September 30, 1918.

GAGE.—Chain gage attached to bridge; read by J. C. Taylor.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge; in high water also from downstream side of wooden trestle about 1 mile east of main channel. Low-water measurements made by wading below gage.

CHANNEL AND CONTROL.—Channel practically permanent; rough. Control is remains of rock dam at bridge section. Point of zero flow was determined August 20, 1914, to be at a stage represented by a gage height of 1.6 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 21.2 feet at 1 p. m. May 13 (discharge, 5,400 second-feet); minimum stage recorded, 2.00 feet October 1 to 17 and August 9 to 12. Minimum discharge, 0.7 second-foot, August 9 to 12, 1908–1912; 1914–1918: Maximum stage recorded, 23.1 feet August 22, 1915 (discharge, 9,350 second-feet, supersedes figure previously published); zero flow existed for 54 days in September to December, inclusive, of 1908.

DIVERSIONS.—About 30,000 gallons of water a day are pumped from river above gage into service tank of Southern Railway.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice December 9 to February 10. Rating curves fairly well defined between 15 and 5,000 second-feet, and poorly defined beyond these limits. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table except for period of ice effect. Records good, except for high stages and for period of ice effect, for which they are poor.

Discharge measurements of Skillet Fork at Wayne City, Ill., during the year ending Sept 30, 1918.

[Made by H. C. Beckman.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 20	2.32	4.8
20	2.31	4.6

Daily discharge, in second-feet, of Skillet Fork at Wayne City, Ill., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.8	59	22			355	9.0	4,050	16	95	3.8	13
2	.8	37	9.5			1,340	9.0	3,020	15	46	3.8	8.2
3	.8	34	9.5			770	8.2	788	15	26	1.3	8.2
4	.8	18	8.7			551	6.6	192	15	14	1.3	34
5	.8	15	7.9			406	6.6	88	15	9.0	1.2	395
				8	350							
6	.8	12	7.5			564	5.0	59	635	6.6	1.2	551
7	.8	9.5	6.3			318	16	41	806	5.0	1.2	752
8	.8	9.5	4.2			185	14	37	80	4.0	1.2	230
9	.8	7.5				125	9.0	538	34	3.2	.7	44
10	.8	7.5				92	7.4	260	28	2.3	.7	24
11	.8	7.5				3,670	56	5.8	125	13	2.3	.7	14
12	.8	7.5				3,600	52	5.8	2,700	13	2.3	.7	11
13	.8	7.5				3,950	32	5.0	5,400	5.0	5.0	1.9	9.0
14	.8	7.5				4,050	30	5.0	4,980	5.0	16	1.3	32
15	.8	7.5	2			3,600	28	5.0	4,250	5.0	11	1.3	18
16	.8	5.5				2,780	26	5.0	3,810	4.8	8.2	1.3	25
17	.8	5.5				605	22	291	1,800	4.8	4.8	1.3	245
18	3.0	5.5				207	21	3,020	283	4.8	4.5	9.0	463
19	5.5	5.5				125	21	3,100	365	4.5	3.8	40	395
20	5.5	5.5				132	18	3,190	475	4.5	2.3	22	318
				1									
21	2.2	5.5				102	14	3,670	1,420	6.6	2.3	15	551
22	2.2	5.5				98	14	3,530	1,470	5.0	2.3	15	512
23	2.2	4.2				73	11	3,350	1,420	5.0	2.3	9.0	125
24	2.2	4.2				59	11	1,620	428	3.2	2.3	9.0	40
25	2.2	4.2				56	15	2,180	155	3.2	1.9	8.2	28
			20										
26	2.2	4.2				52	17	4,150	110	2.8	1.8	25	18
27	2.2	9.5				52	11	4,350	80	2.4	1.8	44	14
28	22	9.5				245	10	4,250	31	2.4	3.5	140	8.6
29	200	37				.....	9	4,850	25	207	3.2	88	7.0
30	252	62				.....	9	4,350	22	102	25	33	5.4
31	185	.....				.....	9	.....	21	.....	5.4	21	.....

NOTE.—Discharge, Dec. 9 to Feb. 10, estimated, because of ice, from gage heights, observer's notes, and weather records. Braced figures show mean discharge for periods indicated.

Monthly discharge of Skillet Fork at Wayne City, Ill., for the year ending Sept. 30, 1918.

[Drainage area, 481 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	252	0.8	22.6	0.047	0.05
November	62	4.2	14.0	.029	.03
December	.....	.....	10.3	.021	.02
January	.....	.....	3.26	.0068	.008
February	4,050	.....	963	2.00	2.08
March	1,340	9.0	166	.345	.40
April	4,850	5.0	1,530	3.18	3.55
May	5,400	21	1,240	2.58	2.97
June	806	2.4	68.8	.143	.16
July	95	1.8	10.4	.022	.03
August	140	.7	16.2	.034	.04
September	752	5.4	163	.339	.38
The year	5,400	.7	345	.717	9.72

CUMBERLAND RIVER BASIN.

CUMBERLAND RIVER AT CUMBERLAND FALLS, KY.

LOCATION.—At Cumberland Falls post office, Whitley County, 400 feet above falls, 13 miles from Parkers Lake post office and Cumberland Falls railroad station. McCreary County, on Queen & Crescent Route.

DRAINAGE AREA.—2,040 square miles (measured on maps of Kentucky and Tennessee prepared by the United States Geological Survey; scale, 1:500,000).

RECORDS AVAILABLE.—August 15, 1907, to December 10, 1911; April 1, 1915, to September 30, 1918.

GAGE.—Staff, inclined and vertical, on right bank, 400 feet above brink of falls, established April 3, 1915; read by Alice Brunson. An inclined and vertical staff gage was established in August, 1907, by Viele, Blackwell & Buck, on right bank about 300 feet above site of Survey gage; this gage was read twice daily until March 18, 1911, and once daily from March 19 to December 10, 1911, by H. C. Brunson; nothing is left of it except the bench mark to which it was referred. A staff gage reading to about 6 feet was installed in 1914 on a large boulder in the river near the left bank, practically opposite the site of the gage established in August, 1907; no readings of this gage are available.

DISCHARGE MEASUREMENTS.—Made from cable about 600 feet above gage. A reference on left bank near cable is used to determine depths when soundings can not be made.

CHANNEL AND CONTROL.—Solid rock; permanent. At high stages the edge of the falls serves as control, there being a vertical drop of about 68 feet at the falls at low water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.50 feet at 7.30 a. m. January 28 (discharge, 59,600 second-feet); minimum stage, 1.22 feet at 5.30 p. m. October 18 (discharge, 78 second-feet).

1907–1911; 1915–1918: Maximum stage recorded, that of January 28, 1918; minimum stage, 55 second-feet October 3-7 and 23–27, 1908.

Highest known stage prior to 1918 corresponds to about 12 feet on Survey gage; lowest stage, according to William Taylor, a local resident in September, 1916, occurred in 1902, when entire flow of river was confined in a channel 7 feet wide, 1 foot deep, flowing fast; under these conditions, the discharge would probably be about 30 second-feet.

ICE.—Stage-discharge relation not affected by ice.

REGULATION.—Low-water flow may be affected to a small extent by operation of power plant at Williamsburg, about 25 miles above the station.

ACCURACY.—Stage-discharge relation permanent; affected by ice December 13–20. Rating curve well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

The following discharge measurement was made by Hopkins and Kidwell:

June 13, 1918: Gage height, 1.50 feet; discharge, 320 second-feet.

Daily discharge, in second-feet, of Cumberland River at Cumberland Falls, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	500	1,890	180	1,110	42,100	2,920	2,000	2,920	920	4,450	830	890
2	404	1,460	180	1,080	24,200	2,560	1,890	2,560	785	7,260	604	954
3	338	1,060	199	1,050	9,000	2,330	2,680	2,220	785	3,570	476	1,270
4	256	860	218	1,020	4,450	2,000	5,750	2,000	658	1,890	428	860
5	199	714	228	1,020	3,440	2,110	6,470	1,780	565	1,360	317	971
6	159	617	218	1,090	2,680	2,440	5,410	1,560	591	988	266	1,460
7	138	526	208	2,440	2,560	3,570	4,760	1,360	658	714	237	1,670
8	124	452	218	4,150	2,560	6,100	23,000	1,270	617	604	218	1,360
9	110	404	218	4,150	2,440	6,860	24,900	1,670	440	658	199	1,090
10	102	359	218	2,560	2,220	4,760	19,200	2,000	416	845	180	728
11	94	338	208	1,890	2,220	4,760	10,400	2,000	370	686	275	526
12	94	317	218	2,000	2,330	4,150	5,410	1,460	317	500	428	428
13	94	296	210	3,440	2,330	3,570	4,150	3,300	286	428	380	359
14	86	275	210	4,760	2,110	3,180	3,050	18,000	275	338	275	306
15	86	256	200	6,100	1,890	3,050	2,560	16,800	237	296	237	266
16	82	246	200	7,260	1,780	3,050	2,330	9,460	199	256	228	237
17	82	237	200	6,860	1,780	2,680	2,330	4,150	180	218	218	237
18	82	228	200	4,760	1,670	2,330	2,440	2,920	266	180	208	218
19	275	218	200	3,050	1,460	2,110	2,800	2,560	208	190	237	199
20	6,470	208	250	2,220	2,800	1,890	2,920	5,080	180	199	266	208
21	3,570	199	306	1,890	6,860	2,110	3,850	6,470	1,040	199	338	180
22	2,110	190	359	1,670	6,860	2,800	8,110	4,760	3,300	180	286	218
23	1,360	180	476	1,460	5,080	2,920	7,680	8,110	2,330	180	218	218
24	920	180	604	1,460	3,850	2,800	5,080	7,260	2,000	166	166	199
25	686	180	742	1,460	3,050	4,450	3,570	5,080	1,460	275	138	190
26	578	190	1,560	1,780	3,050	5,080	3,440	3,570	1,890	237	124	173
27	476	180	2,560	19,800	3,300	5,080	3,570	2,560	3,050	180	180	173
28	428	180	2,560	57,500	3,050	3,850	3,180	2,110	2,330	190	218	173
29	380	173	2,330	54,700	.....	3,180	2,920	1,780	1,560	246	199	173
30	552	180	1,740	56,100	.....	2,560	3,050	1,560	2,330	275	338	166
31	630	.....	1,140	56,800	.....	2,220	.....	1,160	.....	742	565	.....

NOTE.—Discharge, Dec. 13–20, estimated because of ice; Dec. 30 and Jan. 1–3, interpolated.

Monthly discharge of Cumberland River at Cumberland Falls, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 2,040 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	6,470	82	692	0.339	0.39
November	1,890	173	426	.209	.23
December	2,560	180	599	.294	.34
January	57,500	1,020	10,200	5.00	5.76
February	42,100	1,460	5,400	2.65	2.76
March	6,860	1,890	3,340	1.64	1.89
April	24,900	1,890	5,960	2.92	3.26
May	18,000	1,160	4,180	2.05	2.36
June	3,300	180	1,010	.495	.55
July	7,260	166	919	.450	.52
August	830	124	299	.147	.17
September	1,670	166	537	.263	.29
The year	57,500	82	2,790	1.37	18.52

CUMBERLAND RIVER AT BURNSIDE, KY.

LOCATION.—Below mouth of South Fork of Cumberland River at Burnside, Pulaski County.

DRAINAGE AREA.—4,890 square miles (measured on maps of Kentucky and Tennessee, prepared by United States Geological Survey; scale, 1:500,000).

RECORDS AVAILABLE.— October 1, 1914, to September 30, 1918.

