

# Quality of Surface Waters of the United States 1948

Parts 1-6

*Prepared under the direction of C. G. PAULSEN, Chief Hydraulic Engineer*

---

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1132

*Prepared in cooperation with the States  
of Florida, Georgia, Iowa, North Caro-  
lina, Ohio, Pennsylvania, South Caro-  
lina, and Virginia and other agencies*



**UNITED STATES DEPARTMENT OF THE INTERIOR**

**Douglas McKay, *Secretary***

**GEOLOGICAL SURVEY**

**W. E. Wrather, *Director***

# CONTENTS

---

	Page
Introduction . . . . .	1
Collection and examination of samples . . . . .	3
Chemical quality . . . . .	3
Suspended sediment . . . . .	4
Temperature . . . . .	5
Expression of results . . . . .	6
Composition of surface waters . . . . .	7
Mineral constituents in solution . . . . .	8
Silica . . . . .	8
Aluminum . . . . .	8
Manganese . . . . .	8
Iron . . . . .	9
Calcium . . . . .	9
Magnesium . . . . .	9
Sodium and potassium . . . . .	9
Carbonate and bicarbonate . . . . .	10
Sulfate . . . . .	10
Chloride . . . . .	10
Fluoride . . . . .	10
Nitrate . . . . .	11
Boron . . . . .	11
Dissolved solids . . . . .	11
Properties and characteristics of water . . . . .	12
Oxygen consumed . . . . .	12
Color . . . . .	12
Hydrogen-ion concentration . . . . .	12
Specific conductance . . . . .	13
Hardness . . . . .	13
Total acidity . . . . .	13
Corrosiveness . . . . .	14
Percent sodium . . . . .	14
Sediment . . . . .	14
Publications . . . . .	15
Cooperation and division of work . . . . .	16
Stream flow . . . . .	20
Literature cited . . . . .	21
Chemical analyses, water temperatures, and suspended sediment . . . . .	22
Part 1. North Atlantic slope basins . . . . .	22
Delaware River basin . . . . .	22
Delaware River at Easton, Pa. . . . .	22

## Chemical analyses, etc. --Continued

## North Atlantic slope basins--Continued

Delaware River basin--Continued Page

Delaware River at Trenton, N. J. . . . . 25

Lehigh River at Catasauqua, Pa. . . . . 28

Lehigh River at Walnutport, Pa. . . . . 31

Schuylkill River at Landingville, Pa. . . . . 33

Schuylkill River at Auburn, Pa. . . . . 40

Schuylkill River at Berne, Pa. . . . . 46

Schuylkill River at Pottstown, Pa. . . . . 53

Schuylkill River at Manayunk, Philadelphia, Pa. . . 59

Schuylkill River at Belmont Filters, Philadelphia, Pa. 62

Little Schuylkill River at Drehersville, Pa. . . . . 65

Perkiomen Creek at Graters Ford, Pa. . . . . 71

Brandywine Creek at Chadds Ford, Pa. . . . . 73

Brandywine Creek at Wilmington, Del. . . . . 74

Miscellaneous analyses of streams in Delaware River basin in Pennsylvania . . . . . 79

Susquehanna River basin . . . . . 96

Susquehanna River at Falls, Pa. . . . . 96

Susquehanna River at Danville, Pa. . . . . 99

Susquehanna River at Harrisburg, Pa. . . . . 105

West Branch Susquehanna River at Lock Haven, Pa. . 110

West Branch Susquehanna River at Lewisburg, Pa. . 113

Frankstown Branch Juniata River at Huntingdon, Pa.. 116

Juniata River at Newport, Pa. . . . . 119

Raystown Branch Juniata River near Huntingdon, Pa.. 122

Conestoga Creek at Lancaster, Pa. . . . . 125

Miscellaneous analyses of streams in Susquehanna River basin in Pennsylvania . . . . . 128

Potomac River basin. . . . . 134

Cacapon River at Great Cacapon, W. Va. . . . . 134

South Branch Potomac River near Petersburg, W. Va. 135

Conococheague Creek at Fairview, Md. . . . . 136

Antietam Creek near Waynesboro, Pa. . . . . 137

Monocacy River at Bridgeport, Md. . . . . 138

## Part 2. South Atlantic slope and eastern Gulf of Mexico basins 139

James River basin . . . . . 139

Jackson River at Falling Spring, Va. . . . . 139

James River at Lick Run, Va. . . . . 140

James River at Buchanan, Va. . . . . 141

James River at Holcombs Rock, Va. . . . . 144

James River at Bent Creek, Va. . . . . 145

James River at Scottsville, Va. . . . . 148

James River at Cartersville, Va. . . . . 149

James River at Richmond, Va. . . . . 150

Cowpasture River near Clifton Forge, Va. . . . . 153

Maury River near Buena Vista, Va. . . . . 154

Buffalo River near Norwood, Va. . . . . 155



## Chemical analyses, etc.--Continued

South Atlantic slope and eastern Gulf of Mexico basins--  
Continued

	Page
James River basin--Continued	
Rivanna River at Palmyra, Va. . . . .	156
Chickahominy River near Providence Forge, Va. . .	157
Miscellaneous analyses of streams in James River basin in Virginia . . . . .	158
Pee Dee River basin . . . . .	163
Yadkin River at Patterson, N. C. . . . .	163
Yadkin River at Wilkesboro, N. C. . . . .	164
Yadkin River at High Rock, N. C. . . . .	167
Pee Dee River near Rockingham, N. C. . . . .	170
Reddies River at North Wilkesboro, N. C. . . . .	173
Fisher River near Copeland, N. C. . . . .	174
South Yadkin River at Cooleemee, N. C. . . . .	175
Abbotts Creek at Lexington, N. C. . . . .	178
Uwharrie River near Eldorado, N. C. . . . .	181
Rocky River near Norwood, N. C. . . . .	182
Santee River basin . . . . .	185
Broad River near Carlisle, S. C. . . . .	185
Enoree River near Enoree, S. C. . . . .	186
Edisto River basin . . . . .	187
North Fork Edisto River at Orangeburg, S. C. . . .	187
St. Johns River basin . . . . .	188
St. Johns River near De Land, Fla. . . . .	188
Miscellaneous analyses of streams in South Atlantic slope basins in North Carolina . . . . .	191
Part 3. Ohio River basin. . . . .	193
Ohio River main stem . . . . .	193
Allegheny River at Kittanning, Pa. . . . .	193
Allegheny River at Sharpsburg, Pa. . . . .	195
Ohio River at Ambridge, Pa. . . . .	197
Allegheny River tributaries . . . . .	201
Clarion River near Piney, Pa. . . . .	201
Kiskiminetas River at Leechburg, Pa. . . . .	203
Monongahela River basin . . . . .	206
Tygart River at Elkins, W. Va. . . . .	206
Monongahela River at Charleroi, Pa. . . . .	207
Shavers Fork at Parsons, W. Va. . . . .	210
Youghiogheny River at Sutersville, Pa. . . . .	211
Beaver River basin . . . . .	214
Mahoning River at Warren, Ohio . . . . .	214
Beaver River at New Brighton, Pa. . . . .	217
Muskingum River basin . . . . .	220
Tuscarawas River at Newcomerstown, Ohio . . . .	220
Little Kanawha River basin . . . . .	223
Little Kanawha River at Glenville, W. Va. . . . .	223