GAGE.—Vertical staff in two sections on piers of toll bridge across South Fork of Cumberland River about 700 feet above mouth; installed in July, 1914, by United States Weather Bureau; readings on this gage by the Weather Bureau began January 1, 1915; sea-level elevation of zero, 589.53 feet (Smith Shoals Survey datum, United States Engineer Corps); datum same as that of gage which was marked on the rails of inclines 1 and 2 leading from the South Fork to the warehouse, about 500 feet below the present gage, and which was established in 1884 and read daily until January 1, 1915; upper part of old gage, reading from 54 to 71 feet, was spiked to office of Col. Cole. The United States Weather Bureau [1] reports that "the old river gage was changed on several unknown dates and by amounts that are uncertain, so that readings prior to January 1, 1915, are not comparable by from 0.1 to 0.7 foot." New gage is read for the United States Geological Survey by L. M. Cheeley.

DISCHARGE MEASUREMENTS.—Flow of South Fork is measured from the highway bridge; the Cumberland above the South Fork is measured from a boat, from the Queen & Crescent Railroad bridge, or by means of floats, the method used depending on the stage; flow below the South Fork is the combined flow of both streams.

CHANNEL AND CONTROL.—Channel considered permanent except for deposits of mud, which are washed away at high stages. Low-water control is crest of dam No. 21, 28 miles below Burnside; gage height of crest of dam, 1.47 feet. The dam is a recently built concrete structure, and probably little or no water leaks through dam or lock.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 69.5 feet at 1 a. m. January 29 (discharge, roughly, 157,000 second-feet); minimum stage, 2.07 feet October 11 (discharge, 289 second-feet).

1915–1918: Maximum stage recorded, that of January 29, 1918; minimum stage 1.97 feet July 13 and 14, 1917, due to lowering of pool to flood steamer off bar below lock.

The stage of January 29, 1918, is the maximum stage since December 15, 1884, the date of establishment of the United States Weather Bureau gage.

ICE.—Stage-discharge relation seldom affected by ice.

REGULATION.—Stage at low water will be affected by any manipulation of the level of pool No. 21 at the lock.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice during parts of December and January. Rating curve fairly well defined to 30,000 second feet (gage height approximately, 20 feet); above 30,000 second-feet curve is an extension and may be considerably in error. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. At low stages discharge relation may be affected by water entering between the gage and the dam owing to heavy local showers in the basins of the small intervening tributaries. Records good for discharge of less than 30,000 second-feet.

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[1] Daily river stages, pt. 12, p. 29.

Discharge measurements of Cumberland River at Burnside, Ky., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 11	Peterson and Hopkins	17.57	24,200
June 17	Hopkins and Kidwell	2.44	552

Daily discharge, in second-feet, of Cumberland River at Burnside, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,780	4,080	524	3,000	69,100	6,260	4,540	7,540	2,580	5,460	1,890	970
2	1,430	3,730	695	3,000	44,000	5,680	4,190	6,260	2,120	6,260	2,000	1,430
3	1,030	3,040	800	2,500	25,000	5,340	4,880	5,460	2,120	5,920	1,430	1,780
4	912	2,580	912	2,500	13,400	5,340	14,100	4,760	1,890	4,080	1,200	2,920
5	695	2,120	970	2,500	9,600	7,540	16,600	4,300	1,660	2,580	912	4,300
6	636	1,780	912	2,500	7,260	11,200	12,900	3,730	1,660	1,890	745	7,400
7	569	1,540	912	4,880	6,740	13,000	10,200	3,380	1,660	1,370	695	6,030
8	508	1,430	912	9,900	7,820	13,700	53,300	3,270	1,780	1,140	533	3,840
9	441	1,320	912	9,150	9,450	12,400	61,100	3,960	1,660	1,080	550	2,460
10	378	1,200	912	7,260	10,400	11,500	39,000	7,000	1,320	1,140	533	1,780
11	303	1,030	900	4,800	8,550	9,450	23,700	5,220	1,140	1,370	524	1,260
12	325	970	900	6,000	7,400	8,550	15,200	4,760	1,030	1,200	490	1,140
13	378	912	850	11,000	6,620	7,540	9,900	7,540	912	970	490	1,030
14	425	912	800	10,000	6,140	6,870	7,820	36,800	800	800	490	695
15	362	855	750	18,900	5,680	6,260	6,030	37,000	695	607	465	626
16	378	855	650	25,400	5,460	5,800	5,460	20,500	645	533	449	533
17	362	800	650	19,100	5,340	5,570	5,800	10,500	569	533	449	533
18	645	800	650	12,200	4,880	5,000	6,740	7,400	533	490	490	490
19	5,110	695	650	9,000	4,420	4,420	6,870	5,800	578	490	745	516
20	6,870	695	700	7,000	14,800	4,190	6,260	6,140	695	433	550	607
21	11,500	645	800	5,500	29,000	4,420	8,850	17,000	745	370	533	607
22	5,570	645	900	5,000	22,400	4,880	18,900	14,600	2,240	401	533	578
23	3,960	645	1,780	4,500	14,300	5,340	16,100	16,100	4,420	441	524	533
24	2,700	616	2,120	5,340	10,500	5,460	12,200	30,300	3,380	441	449	533
25	2,120	569	2,350	4,540	8,250	11,000	9,000	15,500	3,040	457	409	533
26	1,540	542	4,540	4,420	7,540	12,000	7,820	9,900	2,810	490	370	465
27	1,430	524	5,460	27,900	7,260	10,200	11,700	7,130	3,840	490	385	449
28	1,260	524	6,140	115,000	6,870	8,700	12,500	5,800	3,960	626	516	385
29	1,540	508	5,460	149,000	.....	7,000	9,900	4,650	3,500	1,030	645	332
30	2,460	482	4,650	101,000	.....	5,800	8,100	3,730	3,620	1,430	578	310
31	3,270	.....	3,500	91,200	.....	5,000	.....	3,040	.....	1,540	695	.....

NOTE.—Discharge, Dec. 11–22, 31, Jan. 1–6, 11–14, and 21–23, estimated because of ice effect.

Monthly discharge of Cumberland River at Burnside, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 4,890 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	11,500	303	1,960	0.401	0.46
November	4,080	482	1,230	.252	.28
December	6,140	524	1,730	.354	.41
January	149,000	2,500	22,100	4.52	5.21
February	69,100	4,420	13,500	2.76	2.87
March	13,700	4,190	7,590	1.55	1.79
April	61,100	4,190	14,300	2.92	3.26
May	37,000	3,040	10,300	2.11	2.43
June	4,420	533	1,920	.393	.44
July	6,260	370	1,490	.305	.35
August	2,000	370	686	.140	.16
September	7,400	310	1,500	.307	.34
The year	149,000	303	6,490	1.33	18.00

SOUTH FORK OF CUMBERLAND RIVER AT NEVELSVILLE, KY.

LOCATION.—One-fourth mile below Turkey Creek ferry on Greenwood-Monticello pike, 1 mile from Nevelsville, McCreary County. Little South Fork enters on left 1¾ miles above station.

DRAINAGE AREA.—1,260 square miles (measured on maps of Kentucky and Tennessee prepared by United States Geological Survey; scale, 1:500,000).

RECORDS AVAILABLE.—March 10, 1915, to September 30, 1918.

GAGE.—Vertical staff gage in 5 sections bolted to rock ledges on left bank; read by Ben Whitehead. A reference gage for use in referencing soundings at the measuring section, is attached to a tree on the left bank 110 feet below cable.

DISCHARGE MEASUREMENTS.—Made from cable about 2,000 feet below gage or by wading at low stages.

CHANNEL AND CONTROL.—Channel straight above and below; bed, compact gravel. Low-water control is partly the bed of the river below gage and partly a gravel bar about 2 miles below gage. Both are probably permanent. High-water control is bed of stream for several miles below gage, and may be slightly affected by foliage along the banks.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 51.4 feet at 5.30 p. m. January 28 (discharge, roughly, 84,300 second-feet); minimum stage, 1.84 feet at 5.30 p. m. August 16 and 26 (discharge, 88 second-feet).

1915–1918: Maximum stage recorded, that of January 28, 1918; minimum stage 1. 82 feet at 5.30 a. m. July 13, 1917 (discharge, 64 second-feet).

ICE.—Stage-discharge relation seldom affected by ice.

REGULATION.—Operation of a small power plant short distance above gage may affect flow at extreme low water.

ACCURACY.—Stage-discharge relation probably permanent; affected by ice during parts of December and January. Rating curve well defined between 500 and 25,000 second-feet, and fairly well defined below 500 second-feet; extended above 25,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

The following discharge measurement was made by Hopkins and Kidwell:

June 15, 1918: Gage height, 2.43 feet; discharge, 235 second-feet.

Daily discharge, in second-feet, of South Fork of Cumberland River at Nevelsville, Ky., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	500	1,450	261	750	7,930	1,660	1,210	2,810	740	261	850	410
2	371	1,090	296	750	5,860	1,520	1,150	2,150	685	333	525	550
3	296	850	602	680	4,190	1,390	2,080	1,800	630	333	410	500
4	244	685	575	670	3,210	1,270	8,840	1,520	602	314	278	850
5	195	550	475	660	2,500	1,590	5,980	1,330	550	244	218	1,210
6	190	500	430	900	2,010	1,590	3,740	1,150	575	195	179	1,730
7	177	452	410	1,800	2,150	2,430	4,190	1,030	712	165	170	1,270
8	151	430	390	2,650	2,150	1,940	35,300	970	685	156	156	685
9	140	390	390	2,000	1,940	2,150	22,900	970	575	212	140	500
10	134	371	270	1,600	1,730	1,870	8,580	1,030	500	314	130	352
11	134	352	330	1,200	1,940	1,940	4,970	850	410	296	118	278
12	147	333	350	2,100	1,520	1,800	3,650	850	352	231	110	225
13	151	314	350	4,400	1,520	1,660	2,810	2,730	296	179	98	195
14	147	314	330	2,600	1,450	1,450	2,080	12,900	261	151	95	170
15	140	296	310	5,100	1,330	1,450	1,800	6,220	222	134	92	156
16	136	296	290	7,900	1,330	1,390	1,730	3,210	201	126	88	142
17	134	296	270	4,300	1,270	1,330	3,740	2,500	179	120	108	138
18	130	278	260	2,800	1,210	1,210	4,670	2,290	177	114	187	132
19	2,570	261	260	2,000	1,150	1,150	3,470	1,520	278	114	174	130
20	5,630	261	270	1,500	4,280	1,150	2,970	2,150	244	118	352	134
21	2,430	244	330	1,350	7,800	1,520	5,190	2,730	575	118	333	130
22	1,330	244	370	1,200	4,870	1,520	7,300	2,890	795	110	278	126
23	910	238	480	1,150	3,470	1,390	4,870	6,100	1,210	118	218	122
24	685	231	520	1,100	2,730	1,800	3,470	11,600	575	170	145	114
25	525	225	680	1,050	2,220	2,810	2,650	4,770	430	170	122	114
26	452	218	1,500	1,300	2,290	2,730	3,050	2,810	390	147	100	114
27	296	209	1,400	16,300	2,150	2,500	5,410	2,010	371	138	170	114
28	158	201	1,300	53,100	1,800	2,010	4,190	1,730	314	333	278	122
29	390	212	1,100	31,100	.....	1,730	3,470	1,330	278	575	238	151
30	740	234	900	15,400	.....	1,390	3,210	1,030	261	550	261	179
31	1,520	.....	750	18,800	.....	1,270	.....	850	.....	740	278	.....

NOTE.—Discharge, Dec. 10 to Jan. 26, estimated because of ice effect.

Monthly discharge of South Fork of Cumberland River at Nevelsville, Ky., for the year ending Sept. 30, 1918.

[Drainage area, 1,260 square miles].

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	5,630	130	682	0.541	0.62
November	1,450	201	401	.318	.35
December	1,500	260	532	.422	.49
January	53,100	660	6,070	4.82	5.56
February	7,930	1,150	2,790	2.21	2.30
March	2,810	1,150	1,700	1.35	1.56
April	35,300	1,150	5,620	4.46	4.98
May	12,900	850	2,830	2.25	2.59
June	1,210	177	469	.372	.42
July	740	114	235	.187	.22
August	850	88	223	.177	.20
September	1,730	114	368	.292	.33
The year	53,100	88	1,820	1.44	19.62

CANEY FORK NEAR ROCK ISLAND, TENN.

LOCATION.—About 100 feet downstream from power house of Tennessee Power Co., half a mile downstream from mouth of Collins River, and 1 mile northwest of Rock Island, Warren County.

DRAINAGE AREA.—1,640 square miles (measured from Post Route map).

RECORDS AVAILABLE.—November 14, 1911, to September 30, 1918.

GAGE.—Bristol water-stage recorder known as gage No. 3, 100 feet downstream from power house and about half a mile downstream from Rock Island dam. This gage has been used since January 1, 1917. From March 26 to December 31, 1916, a Bristol water-stage recorder installed March 26, 1916, at site of staff gage known as gage B (No. 2), half a mile upstream from gage No. 3 and 300 feet downstream from Rock Island dam, was used. The closing of sluice gates in dam on December 8, 1916, and diversion of flow through tunnel on December 12 made gage B useless after December 7, 1916. Prior to March 26, 1916, daily mean stage was determined from a water-stage recorder known by the Billesby Co., as gage A, 400 feet upstream from gage B, just above point at which dam is now built; date of installation of recorder not known. Backwater from dam began to affect stage-discharge relation at gage A on March 26, 1916.

DISCHARGE MEASUREMENTS.—Formerly made from cable at gage B or from sluice ways in dam. No discharge measurements have been made since closing of the sluiceways on December 8, 1916.

CHANNEL AND CONTROL.—Bed of stream above and below gage consists chiefly of solid rock; probably permanent.

EXTREMES OF DISCHARGE.—Maximum mean daily stage from water-stage recorder, 16.28 feet January 28 (discharge, about 44,900 second-feet); minimum mean daily stage, zero on gage July 27, 28, and September 1, 26 (discharge, 140 second-feet).

1911–1918: Maximum stage recorded, 13.2 feet April 2, 1912 (discharge, 107,000 second-feet); minimum stage recorded, same as for 1918.

DIVERSIONS.—None.

REGULATION.—Considerable fluctuation caused by storage in reservoir and operation of plant.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve is fairly well defined between 300 and 9,000 second-feet, above which it is an extension. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting gage-height graph. Records good except for extreme high and low stages.

COOPERATION.—Gage-height record furnished by Tennessee Power Co.

No discharge measurements were made at this station during the year.

Daily discharge, in second-feet, of Caney Fork near Rock Island, Tenn., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,370	1,950	700	1,610	22,100	1,730	1,570	2,950	1,060	1,490	760	140
2	1,410	1,690	730	1,610	16,100	3,880	2,080	5,690	1,370	880	578	155
3	1,410	1,530	650	1,610	16,900	1,370	1,410	2,520	1,230	1,090	625	212
4	1,340	1,370	915	1,120	13,400	1,770	1,060	1,950	1,120	1,260	386	222
5	1,260	1,260	1,450	1,450	8,760	3,320	2,220	2,420	1,370	950	850	564
6	1,300	1,260	1,490	1,530	9,430	1,950	3,450	3,450	1,340	1,020	850	1,020
7	1,200	1,260	1,300	3,320	9,430	1,410	5,260	2,420	1,200	950	850	1,300
8	1,060	1,200	1,200	3,880	6,940	1,410	32,100	1,610	1,120	610	850	850
9	915	1,300	1,300	3,880	6,410	4,190	28,100	1,860	790	760	850	510
10	820	950	1,650	1,860	7,510	1,650	18,500	1,860	985	630	880	470
11	760	950	1,450	2,730	3,450	1,530	10,800	1,260	850	850	546	486
12	730	880	1,450	8,440	4,190	2,000	6,160	1,260	1,200	820	790	438
13	675	880	1,490	9,090	4,030	2,040	2,730	9,770	1,200	650	730	519
14	578	850	1,490	6,670	3,730	2,620	4,520	25,300	1,230	430	366	615
15	450	820	1,450	13,000	5,060	2,420	2,730	9,090	1,060	390	555	287
6	450	850	1,530	14,200	4,690	1,410	4,350	7,510	880	332	478	730
17	450	880	1,530	8,120	7,810	1,490	16,900	2,840	820	280	332	700
18	450	880	1,450	6,940	9,090	1,570	16,500	3,590	880	578	225	790
19	1,450	850	1,300	5,690	7,810	1,730	11,500	1,200	730	418	280	675
20	8,440	790	1,370	2,840	12,200	1,900	11,200	1,690	610	410	262	301
21	2,620	675	1,410	2,080	14,200	5,920	21,700	3,070	354	564	173	298
22	2,130	600	1,490	1,530	13,400	3,590	16,900	3,070	434	573	248	175
23	1,370	625	2,950	3,320	10,800	3,730	8,760	3,450	700	519	188	188
24	1,370	600	1,610	2,220	6,940	3,450	6,940	11,900	985	490	192	308
25	1,230	650	2,730	1,610	4,520	7,510	6,160	5,060	985	386	256	250
26	1,200	675	1,370	4,690	3,320	6,160	4,520	2,620	1,120	537	250	140
27	1,200	650	2,520	27,300	2,180	4,030	11,200	1,610	1,020	140	591	615
28	1,120	650	2,420	44,900	3,190	4,190	4,350	2,420	1,090	140	532	346
29	950	650	1,570	39,700	.....	2,220	6,940	1,090	2,950	336	410	175
30	2,320	820	1,860	35,300	.....	1,820	6,940	1,300	1,770	336	242	700
31	2,130	.....	1,610	34,100	.....	1,900	.....	1,230	.....	430	210	.....

Monthly discharge of Caney Fork near Rock Island, Tenn., for the year ending Sept. 30, 1918.

[Drainage area, 1,640 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	8,440	450	1,420	0.866	1.00
November	1,950	600	966	.589	.66
December	2,950	650	1,530	.933	1.08
January	44,900	1,120	9,560	5.82	6.71
February	22,100	2,180	8,490	5.18	5.39
March	7,510	1,370	2,770	1.69	1.95
April	32,100	1,060	9,250	5.64	6.29
May	25,300	1,090	4,100	2.50	2.88
June	2,950	354	1,080	.659	.74
July	1,490	140	621	.379	.44
August	880	173	495	.302	.35
September	1,300	140	473	.288	.32
The year	44,900	140	3,360	2.05	27.81

COLLINS RIVER NEAR ROWLAND, TENN.

LOCATION.—At Hennessee's iron highway bridge, 1 mile below Mountain Creek, 2½ miles northwest of Rowland, Warren County, 5 miles southwest of Rock Island, and 8 miles upstream, by river, from junction with Caney Fork.

DRAINAGE AREA.—800 square miles (measured by Tennessee Power Co.).

RECORDS AVAILABLE.—April 1, 1916, to September 30, 1918.

GAGE.—Chain gage on downstream side of bridge at middle of second span from right bank; read by Joe Keathley. Sea-level elevation of zero of gage, 795.86 feet.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of rock, boulders, and sand. Channel fairly straight for a considerable distance above and below gage. Right bank is a steep rock bluff; left bank is low and subject to overflow above a stage of 8 feet. A series of rock and boulder riffles beginning just below bridge forms the control, probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.17 feet at 5 p. m. January 28 (discharge, 23,200 second-feet); minimum stage recorded, 1.02 feet at 7 p. m. September 15 (discharge, 92 second-feet).

1916–1918: Maximum stage recorded, 14.1 feet at noon March 4, 1917 (discharge, 28,900 second-feet); minimum stage recorded same as for 1918.

By means of levels the elevation of marks of the flood of 1854 (exact date unknown), obtained from old residents nearby, indicates that stage rose to 32.6 feet (discharge estimated at 82,200 second-feet). Elevation of marks of the flood of 1902 (exact date unknown), obtained in the same manner, indicates that stage rose to 27.2 feet (estimated discharge, 66,000 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.—Small mills upstream probably cause some diurnal fluctuation.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice. Rating curve well defined below 8,000 second-feet; above that point curve is an extension. Gage read to hundredths twice daily; during high water read oftener. Daily discharge ascertained by applying mean daily gage height to rating table. Records good except above stage of overflow (about 8 feet, discharge, 11,300 second-feet) when they are subject to error.

COOPERATION.—Gage-height record furnished by the Tennessee Power Co.

Discharge measurements of Collins River near Rowland, Tenn., during the year ending Sept. 30, 1918.

[Made by L. J. Hall.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Nov. 7	1.60	440
Feb. 19	3.16	2,100
Aug. 21	1.10	123

Daily discharge, in second-feet, of Collins River near Rowland, Tenn., for the year ending Sept. 30, 1918.

Day.	Oct	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	840	890	510	582	6,760	1,320	735	1,460	636	358	249	398
2	690	753	609	618	4,220	1,180	717	1,250	564	318	235	318
3	564	663	600	600	3,300	1,020	726	1,100	502	286	235	242
4	494	591	555	564	2,720	953	762	1,010	510	263	228	207
5	454	555	537	546	2,240	920	910	900	470	263	207	242
6	414	502	510	636	2,000	910	860	880	446	263	207	221
7	358	462	478	1,450	2,050	880	2,020	800	486	256	180	228
8	382	510	510	1,340	1,950	840	19,300	860	546	263	193	228
9	318	446	780	1,180	1,730	900	14,000	800	494	214	180	186
10	334	430	800	1,030	1,660	986	5,440	820	438	228	167	160
11	318	422	708	1,050	1,600	1,030	3,300	840	414	228	167	144
12	302	430	690	2,610	1,570	964	2,450	1,180	382	228	173	144
13	302	462	627	2,650	1,640	986	1,960	4,300	342	207	167	160
14	278	494	600	2,170	1,480	910	1,710	8,120	326	221	167	167
15	294	462	573	5,070	1,380	900	1,470	4,000	326	214	148	104
16	270	430	546	4,460	1,590	840	2,430	2,430	286	221	148	144
17	242	430	528	3,040	3,050	780	3,860	1,830	278	214	156	128
18	256	398	486	2,330	2,600	771	4,980	1,450	286	228	148	136
19	1,100	374	537	1,850	2,140	744	3,860	1,220	278	256	140	128
20	1,610	398	582	1,630	4,800	762	3,510	1,070	663	286	167	124
21	663	382	654	1,380	4,080	762	4,460	1,350	860	270	173	112
22	790	374	744	1,270	2,960	780	4,000	1,290	564	256	186	97
23	627	398	810	1,180	2,420	762	2,910	1,840	422	256	173	140
24	555	374	840	1,100	2,070	870	2,250	3,650	366	242	160	136
25	486	302	830	1,120	1,820	1,210	1,850	2,270	358	214	152	124
26	454	318	820	1,530	1,720	1,140	1,610	1,490	326	207	152	136
27	438	302	880	9,320	1,610	1,050	1,780	1,250	318	263	160	173
28	438	318	800	21,700	1,470	942	1,590	1,030	318	256	173	186
29	430	350	726	19,300	.....	830	1,820	880	510	242	152	173
30	1,460	398	672	14,500	.....	810	1,690	762	422	318	148	173
31	1,110	.....	636	14,300	.....	735	.....	708	.....	256	342	.....

Monthly discharge of Collins River near Rowland, Tenn., for the year ending Sept. 30, 1918.

[Drainage area, 800 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,610	242	557	0.696	0.80
November	890	302	454	.568	.63
December	880	478	651	.814	.94
January	21,700	546	3,940	4.92	5.67
February	6,760	1,380	2,450	3.06	3.19
March	1,320	735	919	1.15	1.33
April	19,300	717	3,300	4.12	4.60
May	8,120	708	1,700	2.12	2.44
June	860	278	438	.548	.61
July	358	207	251	.314	.36
August	342	140	182	.228	.26
September	398	97	175	.219	.24
The year	21,700	97	1,240	1.55	21.07

TENNESSEE RIVER BASIN.

FRENCH BROAD RIVER AT ASHEVILLE, N. C.