## Chemical analyses, etc. --Continued

Ohio River basin --Continued	Page
Kanawha River basin . . . . .	224
New River at Hinton, W. Va. . . . .	224
Greenbrier River at Alderson, W. Va. . . . .	225
Knapp Creek at Marlinton, W. Va. . . . .	226
Big Sandy River basin . . . . .	227
Tug Fork at Kermit, W. Va. . . . .	227
Scioto River basin . . . . .	228
Olentangy River at Delaware, Ohio . . . . .	228
Olentangy River near Delaware, Ohio . . . . .	229
Little Miami River basin . . . . .	230
Little Miami River at Milford, Ohio . . . . .	230
Little Miami River near Oldtown, Ohio . . . . .	233
East Fork Little Miami River near Milford, Ohio . . . . .	234
Massie Creek at Oldtown, Ohio . . . . .	235
Miami River basin . . . . .	236
Miami River above Stillwater River at Dayton, Ohio . . . . .	236
Stillwater River at Dayton, Ohio . . . . .	237
Mad River near Dayton, Ohio . . . . .	238
Mad River at West Liberty, Ohio . . . . .	241
Miscellaneous analyses of streams in Ohio River basin in North Carolina . . . . .	242
Part 4. St. Lawrence River basin . . . . .	245
Streams tributary to Lake Erie . . . . .	245
Auglaize River at Wapakoneta, Ohio . . . . .	245
Ottawa River at Lima, Ohio . . . . .	246
Blanchard River at Findley, Ohio . . . . .	247
Toussaint River near Genoa, Ohio . . . . .	248
Portage River at Elmore, Ohio . . . . .	249
Sandusky River at Upper Sandusky, Ohio . . . . .	250
Sandusky River at Fremont, Ohio . . . . .	251
Cuyahoga River at Botzum, Ohio . . . . .	254
Part 5. Hudson Bay and Upper Mississippi River basins	257
Red River of the North basin . . . . .	257
Red River of the North at Fargo, N. Dak. . . . .	257
Miscellaneous analyses of streams in Red River of the North basin in North Dakota . . . . .	258
Iowa River basin . . . . .	259
Iowa River at Iowa City, Iowa . . . . .	259
Cedar River at Cedar Rapids, Iowa . . . . .	262
Part 6. Missouri River basin . . . . .	265
Marias River basin . . . . .	265
Miscellaneous analyses of streams in Marias River basin in Montana . . . . .	265
Yellowstone River basin . . . . .	266
Wind River near Dubois, Wyo. . . . .	266
Wind River at Riverton, Wyo. . . . .	268
Bighorn River at Thermopolis, Wyo. . . . .	270

## Chemical analyses, etc. --Continued

## Missouri River basin--Continued

Yellowstone River basin--Continued	Page
Bighorn River at Manderson, Wyo. . . . .	275
Bighorn River at Kane, Wyo. . . . .	279
Bighorn River near Custer, Mont. . . . .	283
Badwater Creek at Bonneville, Wyo. . . . .	287
Shoshone River below Buffalo Bill Reservoir, Wyo. . . . .	291
Shoshone River at Byron, Wyo. . . . .	293
Tongue River at Miles City, Mont. . . . .	295
Powder River at Arvada, Wyo. . . . .	299
Miscellaneous analyses of streams in Yellowstone River basin in Montana. . . . .	303
Miscellaneous analyses of streams in Yellowstone River basin in Wyoming . . . . .	304
Little Missouri River basin . . . . .	305
Little Missouri River at Medora, N. Dak. . . . .	305
Little Missouri River near Watford City, N. Dak. . . . .	311
Miscellaneous analyses of streams in Little Missouri River basin in North Dakota . . . . .	322
Knife River basin . . . . .	325
Knife River near Golden Valley, N. Dak. . . . .	325
Knife River at Hazen, N. Dak. . . . .	329
Heart River basin . . . . .	333
Heart River near South Heart, N. Dak. . . . .	333
Heart River near Richardton, N. Dak. . . . .	339
Miscellaneous analyses of streams in Heart River basin in North Dakota . . . . .	343
Cannonball River basin . . . . .	346
Cannonball River near New Leipzig, N. Dak. . . . .	346
Cedar Creek near Pretty Rock, N. Dak. . . . .	350
Miscellaneous analyses of streams in Cannonball River basin in North Dakota . . . . .	353
Grand River basin . . . . .	354
Grand River at Shadehill, S. Dak. . . . .	354
Miscellaneous analyses of streams in Grand River basin in South Dakota . . . . .	360
Moreau River basin . . . . .	363
Moreau River near Faith, S. Dak. . . . .	363
Miscellaneous analyses of streams in Moreau River basin in South Dakota . . . . .	369
Cheyenne River basin . . . . .	370
Cheyenne River near Hot Springs, S. Dak. . . . .	370
Miscellaneous analyses of streams in Cheyenne River basin in South Dakota . . . . .	375
Miscellaneous analyses of streams in Cheyenne River basin in Wyoming . . . . .	376

## Chemical analyses, etc.--Continued

Missouri River basin --Continued	Page
Bad River basin . . . . .	377
Miscellaneous analyses of streams in Bad River basin in South Dakota . . . . .	377
White River basin . . . . .	378
White River near Oglala, S. Dak. . . . .	378
Miscellaneous analyses of streams in White River basin in South Dakota . . . . .	382
Niobrara River basin . . . . .	383
Niobrara River near Gordon, Nebr. . . . .	383
Niobrara River near Cody, Nebr. . . . .	387
Niobrara River near Sparks, Nebr. . . . .	390
Long Pine Creek near Riverview, Nebr. . . . .	395
Miscellaneous analyses of streams in Niobrara River basin . . . . .	398
Platte River basin . . . . .	401
North Platte River below Casper, Wyo. . . . .	401
North Platte River near Douglas, Wyo. . . . .	405
North Platte River near Cassa, Wyo. . . . .	409
North Platte River below Guernsey Reservoir, Wyo. . . . .	413
South Platte River at Julesburg, Colo. . . . .	416
Wood River near Riverdale, Nebr. . . . .	420
Middle Loup River at Dunning, Nebr. . . . .	425
Middle Loup River at St. Paul, Nebr. . . . .	427
South Loup River at St. Michael, Nebr. . . . .	431
North Loup River near St. Paul, Nebr. . . . .	436
Beaver Creek at Loretto, Nebr. . . . .	441
Miscellaneous analyses of streams in Platte River basin . . . . .	445
Kansas River basin . . . . .	447
Arikaree River at Haigler, Nebr. . . . .	447
Republican River at Trenton, Nebr. . . . .	451
Republican River near Orleans, Nebr. . . . .	459
Medicine Creek at Cambridge, Nebr. . . . .	463
Sappa Creek near Beaver City, Nebr. . . . .	467
Sappa Creek near Stamford, Nebr. . . . .	471
Prairie Dog Creek at Norton, Kans. . . . .	476
Smoky Hill River near Ellis, Kans. . . . .	481
Saline River near Russell, Kans. . . . .	485
Saline River near Wilson, Kans. . . . .	491
Paradise Creek near Paradise, Kans. . . . .	493
Wolf Creek near Sylvan Grove, Kans. . . . .	497
South Fork Solomon River at Alton, Kans. . . . .	501
Solomon River at Beloit, Kans. . . . .	505
Miscellaneous analyses of streams in Kansas River basin . . . . .	508
Index . . . . .	511

---

ILLUSTRATION

---

	Page
Figure 1. Map of the United States showing basins covered by the two water-supply papers on quality of surface waters in 1948. The shaded portion represents the section of the country covered by this volume. The unshaded portion is included in Water-Supply Paper 1133. . . . .	2



# QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1948

---

## INTRODUCTION

The quality-of-water investigations of the United States Geological Survey are concerned with chemical and physical characteristics of the surface and ground water supplies of the Nation. Most of the investigations carried on in cooperation with states and other federal agencies deal with the amounts of matter in solution and in suspension in streams.