LOCATION.—At new concrete highway bridge which replaced old Smith's Bridge, washed out July 16, 1916, 1 mile below Southern Railway station at Asheville, Buncombe County, and 2 miles below mouth of Swannanoa River.

DRAINAGE AREA.—987 square miles.

RECORDS AVAILABLE.—January 1, 1905, to July 16, 1916; January 1, 1917, to September 30, 1918. Records were obtained at Bingham School Bridge, about 3 miles below Asheville, from September 17, 1895, to December 31, 1901.

GAGE.—Vertical staff, graduations from −2.0 to 14.7 feet stamped on right downstream face of third pier from right bank. The original gages, a vertical staff attached to one of the bridge piers of the old Smith's Bridge and an auxiliary chain gage (for obtaining readings below zero) attached to that bridge, were used until the flood in July, 1916. All gages set to same datum. From January 1 to November 21, 1917, readings were obtained from a temporary staff gage set at different datum; readings reduced to datum of present gage. Gage read by O. S. Snook.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Bed composed chiefly of rock; practically permanent. Control formed by rock shoal and concrete piers of Southern Railway bridge; permanent, though piers of bridge may become choked with débris during extreme floods, causing backwater at gage for short periods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.0 feet at 5 p. m. January 28 (discharge, 12,200 second-feet); minimum stage recorded, −0.6 foot December 21, September 3–4 and 16–18 (discharge, 760 second-feet).

1905–1918: Maximum stage, 24.13 feet July 16, 1916, determined by levels from flood marks November 21, 1917 (discharge not determined; stage-discharge relation probably affected by backwater from drift lodged against the Southern Railway bridge). Maximum stage recorded before or after the flood in July, 1916, 7.8 feet January 23, 1906 (discharge, 25,800 second-feet). Minimum stage recorded, −0.7 foot September 16 and 20, 1907 (discharge, 380 second-feet).

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—None.

REGULATION.—Slight diurnal fluctuation may be caused by operation of small mills upstream.

ACCURACY.—Stage-discharge relation practically permanent, except as affected by ice during December and January. Rating curve well defined below 10,800 second-feet. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage height to rating table except for periods of ice effect. Records good.

COOPERATION.—Gage-height record furnished by United States Weather Bureau.

Discharge measurements of French Broad River at Asheville, N. C., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Mar. 1	L. J. Hall	0.48	1,820
May 28	C. G. Paulsen	.40	1,740

Daily discharge, in second-feet, of French Broad River at Asheville, N. C., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,640	1,750	1,020	.....	5,750	2,100	1,420	2,360	1,310	2,100	1,860	1,020
2	1,420	1,420	1,020	1,420	4,050	1,860	1,420	1,980	1,210	1,530	1,530	840
3	1,420	1,530	930	1,310	4,050	1,750	1,420	1,750	1,210	1,310	1,530	760
4	1,310	1,310	930	1,110	3,480	1,640	1,420	1,750	2,970	1,210	1,110	760
5	1,310	1,310	930	1,110	2,500	1,750	1,420	1,530	1,640	1,110	1,020	840
6	1,310	1,420	930	1,210	1,980	1,750	1,420	1,530	1,210	1,110	1,020	1,020
7	1,210	1,310	840	2,360	1,980	1,750	1,750	1,530	2,500	1,110	930	1,110
8	1,210	1,210	840	2,100	1,980	1,750	1,980	1,530	1,860	1,020	930	1,210
9	1,310	1,310	1,020	1,530	1,980	1,640	5,990	2,100	1,530	1,210	930	1,310
10	1,420	1,210	1,020	.....	1,980	1,640	3,670	1,980	1,530	1,110	1,530	1,110
11	1,310	1,210	930	.....	1,980	1,750	2,650	1,750	1,310	1,110	1,420	1,020
12	1,310	1,210	930	4,630	2,100	1,640	2,500	1,640	1,310	1,110	1,530	1,020
13	1,310	1,310	840	.....	2,100	1,640	2,100	1,530	1,310	1,110	1,110	930
14	1,110	1,210	840	.....	1,980	1,640	1,980	2,360	1,210	1,110	930	840
15	1,020	1,210	840	2,500	1,980	1,640	1,860	2,100	1,210	1,020	840	840
16	1,110	1,210	840	3,670	1,980	1,530	1,860	1,640	1,110	930	930	760
17	1,020	1,110	760	2,500	2,100	1,530	1,860	1,530	1,110	930	1,210	760
18	1,020	1,110	760	2,360	2,500	1,530	1,750	1,640	1,750	1,210	1,420	760
19	1,640	1,210	760	1,860	2,360	1,530	1,750	1,530	1,210	1,020	2,500	1,110
20	5,750	1,110	760	.....	3,670	1,420	1,860	1,860	1,210	930	1,750	1,210
21	2,500	1,110	760	.....	3,670	1,980	1,980	2,360	1,640	930	1,210	1,310
22	2,100	1,110	930	.....	3,130	1,750	1,980	1,980	3,670	930	1,020	1,210
23	1,860	1,020	1,020	.....	2,500	1,530	1,860	2,100	1,860	1,750	930	930
24	1,530	1,020	1,020	.....	2,360	2,230	1,750	1,980	1,640	1,210	930	840
25	1,310	1,020	1,020	.....	2,100	2,100	1,640	2,360	1,310	1,110	930	840
26	1,420	1,020	1,020	.....	2,230	1,860	1,640	2,360	1,640	1,020	840	840
27	1,310	1,020	1,110	3,300	2,230	1,640	1,860	2,360	1,530	1,310	930	1,310
28	1,310	1,020	1,020	6,500	2,100	1,640	1,750	1,860	1,310	1,420	840	1,020
29	1,420	930	1,020	10,400	.....	1,530	1,640	1,750	1,210	1,530	1,210	930
30	2,230	930	840	8,900	.....	1,530	1,640	1,530	1,530	1,420	1,210	840
31	2,230	.....	840	8,620	.....	1,420	.....	1,530	.....	2,360	1,020	.....

NOTE.—River frozen Dec. 14–20, 30–31, Jan. 1, 10, 11, 13, 14, and 20–26; gage not read. Discharge Dec. 14–20, 30, and 31 estimated.

Monthly discharge of French Broad River at Asheville, N. C., for the year ending Sept. 30, 1918.

[Drainage area, 987 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	5,750	1,020	1,590	1.61	1.86
November	1,750	930	1,200	1.22	1.36
December	1,110	760	914	.926	1.07
February	5,750	1,980	2,600	2.63	2.74
March	2,230	1,420	1,700	1.72	1.98
April	5,990	1,420	1,990	2.02	2.25
May	2,360	1,530	1,860	1.88	2.17
June	3,670	1,110	1,570	1.59	1.77
July	2,360	930	1,240	1.26	1.45
August	2,500	840	1,200	1.22	1.41
September	1,310	760	977	.990	1.10

TENNESSEE RIVER AT CHATTANOOGA, TENN.

LOCATION.—At Walnut Street Bridge in Chattanooga, Hamilton County, just below Chattanooga Island, 3 miles above mouth of Chattanooga Creek, 4 miles below mouth of Chickamauga Creek, 33 miles above Hales Bar dam, 188 miles below junction of French Broad and Holston rivers, and 464 miles above mouth of Tennessee River.

DRAINAGE AREA.—21,400 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 1, 1874, to October 21, 1913; March 1, 1915, to September 30, 1918, when station was discontinued.

GAGES.—Two gages, 7 miles apart and set to same datum, are used at this station to determine variation in slope of water surface caused by operation of power plant and locks at Hales Bar dam, as the station is within influence of backwater from the dam. Gage No. 1 consists of a sloping section of iron (railroad T rail) bolted to rock and a vertical timber attached to the rock cliff on left bank about 200 feet upstream from Walnut Street Bridge; read by L. M. Andress from October 1, 1917, to February 9, 1918, and by J. B. Miller after that date. Gage No. 2 is a vertical staff gage in three sections, fastened to trees on left bank about 100 feet above Cincinnati Southern Railroad bridge 7 miles upstream from Chattanooga; read by Floyd Gooden from October 1 to November 10, 1917, and by M. M. Swafford from March 1 to September 30, 1918. Prior to October 21, 1913, gage No. 1 was used alone, but on that date backwater from Hales Bar dam began to affect stage-discharge relation, and the station was abandoned until March 1, 1915, when gage No. 2 was installed.

DISCHARGE MEASUREMENTS.—Made from downstream footway of Walnut Street Bridge.

CHANNEL AND CONTROL.—Channel practically permanent. Control now formed by the Hales Bar lock and dam and power plant.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 42.45 feet (gage No. 1) at 7 a. m. February 2 (discharge, 270,000 second-feet); minimum discharge recorded, 8,000 second-feet December 17.

1874–1918: Maximum stage recorded, 54.0 feet at 7 a. m. March 1, 1875 (discharge, 361,000 second-feet); minimum stage recorded, zero on gage September 11–14, 1881, and September 19, 1883 (discharge, 4,800 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.—See "Accuracy."

ACCURACY.—Stage-discharge relation affected by changes in slope of water surface caused by operation of power plant at Hales Bar dam and by rising and falling stages. Discharge determined by slope method (see Water-Supply Paper 345) except for periods indicated in footnote to daily discharge table. Rating curve well defined between 11,500 and 363,000 second-feet. Gages are read to hundredths twice daily, but means are subject to error due to diurnal fluctuations. Records fair.

Discharge measurements of Tennessee River at Chattanooga, Tenn., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.		Discharge.	Date.	Made by—	Gage height.		Discharge.
		Gage No. 1.	Gage No. 2.				Gage No. 1.	Gage No. 2.	
		Feet.	*Feet.*	*Sec.-ft.*			*Feet.*	*Feet.*	*Sec.-ft.*
Nov. 14	L. J. Hall.....	8.00	9.87	11,500	Feb. 5	C. G. Paulsen....	22.14	25.07	99,500
Feb. 2	Paulsen and Hall	42.10	.....	266,000	Mar. 29	L. J. Hall.....	13.23	16.73	51,700

Daily discharge, in second-feet, of Tennessee River at Chattanooga, Tenn., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1...	23,800	16,200	8,400	11,600	263,000	37,500	30,400	40,700	23,400	30,500	21,900	11,900
2...	20,900	17,400	8,800	12,200	266,000	36,000	27,200	38,600	22,500	30,700	23,100	11,200
3...	17,900	16,400	8,400	11,900	200,000	32,200	26,100	36,700	19,000	27,200	21,000	14,300
4...	16,200	15,900	8,800	11,900	167,000	30,900	26,100	35,200	17,600	27,600	18,200	17,800
5...	14,200	15,300	9,200	11,900	104,000	27,800	32,100	32,600	16,400	25,600	15,800	18,900
6...	14,200	15,100	8,800	11,600	71,500	27,100	30,600	28,600	18,900	22,800	14,200	14,600
7...	13,700	15,300	8,800	11,900	59,200	26,600	30,300	27,800	21,200	20,500	14,000	13,000
8...	13,000	14,700	9,800	15,400	53,100	26,600	58,200	27,000	25,200	19,600	13,600	12,300
9...	12,600	14,500	10,400	18,200	48,900	26,600	83,200	25,400	28,500	17,200	13,500	12,500
10...	12,200	14,500	9,800	19,700	45,900	28,600	73,500	26,400	22,700	16,400	13,000	13,400
11...	12,200	.....	10,400	21,400	42,900	33,700	67,600	30,300	20,700	17,900	12,700	13,600
12...	12,700	.....	10,800	30,400	42,900	39,500	72,800	36,200	19,300	17,700	12,500	14,500
13...	12,900	.....	8,800	29,200	41,700	35,200	63,900	40,300	17,500	16,000	14,000	14,900
14...	12,200	.....	8,800	34,800	42,900	34,200	51,800	54,300	17,800	15,000	17,900	14,000
15...	11,800	.....	8,800	34,200	42,900	31,800	39,800	70,800	19,500	14,400	16,000	13,100
16...	12,400	.....	8,400	47,700	41,700	29,500	37,800	62,000	16,200	13,500	14,500	12,800
17...	12,600	.....	8,000	53,900	47,700	28,600	45,100	50,800	15,300	13,400	14,000	12,400
18...	11,600	.....	8,800	52,700	53,400	29,500	51,000	43,100	15,500	13,900	13,000	12,200
19...	12,200	.....	11,600	45,900	54,400	27,900	55,700	36,200	15,800	14,500	12,900	12,700
20...	14,800	.....	11,300	37,100	53,400	26,400	57,000	35,600	18,400	14,500	14,800	12,600
21...	20,700	.....	11,000	30,300	56,600	26,600	64,800	32,200	18,800	15,100	17,000	12,700
22...	25,000	.....	10,500	26,200	65,500	26,900	69,500	32,800	21,300	14,200	18,300	14,000
23...	21,700	.....	10,000	23,700	65,500	28,900	66,300	34,500	44,000	13,800	15,300	15,800
24...	20,100	.....	9,700	20,700	58,000	31,800	59,300	42,200	56,600	14,200	13,500	15,700
25...	17,800	.....	9,290	21,400	51,400	37,800	53,000	45,100	57,000	14,000	12,700	15,100
26...	15,700	.....	12,100	23,400	46,500	45,200	52,200	37,500	39,900	14,300	11,900	14,800
27...	15,300	.....	12,900	25,100	42,300	57,900	50,600	30,300	31,900	16,000	11,600	14,200
28...	14,900	.....	14,000	47,700	39,400	59,100	49,700	29,100	29,200	17,700	11,500	13,500
29...	14,000	.....	14,200	143,000	.....	52,700	44,300	28,500	26,700	16,500	11,200	13,200
30...	15,100	.....	14,300	182,000	.....	44,700	41,900	27,900	32,400	18,500	11,600	13,000
31...	14,600	.....	14,000	232,000	.....	36,800	.....	24,300	.....	20,600	11,900	.....

NOTE.—Discharge record Dec. 1–18, Jan. 6–29, and Feb. 4–28 furnished by Tennessee Power Co.; discharge determined from the gage-height record for the company's gage below Hales Bar dam, the discharge thus obtained being corrected for increase or decrease in storage in order to obtain the natural flow. Discharge for other periods obtained by slope method.

Monthly discharge of Tennessee River at Chattanooga, Tenn., for the year ending Sept. 30, 1918.

[Drainage area, 21,400 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	25,000	11,600	15,500	0.724	0.83
November 1-10	17,400	14,500	15,500	.724	.27
December	14,300	8,000	10,300	.481	.55
January	232,000	11,600	41,900	1.96	2.26
February	266,000	39,400	77,400	3.62	3.77
March	59,100	26,400	34,300	1.60	1.84
April	83,200	26,100	50,400	2.36	2.63
May	70,800	24,300	36,900	1.72	1.98
June	57,000	15,300	25,000	1.17	1.30
July	30,700	13,400	18,200	.850	.98
August	23,100	11,200	14,700	.687	.79
September	18,900	11,200	13,800	.645	.72

TENNESSEE RIVER AT FLORENCE, ALA.

LOCATION.—At Southern Railway bridge at lower end of Pattons Island, just below Little Muscle Shoals, 1 mile south of Florence, Lauderdale County, 3 miles above upper end of Sevenmile Island, 208 miles below Chattanooga, Tenn., and 256 miles above mouth of river.

DRAINAGE AREA.—30,800 square miles.

RECORDS AVAILABLE.—November 7, 1871, to September 30, 1918.

GAGE.—Rod gage consisting of four sections of steel, three-eighths inch by 7½ inches, attached to right face of stone draw pier, which has batter of 1 inch to the foot. These sections form one continuous gage, graduated from −1.92 to 33.5 feet; read by R. E. Coburn. Zero of gage is 400.85 feet above sea level. For description of gages used prior to September 30, 1913, see Water-Supply Paper 353, page 151.

DISCHARGE MEASUREMENTS.—Prior to May, 1918, made from downstream side of highway section (the low-level or through section) of 17-span combined railway and highway bridge. Special care was necessary to counteract effect of obstruction of current by piers. During summer of 1918 measurements were made from boat at a section three-quarters of a mile below gage.

CHANNEL AND CONTROL.—Bed rocky, rough, and uneven; probably permanent. Control is practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 22.0 feet, afternoon of February 6 (discharge, 276,000 second-feet); minimum stage recorded, −0.3 foot, afternoon of September 1 (discharge, 10,400 second-feet).

1871–1918: Maximum stage recorded, 32.5 feet at 10 and 12 p. m. March 19, 1897 (discharge, 444,000 second-feet; supersedes figure previously published); minimum stage recorded, −0.8 foot September 18, 1878 (discharge, 7,350 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.—Operation of power plant at Hales Bar lock and dam, 175 miles upstream, may cause some diurnal fluctuation in low-stage flow.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve is well defined above 12,000 second-feet. Gage read to tenths twice daily: oftener during high water. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Gage-height record furnished by Mississippi River Commission.

Discharge measurements of Tennessee River at Florence, Ala., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec. ft.*
Oct. 30	L. J. Hall	1.07	17,100	May 18	Hall and Wright	8.35	81,600
Nov. 25	do	.25	12,800	20	do	6.15	57,400
Feb. 3	Paulsen and Hall	19.55	230,000	21	do	5.37	50,000
Apr. 1	L. J. Hall	5.47	52,500	June 24	Hall and Adams	2.10	23,400
5	do	3.48	36,400	July 31	L. J. Hall	1.74	20,900
May 14	Paulsen and Adams	8.56	83,900	Aug. 1	do	1.72	20,200
17	Hall and Wright	9.08	91,300	2	do	1.96	21,900

NOTE.—Measurements made in May, June, July, and August were made from boat at a section three-fourths mile below gage.

Daily discharge, in second-feet, of Tennessee River at Florence, Ala., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	25,400	19,600	12,700	17,200	228,000	57,900	53,400	75,500	36,000	42,800	21,600	10,900
2	25,400	20,200	12,700	16,700	240,000	53,400	48,000	69,300	35,200	41,200	21,600	10,900
3	24,600	20,200	12,700	16,700	240,000	51,600	42,800	60,600	32,600	38,600	23,100	13,200
4	26,100	19,000	12,700	17,200	253,000	48,000	37,800	57,000	31,000	36,000	23,800	14,700
5	25,400	20,200	13,200	16,200	269,000	44,600	36,000	53,400	29,300	34,400	23,800	13,700
6	23,100	19,000	13,200	14,700	274,000	42,800	34,400	50,700	27,700	31,000	23,100	15,200
7	20,200	18,400	13,700	14,700	263,000	39,400	39,400	46,200	24,600	29,300	20,200	17,800
8	17,800	17,800	13,700	14,700	244,000	38,600	83,200	45,400	23,100	27,700	18,400	19,000
9	16,700	16,700	13,700	16,200	184,000	37,800	127,000	42,800	23,100	26,100	16,200	16,700
10	15,700	16,700	13,200	17,200	133,000	37,800	154,000	41,200	23,100	21,600	14,700	14,700
11	14,700	16,200	13,700	21,600	90,200	36,000	154,000	42,000	24,600	19,600	14,700	13,700
12	13,700	16,200	14,700	27,700	70,300	36,000	138,000	39,400	24,600	19,000	14,200	13,700
13	13,200	15,700	15,200	31,000	64,300	37,800	114,000	58,800	24,600	18,400	13,700	13,700
14	12,700	15,200	15,200	42,000	60,600	41,200	96,200	83,200	23,800	18,400	13,700	14,700
15	12,200	14,700	16,700	55,200	58,800	44,600	87,800	83,200	23,100	19,000	13,200	15,200
16	12,200	14,200	14,700	68,300	58,800	42,800	74,400	85,400	20,200	17,800	13,700	15,200
17	11,800	14,200	13,700	76,600	63,300	41,200	72,300	90,200	18,400	16,700	16,700	15,200
18	11,800	13,700	12,700	77,700	74,400	37,800	92,600	83,200	18,400	16,700	16,700	13,700
19	11,800	13,200	11,800	81,000	83,200	36,000	103,000	68,300	18,400	17,800	16,700	12,700
20	12,700	13,200	11,800	74,400	86,600	35,200	99,800	58,800	17,800	17,200	14,700	11,800
21	12,700	13,200	11,800	64,300	95,000	36,000	99,800	51,600	17,200	16,700	13,700	11,800
22	15,700	13,200	12,200	56,100	93,800	37,800	101,000	44,600	19,000	17,800	13,200	11,800
23	19,000	12,700	13,700	52,500	93,800	36,000	102,000	42,800	22,400	19,000	13,700	11,400
24	20,200	12,200	13,700	49,800	90,200	35,200	98,600	44,600	24,600	17,800	17,200	11,400
25	23,100	12,200	13,200	42,000	86,600	36,000	90,200	45,400	26,900	18,400	18,400	10,900
26	23,100	12,700	14,200	36,000	78,800	39,400	81,000	46,200	49,800	17,800	16,700	12,700
27	21,600	12,700	14,700	37,800	70,300	41,200	72,300	51,600	55,200	17,200	14,700	15,700
28	19,000	12,700	15,200	58,800	62,400	46,200	68,300	48,900	51,600	20,200	13,700	15,700
29	17,800	12,700	15,200	90,200	.....	57,000	70,300	42,800	43,700	20,200	12,700	15,200
30	16,700	12,700	15,200	152,000	.....	62,400	76,600	39,400	48,000	19,000	12,200	14,700
31	17,800	.....	15,700	208,000	.....	58,800	.....	36,000	.....	20,200	11,800	.....

Monthly discharge of Tennessee River at Florence, Ala., for the year ending Sept. 30, 1918.

[Drainage area, 30,800 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	26,100	11,800	17,900	0.581	0.67
November	20,200	12,200	15,400	.500	.56
December	16,700	11,800	13,800	.448	.52
January	208,000	14,700	50,500	1.64	1.89
February	274,000	58,800	132,000	4.29	4.47
March	62,400	35,200	42,800	1.39	1.60
April	154,000	34,400	84,900	2.76	3.08
May	90,200	36,000	55,800	1.81	2.09
June	55,200	17,200	28,600	.929	1.04
July	42,800	16,700	23,000	.747	.86
August	23,800	11,800	16,500	.536	.62
September	19,000	10,900	13,900	.451	.50
The year	274,000	10,900	40,600	1.32	17.90

SOUTH FORK OF HOLSTON RIVER AT BLUFF CITY, TENN.

LOCATION.—At highway bridge at Bluff City, Sullivan County, 300 feet below Virginia & Southwestern Railway bridge, 1 mile below mouth of Indian Creek, and 10 miles above mouth of Watauga River.

DRAINAGE AREA.—828 square miles.

RECORDS AVAILABLE.—July 17, 1900, to September 30, 1918.

GAGE.—Vertical staff attached to downstream side of bridge pier nearest the right bank; read by W. C. Massengill.

DISCHARGE MEASUREMENTS.—Made from downstream side of highway bridge; or from railroad bridge 300 feet above, where section is much better. At low stages the current becomes sluggish.

CHANNEL AND CONTROL.—Bed of river very rough. Control consists of a shallow ledge; probably permanent. Depth and velocity of current very irregular.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.1 feet January 29 (discharge, 15,100 second-feet); minimum stage recorded, zero on gage December 12 and 13 (discharge, 185 second-feet).

1900–1918: Maximum stage recorded, 11.45 feet February 28, 1902 (discharge, 33,000 second-feet); minimum stage recorded, —0.1 foot October 16 to 19, 21 to 26, 28 to 31, and November 1, 1904 (discharge, 150 second-feet).

ICE.—Stage-discharge relation not affected by ice.

REGULATION.—Operation of small mills upstream causes some diurnal fluctuation.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve fairly well defined below 6,000 second-feet. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good, except for stages below 800 second-feet, for which they are only fair owing to poor definition of rating curve at low stages.