The records of chemical analysis, suspended sediment, and water temperature for surface waters given in this volume serve as a basis for determining the suitability of the waters examined for industrial, agricultural, and domestic uses insofar as such use is affected by the dissolved or suspended mineral matter in the waters. The discharge of a stream and, to a lesser extent, the chemical quality are related to variations in rainfall and other forms of precipitation. In general, lower concentrations of dissolved solids may be expected during the periods of high flow than during periods of low flow. The concentration in some streams may change materially with relatively small variations in flow, whereas for other streams the quality may remain relatively uniform throughout large ranges in discharge. The quantities of suspended sediment carried by streams are also related to discharge, and during flood periods the sediment concentrations in many streams vary over wide ranges.

The regular yearly publication of records of chemical analyses, suspended sediment, and water temperature was begun by the Geological Survey in 1941. The annual records heretofore have been published in a single volume for the entire country. Beginning this year, the records are being published in two volumes, covering the drainage basins shown in figure 1. The samples for which data are given were collected from October 1, 1947, to September 30, 1948. Descriptive statements are given for each sampling station for which regular series of chemical analyses or sediment determinations have been made. These statements include the location of the stream-sampling station, drainage area, length of time for which records are available, extremes of dissolved solids, total hardness, sediment loads, water temperature, and other pertinent data. Records of water discharge of the streams at, or near, the sampling point for the sampling period are included in most tables of analyses. The records are arranged by drainage basins according to Geological Survey practice in reporting records of stream flow.

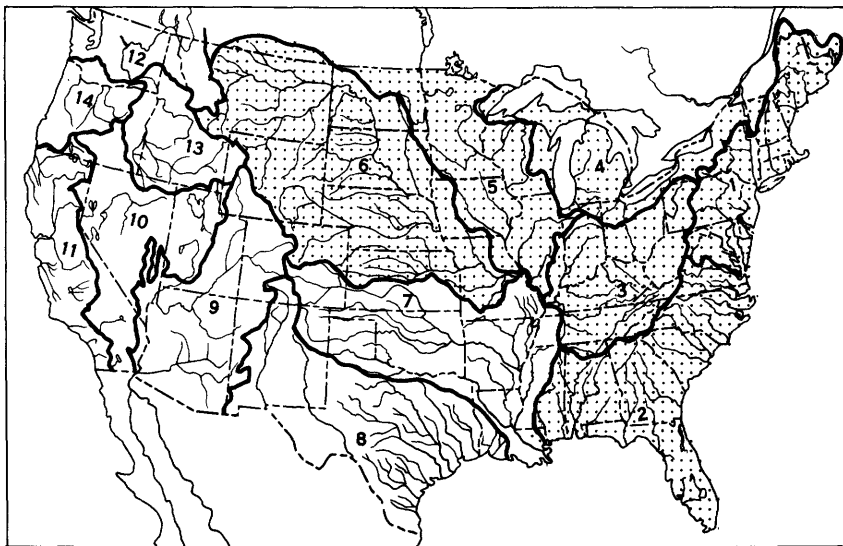


Figure 1. Map of the United States showing basins covered by the two water-supply papers on quality of surface waters in 1948. The shaded portion represents the section of the country covered by this volume. The unshaded portion is included in Water-Supply Paper 1133.

During the year ended September 30, 1948, 54 daily sampling stations for the study of the chemical character of surface waters were maintained by the Geological Survey in the area covered by this volume. Samples were collected less frequently during the year at many other points. Water temperatures were measured daily at 63 of the regular sampling stations. Not all analyses of samples of surface water collected during the year have been included. Single analyses of an incomplete nature generally have been omitted. Also, determinations made on the daily samples before compositing have not been reported. Specific conductance was usually determined on each daily sample, and pH, chloride, or other determinations were also made on many of the daily samples. As noted in the table headings these data are available for reference at the district offices listed under Division of Work, on page 16.

Quantities of suspended sediment are reported for 54 stations during the year ended September 30, 1948. The sediment samples were collected from one to five times daily at most stations, depending on the rate of flow and changes in stage. Sediment samples were collected less frequently during the year at many other points. In connection with measurements of sediment discharge, sizes of the sediment particles were determined at 49 of the stations. As noted under "Remarks" in the table headings, suspended sediment concentrations were also determined from the samples collected for chemical analysis in some parts of the country. Rec-



ords of these infrequent determinations are available for reference in the district offices listed. The data do not provide a reliable basis for computing the loads of suspended sediment carried by the stream but may be of value for design and operation of filtration plants utilizing these stream waters.

Material which is transported essentially in continuous contact with the stream bed is termed bed load and is not considered in this report. All other undissolved material in transport is termed suspended sediment and generally constitutes the major part of the total sediment load. At the present time no reliable method has been developed for determining bed load on a routine basis.

## COLLECTION AND EXAMINATION OF SAMPLES

### CHEMICAL QUALITY

Samples for chemical analysis were usually collected daily at, or near, points on streams where gaging stations are maintained for measurement of water discharge. Most of the analyses were made on 10-day composites of daily samples collected for a period of a year at each sampling point. Three composite samples were usually prepared each month by mixing together equal quantities of daily samples collected from the 1st to the 10th, from the 11th to the 20th, and during the remainder of the month. For streams in the Missouri River basin the composite samples were prepared generally by taking from each daily sample a quantity proportionate to the mean daily water discharge. For some streams that are subject to sudden and large changes in chemical composition, samples were composited for shorter periods on the basis of the concentration of dissolved solids indicated by measurements of specific conductance of the daily samples.

The samples were analyzed according to methods regularly used by the Geological Survey. These methods are essentially the same as, or are modifications of, methods described in recognized authoritative publications for the mineral analysis of water samples (Collins, 1928; Am. Pub. Health Assoc., 1946).

For those waters containing moderately large quantities of soluble salts, the value reported for dissolved solids is the sum of the quantities of the various determined constituents using the carbonate equivalent of the reported bicarbonate. In other analyses the value reported as dissolved solids is the residue on evaporation after drying at 180°C. for 1 hour. Specific conductance is given for most analyses and was determined by means of a conductance bridge using a standard potassium chloride solution as reference.

## SUSPENDED SEDIMENT

In general, samples were collected daily with the US D-43 depth-integrating sampler (U. S. Interagency, 1948, pp. 70-76) from a fixed sampling point at one vertical in the cross section. The US DH-48 hand sampler was used at many stations during periods of low flow. During periods of subfreezing temperatures, samples in the Missouri River basin were collected by observers with the modified Colorado River sampler. At intervals throughout the year, suspended-sediment samples, consisting of depth-integrated samples at three or more verticals in the cross section were made to determine the cross-sectional distribution of the suspended concentration with respect to that at the daily sampling vertical. In streams where comparatively rapid fluctuations in transverse distribution of water discharge or sediment concentration are encountered at the sampling point, samples were regularly taken at two or more verticals to determine the average concentration across the section. During periods of high flow, samples were taken two or more times throughout the day at many sampling stations, and during periods of rapidly changing flow samples were taken hourly at some stations.

Sediment concentrations were determined by filtration or evaporation of the samples as required. At many stations the mean daily concentration for some days was obtained by plotting the instantaneous concentrations on the original or copies of the original gage-height chart. The plotted concentrations adjusted, if necessary, for cross-sectional distribution with respect to that at the daily sampling vertical, were connected or averaged by continuous curves to obtain a concentration graph. This graph represented the estimated concentration at any time and, for most periods, mean daily concentrations were determined from the graph. When the concentration and water discharge were changing rapidly, the day was often subdivided for this computation. For some periods when the day-to-day variation in the concentration was negligible, the data were not plotted, and the average concentration of the samples was used as the mean concentration for the day. For certain stations, when the discharge and sediment concentrations were relatively low and varied only slightly from day to day, the samples for a number of days were composited and the mean daily concentrations and mean daily loads are shown.

For some periods when no samples were collected, daily sediment loads were estimated on the basis of water discharge, sediment concentrations observed immediately preceding and following the periods, and sediment loads for other periods of similar discharge. The estimates were further guided by weather conditions and sediment discharge for other stations.

In many instances where there were no observations for several days, the sediment loads for individual days were not estimated, as numerous factors influencing the quantities of transported sediment made it very difficult to make accurate estimates of sediment loads for individual days. However, estimated sediment loads for missing periods have been included in monthly and annual totals for most streams to provide a complete record.

In addition to the records of total quantities of sediment, records of the particle sizes of sediment are included also. The particle sizes of the suspended sediments were determined periodically for many of the stations. As much of the material carried in suspension can pass through the finest sieves, the bottom-withdrawal tube method (U. S. Inter-agency, 1943, pp. 82-90) was used in most of the analyses. Generally sieves were used in the determination of particle sizes in excess of 0.062 millimeter. Native or distilled water, as noted in the tables of analyses, was used as the settling medium. In some instances, chemical dispersing agents were added to the settling medium. As settling diameters of the clay and colloidal fractions are often affected by the chemical character of the settling medium, analyses made using native water more nearly simulate particle sizes existing in the stream. Results of analyses using distilled water or using a settling medium containing dispersing agents approximate ultimate particle sizes of the finer fractions. The concentration of sediment suspension for analysis was reduced to less than 10,000 parts per million, where necessary, by means of a sample splitter, in order to meet the limits recommended for the bottom-withdrawal tube method. The concentration of suspended sediment used in the bottom-withdrawal tube was often different from the concentration in the original suspension. The weight of sediment used is indicated in the tables of analyses.

## TEMPERATURE

For most of the stations, daily water temperatures were obtained at the time that the chemical quality or sediment samples were collected. So far as practicable the water temperatures were observed at about the same time each day for an individual river station in order that the data would be relatively unaffected by diurnal variations in temperature. For most large, swiftly flowing streams the diurnal variation in water temperature is probably small, but for sluggish or shallow streams the daily range in temperature may amount to several degrees and may follow closely changes in air temperature. The thermometers used for determination of water temperature were accurate to plus or minus about 0.5°F. Consequently water temperatures of 31°F. have been included in this report.

## EXPRESSION OF RESULTS

The dissolved mineral constituents are reported in parts per million. A part per million is a unit weight of a constituent in a million unit weights of water. Equivalents per million are not given in this report though the expression of analyses in equivalents per million is sometimes preferred. An equivalent per million is a unit chemical combining weight of a constituent in a million unit weights of water and is calculated by dividing the concentration in parts per million by the chemical combining weight of the constituent. For convenience in making this conversion the reciprocals of chemical combining weights of the most commonly reported constituents (ions) are given in the following table:

Constituent	Factor	Constituent	Factor
Iron ( $\text{Fe}^{++}$ ) -----	0.0358	Carbonate ( $\text{CO}_3^{--}$ )----	0.0333
Iron ( $\text{Fe}^{+++}$ )-----	.0537	Bicarbonate ( $\text{HCO}_3^-$ )--	.0164
Calcium ( $\text{Ca}^{++}$ ) -----	.0499	Sulfate ( $\text{SO}_4^{--}$ ) -----	.0208
Magnesium ( $\text{Mg}^{++}$ ) ---	.0822	Chloride ( $\text{Cl}^-$ ) -----	.0282
Sodium ( $\text{Na}^+$ )-----	.0435	Fluoride ( $\text{F}^-$ ) -----	.0526
Potassium ( $\text{K}^+$ ) -----	.0256	Nitrate ( $\text{NO}_3^-$ ) -----	.0161

Results given in parts per million can be converted to grains per United States gallon by dividing by 17.12. A calculated quantity of sodium and potassium is given in some analyses and is the quantity of sodium needed in addition to the calcium and magnesium to balance the acid radicals.

The total hardness, as calcium carbonate ( $\text{CaCO}_3$ ), is calculated from the equivalents of calcium and magnesium except for a few samples for which the reported values also include equivalents of free mineral acid, aluminum, iron, and manganese when present in significant quantities. The hardness caused by calcium and magnesium (and other ions if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness.

In the analyses of most waters used for irrigation, the quantity of dissolved solids is given in tons per acre-foot as well as in parts per million. Percent sodium has been computed for those analyses where sodium and potassium are reported separately by dividing the equivalents per million of sodium by the sum of the equivalents per million of calcium, magnesium, sodium, and potassium and multiplying the quotient by 100. In analyses where sodium and potassium were calculated and reported as a combined value, the value reported for percent sodium will include the equivalent quantity of potassium. In most waters of moderate to high concentration, the proportion of potassium is much smaller than that of sodium.

Specific conductance values are expressed in reciprocal ohms (micromhos at 25°C.). The discharge of the streams is reported in second-feet (see Stream flow, p. 20) and the temperature in degrees Fahrenheit. Color is expressed in units of the platinum-cobalt scale proposed by Hazen (1892, pp. 427-428). Hydrogen-ion concentration (pH) is given as the negative logarithm of the number of moles of ionized hydrogen per liter of water.

Average analyses (arithmetical or weighted) for the water year are given for most daily sampling stations. An arithmetical-average analysis represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the river each day for the water year. A weighted-average analysis represents approximately the composition of water that would be found in a reservoir containing all of the water passing a given station during the year after thorough mixing in the reservoir. The weighted-average analysis is computed by multiplying the discharge for the sampling period by the quantities of the individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. The weighted-average analysis shows less concentrated water than that represented by the average of the individual analyses for most streams because at times of high discharge the rivers generally have lower concentrations of dissolved solids.

Mean daily sediment concentrations are expressed in parts per million by weight. Daily sediment loads are expressed in tons per day, usually obtained by multiplying mean daily sediment concentration in parts per million by the mean daily discharge, and the conversion factor 0.0027.

Particle-size analyses are expressed in percentages finer than indicated sizes in millimeters. The size classification used in this report is that recommended by the American Geophysical Union Subcommittee On Sediment Terminology (Lane, et al; 1947, p. 937). Other data included as pertinent to the size analyses for many streams are the date of collection, the stream discharge and sediment concentration when the sample was collected, the concentration of the suspension during analysis, and the method of analysis.

## COMPOSITION OF SURFACE WATERS

All natural waters contain dissolved mineral matter. Water in contact with soils or rock, even for only a few hours, will dissolve some rock materials. The quantity of dissolved mineral matter in a natural water depends primarily on the type of rocks or soils through which the water has passed and the length of time it has been in contact with the rocks or soils. Some streams are fed by both surface runoff and underground water from springs or seeps. Such streams reflect the chemical character of their concentrated underground sources during dry periods and are more dilute during periods of heavy rainfall. Underground water is usually more

highly concentrated than surface runoff as it remains in contact with the rocks and soils for much longer periods. The concentration of dissolved solids in a river water is frequently increased by drainage from mines or oil fields, by the addition of industrial or municipal wastes, or--in irrigated areas--by return drain waters.

The mineral constituents and physical properties of natural waters reported in the tables of analyses include those that have a practical bearing on the value of the waters for most purposes. The analyses generally include results for silica, iron, calcium, magnesium, sodium, potassium (or sodium and potassium together as sodium), bicarbonate, sulfate, chloride, fluoride, nitrate, boron, and dissolved solids. Aluminum, manganese, color, pH, acidity, and oxygen consumed are reported for certain streams. The source and significance of the different constituents and properties of natural waters are discussed in the following paragraphs.

## MINERAL CONSTITUENTS IN SOLUTION

### Silica ( $\text{SiO}_2$ )

Silica is dissolved from practically all rocks. Some natural surface waters contain less than 5 parts per million of silica and few contain more than 50 parts, but the more common range is from 10 to 30 parts per million. Silica affects the usefulness of a water because it contributes to the formation of boiler scales; it usually is removed from feed water for high-pressure boilers. Silica also forms troublesome deposits on the blades of steam turbines.