COOPERATION.—Gage-height record furnished by United States Weather Bureau.

The following discharge measurement was made by L. J. Hall:

February 25, 1918: Gage height, 1.61 feet; discharge, 1,150 second-feet.

Daily discharge, in second-feet, of South Fork of Holston River at Bluff City, Tenn., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	245	590	475	325	5,990	1,480	1,280	1,480	650	1,100	785	370
2	212	475	370	370	4,390	1,280	1,100	1,380	590	940	530	325
3	212	370	420	370	3,320	1,280	1,020	1,190	590	785	370	325
4	245	370	325	325	2,760	1,020	1,020	1,100	590	715	285	285
5	245	325	370	325	2,250	1,190	860	1,020	590	650	285	245
6	245	285	325	325	2,010	1,480	860	940	530	530	285	245
7	245	285	285	1,190	1,900	1,680	940	785	530	420	285	285
8	245	285	285	1,100	1,790	2,500	1,190	1,100	530	370	650	325
9	285	285	212	1,100	1,900	1,900	3,610	1,280	590	590	475	785
10	325	285	212	785	3,180	1,680	3,610	1,680	530	650	650	650
11	285	212	212	590	3,760	1,580	2,500	1,380	420	530	475	420
12	285	245	185	2,250	2,760	1,380	2,010	2,500	370	475	370	325
13	370	285	185	2,250	2,370	1,280	1,680	2,370	370	420	325	370
14	325	285	245	1,480	2,130	1,790	1,480	2,630	370	370	325	420
15	245	370	370	1,680	1,790	1,680	1,380	2,250	325	325	325	325
16	245	325	325	1,380	1,680	1,480	1,380	1,680	325	325	285	325
17	245	285	285	1,100	1,580	1,280	1,190	1,480	325	370	370	285
18	245	245	212	940	1,380	1,100	1,380	1,190	245	325	370	370
19	285	245	212	860	1,190	1,020	1,480	1,100	1,900	420	420	530
20	860	212	245	785	1,190	1,020	1,480	1,020	1,020	650	370	530
21	715	245	245	715	1,580	2,010	2,900	940	785	420	370	475
22	530	245	285	715	1,190	3,760	2,500	1,190	1,680	420	325	475
23	420	245	245	715	1,280	2,630	2,010	1,190	2,130	370	285	420
24	370	245	285	860	1,190	2,500	1,680	940	1,280	475	245	370
25	370	245	285	590	1,190	3,910	1,380	1,020	785	370	245	325
26	325	245	370	590	1,190	4,060	1,280	940	1,280	285	245	285
27	325	245	325	6,180	1,900	3,040	1,190	860	2,250	245	285	325
28	285	245	420	12,500	1,680	2,250	1,100	860	1,280	420	370	370
29	285	285	475	15,100	.....	1,900	1,020	860	1,020	420	325	325
30	370	325	370	7,830	.....	1,580	1,020	860	860	370	325	285
31	715	.....	370	9,410	.....	1,380	.....	785	.....	475	325	.....

Monthly discharge of South Fork of Holston River at Bluff City, Tenn., for the year ending Sept. 30, 1918.

[Drainage area, 828 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	860	212	342	0.413	0.48
November	590	212	294	.355	.40
December	475	185	304	.367	.42
January	15,100	325	2,410	2.91	3.36
February	5,990	1,190	2,160	2.61	2.72
March	4,060	1,020	1,870	2.26	2.61
April	3,610	860	1,580	1.91	2.13
May	2,630	785	1,290	1.56	1.80
June	2,250	245	825	.996	1.11
July	1,100	245	491	.593	.68
August	785	245	374	.452	.52
September	785	245	380	.459	.51
The year	15,100	185	1,020	1.23	16.74

HOLSTON RIVER NEAR ROGERSVILLE, TENN.

LOCATION.—At Virginia & Southwestern Railway bridge near Austins Mill, Hawkins County, half a mile below the county highway bridge, 2 miles downstream from mouth of Dodson Creek, 3 miles south of Rogersville, and 11 miles northeast of Bulls Gap, Tenn.

DRAINAGE AREA.—3,060 square miles.

RECORDS AVAILABLE.—March 10, 1902 (daily-discharge record beginning January 1, 1904), to September 30, 1918.

GAGE.—Vertical staff attached to right side of bridge pier nearest right bank.

DISCHARGE MEASUREMENTS.—Made from steel highway bridge about half a mile upstream from gage.

CHANNEL AND CONTROL.—Bed of stream composed of solid rock, boulders, and gravel. Right bank high and not subject to overflow; left bank high but subject to overflow at extremely high stages. Control formed by rock shoals below bridge; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year, 20.0 feet at crest on January 29 (discharge, about 70,900 second-feet); minimum stage recorded, 1.3 feet December 24 to 26 (discharge, 680 second-feet).

1904–1918: Maximum stage recorded, 19.1 feet March 28, 1913 (discharge, about 67,000 second-feet); minimum stage recorded, 1.0 foot October 23 to November 3, 1904 (discharge, 490 second-feet).

ICE.—Stage-discharge relation seldom affected by ice.

REGULATION.—Some diurnal fluctuation caused by Austin's mill power plant and by several other small plants situated on tributaries. The effect is negligible except in extreme low water.

ACCURACY.—Stage-discharge relation practically permanent; probably not affected by ice although river was frozen over January 13 to 27. Rating curve well defined below 33,000 second-feet; extended above that point. Below 10,000 second-feet it coincides with curve used from 1911 to 1915; above 10,000 second-feet revised and slightly changed as a result of flood data obtained in March, 1917. Gage read to tenths once daily (morning) except during period of ice cover when no readings were made. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

Discharge measurements of Holston River near Rogersville, Tenn., during the year ending Sept. 30, 1918.

[Made by L. J. Hall.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Nov. 19	1.51	1,020
Feb. 23	3.13	4,410

Daily discharge, in second-feet, of Holston River near Rogersville, Tenn., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,570	1,570	850	1,390	22,400	4,500	3,970	3,720	3,000	6,230	1,950	4,230
2	1,210	1,760	1,210	1,390	15,000	3,970	3,720	4,770	2,350	6,530	2,350	3,720
3	850	1,570	1,390	1,390	11,300	3,720	3,470	3,970	2,150	4,500	1,950	3,470
4	850	1,570	1,210	1,390	9,850	3,470	3,720	3,720	2,150	3,470	1,570	1,390
5	850	1,390	1,390	1,390	7,790	3,000	3,720	3,470	2,350	2,780	1,570	1,210
6	850	1,390	1,210	1,390	6,230	2,780	3,000	3,000	2,150	2,350	1,390	1,030
7	850	1,390	1,030	1,760	6,230	4,230	2,780	3,000	2,150	2,150	1,390	1,030
8	850	1,210	1,030	2,350	6,230	4,770	3,970	3,000	2,150	1,950	1,390	1,570
9	850	1,030	1,210	3,720	5,930	6,530	7,150	7,470	2,150	1,950	1,390	1,760
10	850	1,030	1,390	3,230	6,230	5,340	12,400	7,470	2,150	2,150	2,150	1,950
11	850	1,030	1,210	3,230	9,850	6,230	9,490	6,230	1,760	2,150	1,950	1,950
12	850	1,030	1,030	3,720	9,490	5,340	7,150	5,630	1,760	1,760	1,760	1,570
13	1,030	1,030	1,030	.....	7,150	4,500	5,630	6,530	1,570	1,760	1,570	1,570
14	1,210	1,030	1,030	.....	6,530	4,500	5,340	7,150	1,570	1,570	1,390	1,760
15	1,570	1,030	850	.....	5,930	5,340	4,500	7,470	1,390	1,570	1,390	1,760
16	1,030	1,030	850	.....	5,630	5,050	3,970	6,530	1,390	1,390	1,760	1,570
17	1,030	1,030	850	.....	5,630	4,500	3,970	5,050	1,390	1,390	1,390	1,570
18	850	1,210	850	.....	5,050	4,230	7,150	4,230	1,390	1,570	1,390	1,570
19	850	1,030	850	.....	4,230	3,720	6,230	3,970	1,950	1,570	1,570	1,760
20	1,030	1,030	850	.....	4,770	3,230	5,050	4,500	3,470	1,950	1,570	1,760
21	3,740	1,030	850	.....	5,050	3,970	5,930	3,970	3,720	1,950	1,570	2,350
22	2,350	850	850	.....	4,770	6,530	9,490	3,720	5,930	1,760	1,570	2,150
23	1,950	850	850	.....	4,770	8,120	7,470	5,050	8,800	1,570	1,390	1,950
24	1,570	850	680	.....	4,230	6,530	6,530	3,970	6,530	1,570	1,210	1,760
25	1,570	850	680	.....	3,970	8,460	5,340	3,720	4,230	1,760	1,030	1,760
26	1,390	850	680	.....	3,970	11,000	4,770	3,720	3,720	1,760	1,210	1,570
27	1,210	850	850	.....	3,970	9,850	4,230	4,230	7,790	1,760	1,570	1,390
28	1,210	850	1,760	39,900	4,770	7,470	3,970	3,720	7,150	1,950	1,950	1,570
29	1,210	850	1,760	58,600	.....	5,630	3,720	3,970	4,770	1,760	1,570	1,570
30	1,390	850	1,390	34,600	.....	5,050	3,470	3,470	3,720	1,570	1,570	1,390
31	1,390	.....	1,390	34,600	.....	4,500	.....	3,470	.....	1,760	1,950	.....

NOTE.—No record Jan. 13–27.

Monthly discharge of Holston River near Rogersville, Tenn., for the year ending Sept. 30, 1918.

[Drainage area, 3,060 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	3,470	850	1,240	0.405	0.47
November	1,760	850	1,100	.359	.40
December	1,760	680	1,070	.350	.40
February	22,400	3,970	7,030	2.30	2.40
March	11,000	2,780	5,360	1.75	2.02
April	12,400	2,780	5,380	1.76	1.96
May	7,470	3,000	4,640	1.52	1.75
June	8,800	1,390	3,220	1.05	1.17
July	6,530	1,390	2,260	.739	.85
August	2,350	1,030	1,590	.520	.60
September	4,230	1,030	1,860	.608	.68

TOCCOA RIVER NEAR DIAL, GA.

LOCATION.—About 2,600 feet above Shallow Ford, 1 mile above Rock Creek, 2½ miles below Big Creek, 3½ miles below Noontootley Creek, 4 miles northwest of Dial, Fannin County, and 12 miles by river above gaging station at Morganton.

DRAINAGE AREA.—175 square miles (measured on topographic maps).

RECORDS AVAILABLE.—January 1, 1913, to September 30, 1918.

GAGE.—Bristol water-stage recorder. Sea-level elevation of zero of auxiliary staff gage, 1,781.13 feet.

DISCHARGE MEASUREMENTS.—Made from cable about 1,000 feet upstream from gage.

CHANNEL AND CONTROL.—Bed of stream consists of gravel and boulders; fairly smooth. Left bank is overflowed at a stage of about 12 feet. Control is formed by the head of rapids just below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum mean daily stage during year from water stage recorder, 3.85 feet January 28 (discharge, 1,880 second-feet); minimum mean daily stage, 0.80 foot September 2 and 16 (discharge, 140 second-feet).

1913–1918: Maximum stage recorded, 10.0 feet at 6 p. m. July 9, 1916 (discharge, 9,200 second-feet); minimum stage recorded, 0.55 foot October 13, 29, and 30, 1914 (discharge, 109 second-feet).

DIVERSIONS.—None.

REGULATION.—Slight diurnal fluctuations are caused by operation of small mills upstream.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined below 4,000 second-feet. Operation of water-stage recorder was satisfactory throughout the year. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting gage-height graph. Records good.

COOPERATION.—Gage-height record furnished by Tennessee Power Co.

No discharge measurements were made at this station during the year.