### Aluminum (Al)

Aluminum is usually present only in negligible quantities in natural waters except in areas where the waters have been in contact with the more soluble rocks of high aluminum content such as bauxite and certain shales. Acid waters often contain large amounts of aluminum. It may be troublesome in feed waters where it tends to be deposited as a scale on boiler tubes.

### Manganese (Mn)

Manganese is dissolved in appreciable quantities from rocks in some sections of the country. Waters impounded in large reservoirs may contain manganese that has been dissolved from the mud on the bottom of the reservoir by action of carbon dioxide produced by anaerobic fermentation of organic matter. Manganese is not regularly determined in areas where it is not present in the wa-

ters in appreciable amounts. It is especially objectionable in water used in laundry work and in textile processing. Concentrations as low as 0.2 part per million may cause a dark-brown or black stain in fabrics and on porcelain fixtures. Appreciable quantities of manganese are often found in waters containing objectionable quantities of iron.

### Iron (Fe)

Iron is dissolved from many rocks and soils. On exposure to the air, normal basic waters that contain more than 1 part per million of iron soon become turbid with the insoluble reddish ferric oxide produced by oxidation. Surface waters, therefore, seldom contain as much as 1 part per million of dissolved iron, although some acid waters carry large quantities of iron in solution. Iron causes reddish-brown stains on white porcelain or enameled ware and fixtures and on fabrics washed in the water.

### Calcium (Ca)

Calcium is dissolved from practically all rocks and soils, but the highest concentrations are usually found in waters that have been in contact with limestone, dolomite, and gypsum. Calcium and magnesium make water hard and are largely responsible for the formation of boiler scale. Most waters associated with granite or silicious sands contain less than 10 parts per million of calcium; waters in areas where rocks are composed of dolomite and limestone contain from 30 to 100 parts per million; and waters that have come in contact with deposits of gypsum may contain several hundred parts per million.

### Magnesium (Mg)

Magnesium is dissolved from many rocks, particularly from dolomitic rocks. Its effect in water is similar to that of calcium. The magnesium in soft waters may amount to only 1 or 2 parts per million, but water in areas that contain large quantities of dolomite or other magnesium-bearing rocks may contain from 20 to 100 parts per million or more of magnesium.

### Sodium and potassium (Na and K)

Sodium and potassium are dissolved from practically all rocks. Sodium is the predominant cation in some of the more highly mineralized waters found in the Western United States. Natural waters that contain only 3 or 4 parts per million of the two together are likely to carry almost as much potassium as sodium. As the total quantity of these constituents increases, the proportion of sodium becomes much greater. Moderate quantities of sodium and potassium have little effect on the usefulness of the water for most

purposes, but waters that carry more than 50 or 100 parts per million of the two may require careful operation of steam boilers to prevent foaming. More highly mineralized waters that contain a large proportion of sodium salts may be unsatisfactory for irrigation.

#### Carbonate and bicarbonate ( $\text{CO}_3$ and $\text{HCO}_3$ )

Bicarbonate occurs in waters largely through the action of carbon dioxide, which enables the water to dissolve carbonates of calcium and magnesium. Carbonate as such is not usually present in appreciable quantities in natural waters. The bicarbonate in waters that come from relatively insoluble rocks may amount to less than 50 parts per million; many waters from limestone contain from 200 to 400 parts per million. Bicarbonate in moderate concentrations in water has no effect on its value for most uses. Bicarbonate or carbonate is an aid in coagulation for the removal of suspended matter from water.

#### Sulfate ( $\text{SO}_4$ )

Sulfate is dissolved from many rocks and soils--in especially large quantities from gypsum and from beds of shale. It is formed also by the oxidation of sulfides of iron and is therefore present in considerable quantities in waters from mines. Sulfate in waters that contain much calcium and magnesium causes the formation of hard scale in steam boilers and may increase the cost of softening the water.

#### Chloride (Cl)

Chloride is dissolved from rock materials in all parts of the country. Surface waters in the humid regions are usually low in chloride, whereas streams in arid or semiarid regions may contain several hundred parts per million of chloride leached from soils and rocks, especially where the streams receive return drainage from irrigated lands. Large quantities of chloride may affect the industrial use of water by increasing the corrosiveness of waters that contain large quantities of calcium and magnesium.

#### Fluoride (F)

Fluoride has been reported as being present in some rocks to about the same extent as chloride. However, the quantity of fluoride in natural surface waters is ordinarily very small compared to that of chloride. Excess of fluoride in water is associated with the dental defect known as mottled enamel if the water is used for drinking by young children during calcification or formation of the teeth. This defect becomes noticeable as the quantity of fluo-



ride in water increases above 1 part per million. Recent investigations indicate that the incidence of dental caries is less when there are small amounts of fluoride present in the water supply than when there is none.

### Nitrate ( $\text{NO}_3$ )

Nitrate in water is considered a final oxidation product of nitrogenous material and in some instances may indicate previous contamination by sewage or other organic matter. The quantities of nitrate present in surface waters usually amount to less than 5 parts per million (as  $\text{NO}_3$ ) and have no effect on the value of the water for ordinary uses.

It has been reported that as much as 2 parts per million of nitrate in boiler water tends to decrease intercrystalline cracking of boiler steel. Studies made in Illinois indicate that nitrates in excess of 70 parts per million (as  $\text{NO}_3$ ) may contribute to methemoglobinemia ("blue babies") (Faucett and Miller, 1946, p. 593), and more recent investigations conducted in Ohio show that drinking water containing nitrates in the range of 44 to 88 parts per million or more (as  $\text{NO}_3$ ) may be the cause of methemoglobinemia in infants (Waring, 1949). In a report published by the National Research Council, Maxcy (1950, p. 271) concludes that a nitrate content in excess of 44 parts per million (as  $\text{NO}_3$ ) should be regarded as unsafe for infant feeding.

### Boron (B)

Boron has been found essential for plant growth, but irrigation water containing more than 1 part per million boron is detrimental to citrus and other boron-sensitive crops. Boron is reported in analyses of surface waters in arid and semiarid regions of the Southwest and West where irrigation is practiced or contemplated, but few of the surface waters analyzed have harmful concentrations of boron.

### Dissolved solids

The reported quantity of dissolved solids--the residue on evaporation--consists mainly of the dissolved mineral constituents in the water. It may also contain some organic matter and water of crystallization. Waters with less than 500 parts per million of dissolved solids are usually satisfactory for domestic and some industrial uses. Waters containing several thousand parts per million of dissolved solids are sometimes successfully used for irrigation where practices permit the removal of soluble salts through the application of large volumes of water on well-drained lands.

## PROPERTIES AND CHARACTERISTICS OF WATER

### Oxygen consumed

The value for oxygen consumed furnishes a rough indication of the oxidizable matter in the unfiltered and filtered samples and gives a partial measure of polluting materials such as sewage and oxidizable industrial wastes. Naturally highly colored waters may have relatively high oxygen consumed, although waters that are not noticeably colored may contain oxidizable material.

### Color

In water analysis the term "color" refers to the appearance of water that is free from suspended solids. Many turbid waters that appear yellow, red, or brown when viewed in the stream show very little color after the suspended matter has been removed. The yellow-to-brown color of some waters is usually caused by organic matter extracted from leaves, roots, and other organic substances in the ground. In some areas objectionable color in water results from industrial wastes and sewage. Clear deep water may appear blue as the result of a scattering of sunlight by the water molecules. Water for domestic use and some industrial uses should be free from any perceptible color. A color less than 10 usually passes unnoticed. Some swamp waters have natural color of 200 to 300 or more.