Daily discharge, in second-feet, of Toccoa River near Dial, Ga., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	312	312	225	210	785	428	334	656	374	382	330	148
2	278	295	225	210	755	424	323	610	370	330	455	140
3	278	295	225	210	700	419	330	585	402	312	330	192
4	278	278	278	195	595	410	354	560	442	302	312	171
5	278	278	242	195	545	406	323	545	406	295	298	210
6	260	260	225	312	545	406	316	536	455	284	267	180
7	242	260	210	260	570	432	845	522	424	284	260	195
8	242	260	242	225	522	390	1,030	700	394	295	242	210
9	260	260	195	225	478	419	785	536	390	281	232	201
10	260	242	278	225	455	446	620	522	362	267	338	162
11	242	260	195	1,200	432	390	565	496	342	260	312	162
12	242	260	225	595	455	378	514	482	370	253	288	165
13	225	260	278	410	432	394	464	755	370	242	213	165
14	225	260	260	432	432	386	455	620	330	239	213	152
15	225	260	295	815	432	370	437	550	320	232	242	142
16	225	242	260	478	700	354	645	527	306	225	320	140
17	210	242	210	410	672	362	595	504	428	242	302	148
18	242	242	210	370	595	358	672	504	509	610	260	250
19	785	225	210	330	700	350	565	532	398	575	195	267
20	500	260	210	330	672	398	532	509	362	342	195	354
21	390	242	210	312	620	386	545	565	460	330	180	216
22	350	242	225	350	570	358	500	610	374	330	165	180
23	330	242	210	312	522	362	478	555	330	309	165	165
24	312	225	210	295	522	378	460	500	302	330	180	155
25	312	225	210	312	500	354	585	491	700	414	162	152
26	312	225	225	350	500	338	1,030	468	545	398	160	160
27	295	225	242	545	455	334	700	432	409	386	171	168
28	295	225	210	1,880	455	330	662	410	350	386	165	165
29	330	278	210	1,270	.....	330	635	410	437	350	171	183
30	595	242	165	1,500	.....	330	728	402	442	390	162	168
31	390	.....	210	1,100	.....	330	.....	382	.....	370	165	.....

Monthly discharge of Toccoa River near Dial, Ga., for the year ending Sept. 30, 1918.

[Drainage area, 175 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	785	210	314	1.79	2.06
November	312	225	254	1.45	1.62
December	295	165	227	1.30	1.50
January	1,880	195	512	2.93	3.38
February	785	432	558	3.19	3.32
March	446	330	379	2.17	2.50
April	1,030	316	568	3.25	3.63
May	755	382	531	3.03	3.49
June	700	302	403	2.30	2.57
July	610	225	330	1.89	2.18
August	455	160	240	1.37	1.58
September	354	140	182	1.04	1.16
The year	1,880	140	374	2.14	28.99

TOCCOA RIVER NEAR MORGANTON, GA.

LOCATION.—At Morganton highway bridge on road from Blueridge, Ga., to Morganton, half a mile downstream from mouth of Star Creek, 2 miles west of Morganton post office, Fannin County, 4 miles east of Blueridge, 12 miles downstream from Dial gaging station, 14 miles upstream from Georgia-Tennessee State line at Copperhill, Tenn., and 28 miles upstream from gaging station on Ocoee River at Emf, Tenn. At State line name of river is changed from Toccoa to Ocoee.

DRAINAGE AREA.—231 square miles (measured on topographic maps).

RECORDS AVAILABLE.—November 25, 1898; to March 31, 1903, and April 1, 1913, to September 30, 1918. Records 1898 to 1903 published in Water-Supply Paper 197 under "Toccoa River near Blueridge, Ga."

GAGE.—Bristol water-stage recorder on right bank 200 feet downstream from bridge and 150 feet downstream from the old vertical staff which was used from 1898 to 1903; zeros of both gages, 1,544.50 feet above sea level, but on account of slope in water surface readings of the two gages do not agree for all stages. The water-stage recorder was installed in 1914 (exact date not recorded). A rod gage has been placed at site of automatic gage. Observer visits gage every day and checks record sheet with rod reading.

DISCHARGE MEASUREMENTS.—Made from cable 1,800 feet downstream from gage.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. Left bank subject to overflow at about gage height 15 feet; right bank not subject to overflow. Low-water control is a low shoal or riffle just below gage; subject to small shifts occasionally; high-water control formed by combination of shoals and banks; practically permanent.

EXTREMES OF DISCHARGE.—Maximum mean daily stage during year from water-stage recorder, 5.3 feet January 28 (discharge, 2,220 second-feet); minimum mean daily stage, 2.3 feet October 12 and December 11 (discharge, 196 second-feet).

1913–1918: Maximum stage recorded, 13.0 feet at 9. p. m. July 9, 1916 (discharge, 13,900 second-feet); minimum stage recorded, 1.8 feet September 10, 14 to 17, 29, 30, and October 1, 1914 (discharge, 129 second-feet).

DIVERSIONS.—None.

REGULATION.—Slight diurnal fluctuations, probably caused by operation of small mills upstream.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting gage-height graph. Records good.

COOPERATION.—Gage-height record furnished by Tennessee Power Co.

Discharge measurements of Toccoa River near Morganton, Ga., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 21	L. J. Hall	2.56	281
Feb. 8	C. G. Paulsen	3.21	593

Daily discharge, in second-feet, of Toccoa River near Morganton, Ga., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	331	310	272	254	982	570	434	827	529	461	369	272
2	290	290	272	272	908	540	424	743	512	383	494	254
3	290	290	254	254	870	529	404	716	529	354	378	306
4	310	290	310	254	764	512	434	683	594	354	354	298
5	310	290	290	254	696	494	393	670	540	340	336	327
6	254	272	272	378	663	483	393	657	594	331	323	306
7	238	272	272	354	696	546	1,050	696	576	345	323	290
8	238	254	272	272	600	489	1,340	1,120	512	340	319	290
9	238	254	254	272	570	494	975	764	500	323	302	323
10	223	254	238	254	540	558	736	696	494	310	364	268
11	210	254	196	1,300	540	483	663	683	483	298	440	254
12	196	254	290	908	540	483	600	663	517	290	298	261
13	254	254	310	512	540	483	558	1,040	517	290	290	261
14	272	254	272	834	540	483	540	885	456	286	290	248
15	272	254	272	945	540	456	529	764	434	286	290	245
16	254	254	290	600	1,060	440	729	716	429	272	350	238
17	238	254	272	483	945	440	736	696	650	283	419	235
18	238	254	290	429	764	440	777	683	750	709	388	354
19	238	238	272	404	764	429	689	709	512	856	354	350
20	512	254	272	378	908	540	683	736	500	451	290	478
21	354	254	254	378	798	483	689	805	594	383	276	323
22	310	254	254	429	729	440	600	856	517	383	268	261
23	290	254	272	378	663	434	588	805	445	331	265	254
24	272	254	254	378	663	478	552	696	429	378	310	248
25	272	254	254	378	663	451	696	670	975	424	283	245
26	254	254	254	429	632	429	1,260	650	827	472	268	272
27	254	254	254	663	600	419	870	600	523	429	290	283
28	272	254	272	2,220	570	419	812	576	456	512	290	279
29	290	290	254	1,500	.....	404	798	564	523	540	279	283
30	540	290	254	1,940	.....	398	922	552	570	540	272	261
31	331	.....	254	1,420	.....	419	.....	540	.....	456	286	.....

NOTE.—Gage heights Dec. 29–31, doubtful; discharge estimated.

Monthly discharge of Toccoa River near Morganton, Ga., for the year ending Sept. 30, 1918.

[Drainage area, 231 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	540	196	285	1.23	1.42
November	310	238	264	1.14	1.27
December	310	196	267	1.16	1.34
January	2,220	254	636	2.75	3.17
February	1,060	540	705	3.05	3.18
March	570	398	473	2.05	2.36
April	1,340	393	696	3.01	3.36
May	1,120	540	725	3.14	3.62
June	975	429	550	2.38	2.66
July	856	272	400	1.73	1.99
August	494	265	324	1.40	1.61
September	478	235	286	1.24	1.38
The year	2,220	196	466	2.02	27.36

OCOEE RIVER AT McHARGE, TENN.

LOCATION.—At county highway bridge at Rogers Ferry, Polk County, half a mile below McHarge railroad siding, half a mile below mouth of Potato Creek, and 2½ miles below Copperhill.

DRAINAGE AREA.—451 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 24, 1917, to June 6, 1918.

GAGE.—Vertical staff bolted to left downstream side of concrete bridge pier on left bank; read by B. V. Karaivanoff.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Left bank subject to overflow at extreme stages, but all water will always pass under bridge. Channel straight for about 300 feet above and 700 feet below gage. Control consists of rock riffle about 300 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, and period of records, 7.1 feet at 7 p. m. January 28, 1918 (discharge not determined); minimum stage recorded, 0.5 foot December 19–23 and 25, 1917 (discharge, 340 second-feet).

ICE.—Stage-discharge relation not affected by ice.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 400 and 2,000 second-feet; extended above 2,000 second-feet. Gage read to half-tenths twice daily; oftener during high water. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Ocoee River at McHarge, Tenn., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 22	L. J. Hall	0.67	441
Feb. 8	Paulsen and Hall	1.68	1,150

Daily discharge, in second-feet, of Ocoee River at McHarge, Tenn., for the period Oct. 1, 1917, to June 6, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	770	630	475	445	1,610	990	630	1,610	805
2	665	565	445	445	1,710	915	700	1,160	770
3	630	565	418	418	1,810	915	840	1,250	878
4	915	535	475	445	1,430	878	840	1,160	952
5	565	535	445	445	1,250	878	700	1,070	915
6	535	505	445	505	1,250	878	630	1,030	878
7	535	505	418	530	1,250	1,160	1,610	990	.....
8	505	505	445	505	1,120	952	2,370	2,130	.....
9	535	505	445	475	1,070	878	2,020	2,020	.....
10	565	505	445	445	1,070	990	1,610	1,810	.....
11	505	505	445	1,910	952	915	1,250	1,430	.....
12	505	505	445	2,250	990	840	1,160	1,070	.....
13	445	475	445	1,070	952	878	990	1,710	.....
14	445	505	418	1,430	915	840	990	1,810	.....
15	445	475	390	2,760	1,160	805	990	1,250	.....
16	445	505	390	1,250	1,610	770	1,430	1,160	.....
17	445	505	365	1,030	2,370	770	2,250	1,160	.....
18	445	445	365	840	1,520	770	1,430	1,070	.....
19	1,430	445	340	770	1,520	840	1,250	1,340	.....
20	1,250	445	340	735	1,810	915	1,160	1,250	.....
21	770	445	340	630	1,610	915	1,250	1,340	.....
22	700	445	340	952	1,430	770	1,160	1,160	.....
23	630	445	340	700	1,430	770	1,070	1,610	.....
24	630	418	365	735	1,160	770	952	1,160	.....
25	565	418	340	665	1,250	770	915	1,070	.....
26	505	418	365	735	1,250	735	2,130	990	.....
27	565	445	365	990	1,160	735	1,520	990	.....
28	505	445	390	4,540	990	700	1,250	915	.....
29	505	475	390	3,830	.....	665	1,340	840	.....
30	840	565	475	5,290	.....	630	1,120	840	.....
31	665	.....	505	3,410	.....	630	.....	840	.....

Monthly discharge of Ocoee River at McHarge, Tenn., for the period Oct. 1, 1917, to May 31, 1918.

[Drainage area, 451 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,430	445	628	1.39	1.60
November	630	418	489	1.08	1.20
December	505	340	407	.902	1.04
January	5,290	418	1,330	2.95	3.40
February	2,370	915	1,340	2.97	3.09
March	1,160	630	834	1.85	2.13
April	2,370	630	1,250	2.77	3.09
May	2,130	840	1,270	2.82	3.25

OCOEE RIVER AT EMF, TENN.