### Hydrogen-ion concentration (pH)

The degree of acidity or alkalinity of water, as indicated by the hydrogen-ion concentration, expressed as pH, is related to the corrosive properties of water, and is useful in determining the proper treatment for coagulation that may be necessary at water-treatment plants. A pH value of 7.0 indicates that the water is neither acid nor alkaline. Values progressively lower than 7.0 denote increasing acidity, whereas values progressively higher than 7.0 denote increasing alkalinity. The pH of water indicates its activity towards metal surfaces. As the pH increases, the corrosive activity of the water decreases. The pH of most natural surface waters ranges between 6 and 8. Some alkaline surface waters have pH values greater than 8.0, and waters containing free mineral acid usually have values less than 4.5.

### Specific conductance (micromhos at 25°C)

The specific conductance of a water is a measure of its capacity to conduct a current of electricity. The conductance varies with the concentration and degree of ionization of the different minerals in solution and with the temperature of the water. When considered in conjunction with results of determinations for other constituents, specific conductance is a useful determination and plays an important part in indicating changes in concentration of the total quantity of dissolved minerals in surface waters.

### Hardness

Hardness is the characteristic of water that receives the most attention in industrial and domestic use. It is usually recognized by the increased quantity of soap required to produce lather. Hard water is also objectionable because of the formation of scale in boilers, water heaters, radiators, and pipes, with the resultant decrease in rate of heat transfer, possibility of boiler failure, and loss of flow.

Hardness is caused almost entirely by compounds of calcium and magnesium. Other constituents--such as iron, manganese, aluminum, barium, strontium, and free acid--also cause hardness, although they usually are not present in quantities large enough to have any appreciable effect. Water that has less than 60 parts per million of hardness is usually rated as soft and suitable for many purposes without further softening. Waters with hardness ranging from 61 to 120 parts per million may be considered moderately hard, but this degree of hardness does not seriously interfere with the use of water for many purposes except for use in high-pressure steam boilers and in some industrial processes. Waters with hardness ranging from 121 to 200 parts per million are considered hard, and laundries and industries may profitably soften such supplies. Water with hardness above 200 parts per million usually requires some softening before being used for most purposes.

### Total acidity

The total acidity of a natural water represents the content of free carbon dioxide, mineral acids, and salts--especially sulfates of iron and aluminum--that hydrolyze to give hydrogen ions. Acid waters are very corrosive and generally contain excessive amounts of objectionable constituents, such as iron, aluminum, and manganese.

### Corrosiveness

The corrosiveness of a water is that property which makes the water aggressive to metal surfaces and frequently results in the appearance of the "red water" caused by solution of iron. The disadvantages of iron in water have been discussed previously. Besides the trouble caused by iron in water, corrosion causes the deterioration of water pipes, steam boilers, and water-heating equipment. Many waters that do not appreciably corrode cold-water lines will aggressively attack hot-water lines. Oxygen, carbon dioxide, free acid, and acid-generating salts are the principal constituents in water that cause corrosion. In a general way, very soft waters of low mineral content tend to be more corrosive than hard waters containing appreciable quantities of carbonates and bicarbonates of calcium and magnesium.

### Percent sodium

Percent sodium is reported in most of the analyses of waters collected from streams in the western part of the country where irrigation is practiced extensively. The proportion of sodium to all the basic constituents in the water has a bearing on the suitability of a water for irrigation. Waters in which the percent sodium is more than 60 may be injurious when applied to certain types of soils, particularly when adequate drainage is not provided (Magistad and Christiansen, 1944, pp. 8-9; Wilcox, 1948, p. 6).

## SEDIMENT

Fluvial sediment is generally regarded as that sediment which is transported by, suspended in, or deposited by water. Suspended sediment is that sediment which remains in suspension in water owing to the upward components of turbulent currents or by colloidal suspension. Most fluvial sediment results from the normal process of erosion, which in turn is part of the geologic cycle of rock transformation. In some instances, this normal process may have been accelerated by agricultural practices. Sediment also results from a number of industrial activities. In certain sections, waste materials from mining, logging, oil-field, and other industrial operations introduce large quantities of suspended as well as dissolved material.

The quantity of sediment, transported or available for transportation, is affected by climatic conditions, form or nature of precipitation, vegetal cover, topography, and land use. An important property of fluvial sediment is the fall velocity of the particles in transport. Particle sizes, as determined by various methods, represent mechanical diameters, which are related to sedi-

mentation diameters indirectly. Sediment particles in the sand-size (0.062 mm) range do not appear to be affected by flocculation or dispersion resulting from the mineral constituents in solution. The sedimentation diameter of clay and silt particles in suspension may vary considerably from point to point in a stream or reservoir, depending upon the mineral matter in solution and in suspension and the degree of turbulence present. The size of sediment particles in transport at any point depends upon the type of erodible and soluble material in the drainage area, the degree of flocculation present, time in transport, and characteristics of the transporting flow. The flow characteristics include velocity of water, turbulence, and the depth, width, and roughness of the channel. As a result of these variable characteristics, the size of particles transported, as well as the total sediment load, is in constant adjustment with the characteristics and physical features of the stream and drainage area.

## PUBLICATIONS

Reports giving chemical analyses, suspended-sediment loads, and water temperatures of samples of surface water made by the Geological Survey have been published yearly since 1941. Records for the years ended September 30, 1941, 1942, 1943, 1944, 1945, 1946, 1947, and 1948, for many of the stations listed in this report are given in Water-Supply Papers 942, 950, 970, 1022, 1030, 1050, 1102, and 1133.

Geological Survey reports containing analyses of surface-water samples collected prior to 1941 are listed below. Publications dealing largely with the quality of ground-water supplies and only incidentally covering the chemical composition of surface-waters are not included. Publications that are out of print are preceded by an asterisk.

### PROFESSIONAL PAPER

- \*135. Composition of river and lake waters of the United States, 1924.

### BULLETINS

- 479. The geochemical interpretation of water analyses, 1911.
- 770. The data of geochemistry, 1924.

### WATER-SUPPLY PAPERS

- \*108. Quality of water in the Susquehanna River drainage basin, with an introductory chapter on physiographic features, 1904.

- \*161. Quality of water in the upper Ohio River basin and at Erie, Pa., 1906.
- \*193. The quality of surface waters in Minnesota, 1907.
- \*236. The quality of surface waters in the United States, Part I, Analyses of waters east of the one hundredth meridian, 1909.
- \*237. The quality of the surface waters of California, 1910.
- \*239. The quality of the surface waters of Illinois, 1910.
- \*273. Quality of the water supplies of Kansas, with a preliminary report on stream pollution by mine waters in southeastern Kansas, 1911.
- \*274. Some stream waters of the Western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, 1911.
- \*339. Quality of the surface waters of Washington, 1914.
- \*363. Quality of the surface waters of Oregon, 1914.
- \*418. Mineral springs of Alaska, with a chapter on the chemical character of some surface waters of Alaska, 1917.
- \*596-B. Quality of water of Colorado River in 1925-26, 1928.
- 596-D. Quality of water of Pecos River in Texas, 1928.
- 596-E. Quality of the surface waters of New Jersey, 1928.
- \*636-A. Quality of water of the Colorado River in 1926-28, 1930.
- \*636-B. Suspended matter in the Colorado River in 1925-28, 1930.
- 638-D. Quality of water of the Colorado River in 1928-30, 1932.
- \*839. Quality of water of the Rio Grande basin above Fort Quitman, Tex., 1938.
- \*889-E. Chemical character of surface waters of Georgia, 1944.
- 998. Suspended sediment in the Colorado River, 1925-41, 1947.

Many of the reports listed are available for consultation in the larger public and institutional libraries. Copies of Geological Survey publications still in print may be purchased at a nominal cost from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., who will, upon request, furnish lists giving prices.

## COOPERATION AND DIVISION OF WORK

The quality-of-water investigations in the States in the different drainage basins included in this volume were made under cooperative agreements with the organizations listed below. The work was conducted by the Water Resources Division of the Geological Survey, Carl G. Paulsen, chief hydraulic engineer, and S. K. Love, chief of the quality of water branch. The records were collected and prepared for publication under the supervision of the district chemists and engineers as follows: in Florida, S. K. Love; in North Carolina and South Carolina, F. H. Pauszek; in Virginia, G. W. Whetstone; in Ohio, W. L. Lamar; in Delaware and Pennsylvania, W. F. White. Any additional analytical

data for the sampling stations can be obtained by writing the responsible Survey district office shown.

The chemical quality and sediment investigations in the Missouri River basin in Colorado, Iowa, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming were initiated in 1945. The studies were made as a part of the program of the Interior Department for development of the Missouri River basin through funds provided directly to the Geological Survey for this purpose. The studies were made under the direction of P. C. Benedict, district engineer, Lincoln, Nebr. A few analyses of streams in the Hudson Bay basin in North Dakota were made in connection with this program.

State	Cooperating agency	Drainage basin	District office
Florida	Cities of Miami and Miami Beach, Fla.	South Atlantic slope and Eastern Gulf of Mexico.	Water Resources Division, Washington, D. C.
Georgia	Georgia Department of Mines, Mining, and Geology, Garland Peyton, director.	South Atlantic slope and Eastern Gulf of Mexico, Ohio River.	203 State Laboratory of Hygiene Building, Raleigh, N. C.
Iowa	Iowa Geological Survey, A. C. Trowbridge, director.	Upper Mississippi River	508 Hydraulic Building, Iowa City, Iowa.
North Carolina	North Carolina Department of Conservation and Development, R. Bruce Etheridge, director.	South Atlantic slope and Eastern Gulf of Mexico, Ohio River.	203 State Laboratory of Hygiene Building, Raleigh, N. C.
Ohio	Ohio Water Resources Board, C. E. MacQuigg, chairman.	Ohio River, St. Lawrence River.	2822 E. Main St. Columbus 9, Ohio.
Pennsylvania	Pennsylvania Department of Commerce, O. J. Matthews, secretary.	North Atlantic slope, Ohio River, St. Lawrence River.	Water Resources Division, Washington, D. C.



State	Cooperating agency	Drainage basin	District office
South Carolina	South Carolina Research, Planning, and Development Board, R. M. Cooper, director.	South Atlantic slope and Eastern Gulf of Mexico.	203 State Laboratory of Hygiene Building, Raleigh, N. C.
Virginia	Virginia Conservation Commission, W. A. Wright, chairman.	North Atlantic slope, South Atlantic slope.	203 State Laboratory of Hygiene Building, Raleigh, N. C.

## STREAM FLOW

Most of the records of stream discharge, used in conjunction with the chemical analyses and in the computation of sediment loads in this volume, are published in Geological Survey reports on the surface-water supply of the United States. The discharge reported for a composite sample is usually the average of the mean daily discharges for the normal composite period. For analyses in which the composite periods differ from the normal 10- or 11-day period, the discharges reported are the averages of the mean daily discharges for the days indicated. The discharges reported in the tables of single analyses either are daily mean discharges or are discharges for the time at which samples were collected, computed from a stage-discharge relation or from a discharge measurement.

## LITERATURE CITED

- American Public Health Association, 1946, Standard methods for the examination of water and sewage, 9th ed, pp. 1-112.
- Collins, W. D., 1928, Notes on practical water analysis: U. S. Geol. Survey Water-Supply Paper 596-H.
- Faucett, R. L., and Miller, H. C., 1946, Methemoglobinemia occurring in infants fed milk diluted with well waters of high nitrate content: Jour. Pediatrics, vol. 29, p. 593.
- Hazen, Allen, 1892, A new color standard for natural waters: Am. Chem. Jour., vol. 12, pp. 427-428.
- Lane, E. W., et al, 1947, Report of the Subcommittee on Terminology: Amer. Geophys. Union Trans., vol. 28, p. 937.
- Magistad, O. C., and Christiansen, J. E., 1944, Saline soils, their nature and management: U. S. Dept. Agri. Circ. 707, pp. 8-9.
- Maxcy, Kenneth F., 1950, Report on the relation of nitrate concentrations in well waters to the occurrence of methemoglobinemia: Nat. Research Council, Bull., Sanitary Engineer, p. 265, App. D.
- U. S. Inter-agency Report 7, 1943, A Study of methods used in measurement and analysis of sediment loads in streams, a study of new methods for size analysis of suspended sediment samples, pp. 82-90; U. S. Engineer Office, St. Paul, Minn.
- U. S. Inter-agency Report 8, 1948, A study of methods used in measurement and analysis of sediment loads of streams, measurement of the sediment discharge of streams, pp. 70-76; U. S. Engineer Office, St. Paul, Minn.
- Waring, F. Holman, 1949, Significance of nitrates in water supplies: Jour. Amer. Water Works Assoc., vol. 72, no. 2.
- Wilcox, L. V., 1948, Explanation and interpretation of analyses of irrigation waters: U. S. Dept. Agr. Circ. 784, p. 6.

## CHEMICAL ANALYSES, WATER TEMPERATURES, AND SUSPENDED SEDIMENT

## PART 1. NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN

## DELAWARE RIVER AT EASTON, PA.

LOCATION.--At raw water intake, Easton Filter Plant, in Easton, Northampton County.

DRAINAGE AREA.--4,717 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMES 1947-48.--Specific conductance: Maximum 119 Sept. 1-10; minimum 59 2 Mar. 21-31.

REMARKS.--Records of discharge for water year October 1947 to September 1948 based on records for Delaware River at Belvidere, N. J., which are given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (°F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947-----	1,960		4	7.9	110	1.6	0.04	12	3.4	4.7		42	15	2.2	0.1	1.0	62	44	10
Oct. 11-20 -----	1,804		5	7.8	104	--	--	--	--	--	--	38	14	--	--	--	--	--	--
Oct. 21-31 -----	1,947		5	7.8	111	--	--	--	--	--	--	42	15	--	--	--	--	--	--
Nov. 1-10 -----	7,886		10	7.2	97.3	--	--	--	--	--	--	30	15	--	--	--	--	--	--
Nov. 11-20 -----	14,139		11	6.8	72.1	--	--	--	--	--	--	19	13	--	--	--	--	--	--
Nov. 21-30 -----	6,975		7	7.1	84.3	--	--	--	--	--	--	23	14	--	--	--	--	--	--
Dec. 1-10 -----	5,401		5	7.3	89.7	--	--	--	--	--	--	26	15	--	--	--	--	--	--
Dec. 11-20 -----	6,164		5	7.2	84.4	--	--	--	--	--	--	25	14	--	--	--	--	--	--
Dec. 21-31 -----	4,572		5	7.3	90.7	--	--	--	--	--	--	27	14	--	--	--	--	--	--
Jan. 1-10, 1948-----	4,452		4	6.8	92.3	4.0	.02	10	2.9	4.0		30	15	2.4	.0	2.5	64	37	12
Jan. 11-20 -----	3,688		5	7.6	94.6	--	--	--	--	--	--	31	15	--	--	--	--	--	--
Jan. 21-31 -----	3,281		6	7.5	99.7	--	--	--	--	--	--	33	15	--	--	--	--	--	--
Feb. 1-10 -----	2,921		5	7.2	100	--	--	--	--	--	--	32	15	--	--	1.9	--	--	--
Feb. 11-20 -----	6,165		4	7.0	101	--	--	--	--	--	--	32	18	--	--	2.2	--	--	--
Feb. 21-29 -----	12,300		3	6.9	88.0	--	--	--	--	--	--	22	17	--	--	3.7	--	--	--
Mar. 1-10 -----	7,330		3	7.3	105	--	--	--	--	--	--	37	17	--	--	3.6	--	--	--
Mar. 11-20 -----	22,539		4	7.4	91.9	--	--	--	--	--	--	28	15	--	--	--	--	--	--
Mar. 21-31 -----	46,573		4	7.1	59.2	--	--	--	--	--	--	9	11	--	--	3.1	--	--	--
Apr. 1-10 -----	15,450		4	6.9	79.2	3.2	.01	8.6	2.3	5.2		28	14	1.9	.0	2.6	54	31	8
Apr. 11-20 -----	25,019		6	6.8	69.3	--	--	--	--	--	--	18	8.9	--	--	1.6	--	--	--
Apr. 21-30 -----	12,408		7	7.2	77.8	--	--	--	--	--	--	24	13	--	--	1.5	--	--	--
May 1-10 -----	8,925		3	7.1	85.9	--	--	--	--	--	--	26	13	--	--	1.3	--	--	--
May 11-20 -----	16,311		7	7.1	78.5	--	--	--	--	--	--	26	13	--	--	1.5	--	--	--
May 21-31 -----	14,818		4	7.5	83.0	--	--	--	--	--	--	22	12	--	--	1.1	--	--	--