LOCATION.—About 600 feet below Tennessee Power Co's. plant No. 2, known as "Caney Creek plant," half a mile upstream from Emf post office, Polk County, 1½ miles below mouth of Goforth Creek, and 8 miles upstream from Parksville, Tenn.

DRAINAGE AREA.—530 square miles (determined by Tennessee Power Co).

RECORDS AVAILABLE.—January 1, 1913, to September 30, 1918.

GAGE.—Bristol water-stage recorder on left bank; checked daily with a staff gage which is bolted to rock near the recorder. Sea-level elevation of zero of staff gage, 830.00 feet.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge 1,000 feet downstream from gage. Prior to August 29, 1917, made from a cable 2,000 feet below gage, and a few of the early measurements were made from boat.

CHANNEL AND CONTROL.—Bed of stream for several hundred feet below gage is composed of boulders, gravel, and solid rock. Banks high; subject to small overflow. Control is formed by a shoal and island 700 feet downstream from gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum mean daily stage during year from water-stage recorder, 7.5 feet January 30 (discharge, 7,730 second-feet); minimum mean daily stage 2.89 feet December 11 (discharge, 288 second-feet).

1913–1918: Maximum stage recorded, 13.7 feet at 12.30 a. m. July 10, 1916 (discharge, 21,400 second-feet); minimum stage recorded, 2.77 feet September 15 to 17, 1914 (discharge, 285 second-feet).

DIVERSIONS.—None.

REGULATION.—The operation of plant No. 2 causes considerable fluctuation at times, but as a rule, this plant runs on a steady load, the quantity of water used depending largely on stage of river. Storage at diversion dam very small. When plant is shut down water overflows dam in a short time, so that periods of fluctuation will be short.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined between 400 and 8,000 second-feet; above 8,000 second-feet curve is extended as a tangent. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting gage-height graph. Records excellent.

COOPERATION.—Gage-height record furnished by Tennessee Power Co.

Discharge measurements of Ocoee River at Emf, Tenn., during the year ending Sept. 30, 1918.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 12	L. J. Hall	3.28	561	June 20	L. J. Hall	3.88	1,070
Nov. 16	do	3.25	509	20	do	3.83	[a] 1,060
Feb. 6	Paulsen and Hall	4.20	1,400	Aug. 17	do	3.51	730
Apr. 18	do	4.34	1,540				

[a] Measurement made at old cable section which was abandoned in August, 1917. This measurement indicates that results obtained at cable section are somewhat too large.

Daily discharge, in second-feet, of Ocoee River at Emf, Tenn., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	681	706	487	523	2,640	1,140	793	1,890	922	1,480	942	538
2	600	584	530	487	2,120	1,080	829	1,530	848	1,010	811	501
3	615	631	466	472	2,040	1,060	811	1,420	903	820	875	479
4	607	664	459	415	1,660	1,050	829	1,300	961	767	811	600
5	689	664	472	472	1,430	1,050	838	1,130	1,060	758	732	681
6	600	592	472	561	1,380	1,040	750	1,180	1,040	715	615	592
7	545	545	453	681	1,360	1,250	1,410	1,170	1,160	732	664	523
8	545	545	459	592	1,290	1,140	3,110	1,820	1,090	838	561	530
9	545	545	538	494	1,230	990	2,730	1,550	913	732	600	538
10	561	545	538	434	1,280	1,160	1,760	1,340	866	681	568	538
11	545	545	288	2,920	1,210	1,070	1,060	1,250	857	664	732	487
12	545	545	391	4,220	1,180	980	1,240	1,160	866	623	732	472
13	530	545	600	1,270	1,180	951	1,140	1,720	1,070	615	561	568
14	538	545	440	1,690	1,140	1,000	1,090	2,370	838	600	545	516
15	545	530	409	3,110	1,260	970	1,030	1,510	884	600	545	459
16	545	530	538	1,620	2,460	903	1,400	1,320	741	584	607	440
17	538	516	538	1,140	3,300	857	1,820	1,320	732	584	932	440
18	530	472	623	922	1,960	942	1,590	1,300	1,510	776	961	523
19	1,720	508	631	802	1,630	884	1,490	1,200	1,130	1,690	767	561
20	1,760	479	623	793	2,280	961	1,400	1,300	1,030	1,100	656	802
21	866	487	623	723	1,890	1,040	1,700	1,440	1,100	913	561	767
22	838	479	631	961	1,630	922	1,420	1,530	1,170	857	523	576
23	767	479	538	811	1,500	903	1,280	2,120	913	884	508	523
24	723	472	545	776	1,300	1,020	1,210	1,280	793	932	553	472
25	706	545	447	750	1,340	980	1,140	1,610	913	922	576	447
26	681	530	459	784	1,340	922	2,120	1,330	2,040	1,050	538	472
27	584	472	487	1,240	1,250	857	1,890	1,200	1,130	1,060	494	648
28	600	434	466	4,420	1,290	820	1,500	1,070	903	1,090	568	568
29	508	440	472	4,950	.....	802	1,500	990	2,370	1,520	553	530
30	951	466	434	7,730	.....	793	1,760	970	2,920	1,300	516	487
31	884	.....	434	5,060	.....	776	.....	1,400	.....	1,250	553	.....

Monthly discharge of Ocoee River at Emf, Tenn., for the year ending Sept. 30, 1918.

[Drainage area, 530 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,760	508	706	1.33	1.53
November	706	434	535	1.01	1.13
December	631	288	500	.943	1.09
January	7,730	415	1,670	3.15	3.63
February	3,300	1,140	1,630	3.08	3.21
March	1,250	776	978	1.85	2.13
April	3,110	750	1,420	2.68	2.99
May	2,370	970	1,410	2.66	3.07
June	2,920	732	1,120	2.11	2.35
July	1,690	584	908	1.71	1.97
August	961	494	650	1.23	1.42
September	802	440	543	1.02	1.14
The year	7,730	288	1,000	1.89	25.66

BIG BEAR RIVER NEAR RED BAY, ALA.

LOCATION.—At Norman Bridge, 2½ miles east of Red Bay, Franklin County, 3 miles east of Mississippi State line, 4 miles below mouth of Blue Creek, and 35 miles above junction with Tennessee River.

DRAINAGE AREA.—254 square miles (measured on map; scale, 1: 500,000).

RECORDS AVAILABLE.—August 24, 1913, to September 30, 1918.

GAGE.—Vertical staff attached to a sweet gum tree on left bank 25 feet upstream from bridge; installed April 10, 1918. Zero of this gage is 0.66 foot below zero of old gage as originally installed, but owing to settlement of old gage, the 8-foot marks on both gages are at the same elevation. Both gages attached to same tree. See paragraph under "Gage" in Water-Supply Paper 453 for additional information as to settlement of old gage. Gage read by Ed. Bullen.

CHANNEL AND CONTROL.—Bed composed of gravel; probably shifting. During extreme low water current is sluggish and irregular. Left bank subject to overflow at stages above 12 feet. Control is a gravel bar 100 feet downstream; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.3 feet at 1 p. m. April 9 (discharge, 3,810 second-feet); minimum stage recorded, 1.2 feet August 15–17 and September 17 (discharge, 10 second-feet).

1913–1918: Maximum stage recorded, 14.2 feet at 7 p. m. July 9, 1916, referred to original datum of gage installed August 24, 1913, or 14.86 feet referred to datum of gage installed April 10, 1918 (discharge, 4,700 second-feet; figure previously published is in error owing to erroneous extension of rating curve): minimum discharge, 10 second-feet August 15–17 and September 17, 1918.

ICE.—Stage-discharge relation not affected by ice.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined between 80 and 4,000 second-feet; poorly defined below 80 second-feet. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records October to January should be used with caution owing to uncertainty in regard to corrections applied to gage heights (see paragraph under "Gage"). Records February to September good, except those below 80 second-feet, which are only fair.

Discharge measurements of Big Bear River near Red Bay, Ala., during the year ending Sept. 30, 1918.

[Made by L. J. Hall.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 8	13.25	3,900	May 16	5.18	848
9	11.89	2,940	16	4.92	764
10	7.34	1,470	July 27	1.91	111
10	6.46	1,200	28	2.66	258
11	5.26	870			

NOTE.—Gage heights of above measurements referred to datum of staff gage installed Apr. 10, 1918.

Daily discharge, in second-feet, of Big Bear River near Red Bay, Ala., for the year ending Sept. 30, 1918.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	130	130	148	46	1,610	263	136	646	130	671	78	32
2	95	78	112	46	906	243	130	481	130	305	62	46
3	62	62	95	46	671	223	130	435	263	166	46	32
4	62	62	95	46	550	204	130	347	148	130	46	46
5	62	62	78	46	413	204	112	305	112	95	46	284
6	46	62	78	62	347	185	112	263	598	78	32	130
7	32	46	112	130	326	263	148	243	527	62	32	32
8	46	46	148	148	326	284	3,440	223	263	46	32	46
9	62	46	130	112	305	243	3,810	1,190	185	46	32	46
10	46	46	112	95	284	223	1,610	722	148	46	20	46
11	32	46	112	130	284	223	906	435	130	32	20	32
12	32	62	112	305	326	204	646	369	112	32	20	32
13	32	78	95	130	458	185	527	1,620	95	32	20	32
14	32	62	112	263	369	185	435	3,620	95	32	20	20
15	32	62	112	458	305	166	413	1,770	78	32	10	20
16	32	46	112	800	326	166	369	906	78	32	10	20
17	32	46	130	504	646	166	435	598	78	32	10	10
18	32	46	130	326	696	148	1,950	481	62	46	130	20
19	46	46	112	284	574	130	2,260	391	62	130	263	32
20	62	62	112	263	598	148	960	326	46	112	130	32
21	62	62	112	223	574	166	1,310	284	46	78	78	20
22	62	62	95	204	550	204	1,070	223	527	130	46	20
23	62	46	95	166	550	185	933	204	263	95	46	20
24	46	46	95	130	527	166	550	185	148	78	32	20
25	46	46	95	148	435	166	458	166	78	78	32	20
26	46	46	78	185	391	166	391	166	95	46	20	20
27	62	46	78	347	347	148	347	148	481	46	20	46
28	62	32	78	800	305	148	413	148	284	263	62	284
29	46	78	78	1,130	.....	130	722	130	185	223	46	204
30	62	166	78	1,980	.....	130	748	166	263	263	32	130
31	112	.....	62	2,450	.....	130	.....	148	.....	112	32	.....

Monthly discharge of Big Bear River near Red Bay, Ala., for the year ending Sept. 30, 1918.

[Drainage area, 254 square miles.]

Month.	Discharge in second-feet.				Run-off in inches.
	Maximum.	Minimum.	Mean.	Per square mile.	
October	130	32	54	0.213	0.25
November	166	32	60.9	.240	.27
December	148	62	103	.406	.47
January	2,450	46	387	1.52	1.75
February	1,610	284	500	1.97	2.05
March	284	130	187	.736	.85
April	3,810	112	853	3.36	3.71
May	3,620	130	559	2.20	2.54
June	598	46	190	.748	.83
July	671	32	115.	.453	.52
August	263	10	48.5	.191	.22
September	284	10	59.1	.233	.26
The year	3,810	10	257	1.01	13.76

MISCELLANEOUS MEASUREMENTS.

The results of measurements of flow of streams in the Ohio River basin at points other than regular gaging stations are presented in the following table:

Miscellaneous measurements in the Ohio River drainage basin in the year ending Sept. 30, 1918.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1918.				*Feet.*	*Sec.-ft.*
Feb. 12	Hiwassee River	Tennessee River	Old gaging station at Reliance, Tenn.	2.20	2,880
Apr. 6	Tuscumbia Spring	do	Weir 1 mile above pumping station of Government nitrate plant No. 1 at Sheffield, Tenn.		61.7
6	do	do	do		60.6
May 20	do	do	do	1.52	175
Apr. 19	Ocoee River	Hiwassee River	Old gaging station at Parksville, Tenn.	5.85	2,530

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