June 1-10	7,942	3	6.6	87.7	--	--	--	30	13	--	--	1.0	--	--
June 11-20	6,324	4	6.9	80.2	--	--	--	20	12	--	--	1.3	--	--
June 21-30	9,362	5	6.9	84.2	--	--	--	29	11	--	--	1.4	--	--
July 1-10	6,080	5	7.1	92.9	--	--	--	33	12	--	--	1.4	--	--
July 11-20	4,268	3	6.9	96.3	--	--	--	37	13	--	--	0	--	--
July 21-31	3,460	4	6.9	104	--	--	--	39	13	--	--	1.7	--	--
Aug. 1-10	3,356	5	6.5	99.7	--	--	--	36	14	--	--	1.7	--	--
Aug. 11-20	2,929	4	6.8	101	--	--	--	35	15	--	--	1.5	--	--
Aug. 21-31	2,489	5	6.9	109	--	--	--	40	17	--	--	1.6	--	--
Sept. 1-10	1,758	8	7.2	119	--	--	--	40	15	--	--	1.8	--	--
Sept. 11-20	1,694	7	7.4	114	--	--	--	42	16	--	--	1.1	--	--
Sept. 21-30	1,654	4	7.4	113	--	--	--	42	18	--	--	1.1	--	--
Average	8,494	5	--	93.1	--	--	--	31	14	--	--	0.2	2.6	69
												1.7	49	15
												--	--	--

DELAWARE RIVER BASIN--Continued  
DELAWARE RIVER AT EASTON, PA.--Continued

Temperature ( $^{\circ}$  F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	55	52	35	33	33	35	49	55	65	75	78	75
2	55	52	34	33	33	34	50	56	66	74	78	73
3	57	51	34	33	33	34	48	56	66	75	73	72
4	58	50	36	33	33	34	47	56	66	74	72	73
5	58	50	37	33	33	34	47	56	67	76	73	72
6	58	50	38	33	33	34	48	56	66	76	72	74
7	60	50	37	33	33	34	48	58	66	75	69	75
8	61	51	38	33	33	35	50	54	67	75	69	75
9	60	49	38	33	33	36	50	53	66	74	70	74
10	59	46	36	33	33	37	48	56	66	75	71	74
11	59	45	36	33	33	35	47	61	66	76	72	72
12	60	46	34	33	33	34	46	65	67	78	73	71
13	59	44	34	33	33	35	46	63	68	78	74	73
14	61	43	33	33	33	35	46	61	68	76	73	73
15	60	42	33	33	33	36	46	58	69	77	72	71
16	61	42	35	33	33	39	44	56	68	76	73	70
17	63	42	34	33	33	40	47	56	68	78	74	69
18	65	41	35	33	33	38	47	54	68	75	74	70
19	65	41	33	33	33	35	49	57	69	75	74	70
20	64	40	33	33	33	39	50	58	69	76	74	71
21	63	39	33	33	33	39	53	57	69	77	74	70
22	63	38	33	33	33	42	54	57	69	78	73	67
23	62	39	34	33	33	42	54	57	66	78	74	66
24	60	40	33	33	33	43	53	60	67	77	75	65
25	57	40	33	33	34	44	54	60	69	75	77	65
26	58	40	33	33	34	44	56	59	71	76	84	63
27	58	38	33	33	34	45	58	60	71	76	80	64
28	59	38	33	33	35	46	56	61	72	74	81	64
29	60	37	33	33	34	44	55	64	73	78	81	64
30	59	36	33	33	--	45	55	66	75	78	81	65
31	57	--	33	33	--	46	--	64	--	79	77	--
Average	60	44	34	33	33	38	50	58	68	76	75	70

## DELAWARE RIVER BASIN--Continued

## DELAWARE RIVER AT TRENTON, N. J.

LOCATION --At gaging station at Trenton Water Works raw water intake, Calhoun Street, Mercer County.

DRAINAGE AREA --6,780 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1944 to September 1948.

Water temperatures: October 1944 to September 1948.

EXTREMES 1947-48 --Specific conductance: Maximum, 206 Sept. 11-20; minimum, 72.6 Mar. 21-31.

EXTREMES 1944-48 --Dissolved solids (1944-47): Maximum, 117 parts per million Sept. 11-20, 1946; minimum, 44 parts per million Mar. 21-31, 1945.

Total hardness (1944-47): Maximum, 85 parts per million Sept. 11-20, 1946; minimum, 28 parts per million Mar. 21-31, 1946.

Specific conductance: Maximum, 206 Sept. 11-20, 1948; minimum, 72.1 Mar. 21-31, 1945.

Water temperatures: Maximum, 83° F. July 6, 1947; Aug. 30, 1948; minimum, 33° F. Dec. 20, 22-23, 1944, Feb. 22, 1947.

REMARKS --Temperature records furnished by city of Trenton, N. J. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Tem- per-a- ture (° F.)	Color	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dis- solved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbon- ate
Oct. 1-10, 1947-----	3,205		3	7.2	194	3.0	0.04	21	7.0	5.8		58	30	8.2	0.0	4.3	113	81	34
Oct. 11-20-----	3,135		7	7.8	200							59	33						
Oct. 21-31-----	3,139		5	7.4	204							60	33						
Nov. 1-10-----	11,195		5	7.6	161							40	28						
Nov. 11-20-----	21,680		7	6.7	101							22	19						
Nov. 21-30-----	11,229		4	7.0	125							31	22						
Dec. 1-10-----	8,217		4	7.2	133							35	22						
Dec. 11-20-----	9,217		4	7.2	132							32	23						
Dec. 21-31-----	6,780		3	7.2	133							34	24						
Jan. 1-10, 1948-----	6,506		3	6.9	142	6.0	.03	12	5.2	6.3		34	25	5	.0	5.0	84	51	23
Jan. 11-20-----	5,685		3	6.9	152							40	28						
Jan. 21-31-----	4,954		4	6.8	165							44	26						
Feb. 1-10-----	4,570		3	6.9	164							44	27				4.4		
Feb. 11-20-----	9,870		5	6.8	146							32	27				5.8		
Feb. 21-30-----	20,844		5	7.1	113							28	21				4.8		
Mar. 1-10-----	14,210		4	7.1	133							32	24				5.1		
Mar. 11-20-----	28,920		8	7.1	120							32	22				4.2		
Mar. 21-31-----	57,100		5	6.7	72.6							16	14				3.6		

DELAWARE RIVER BASIN--Continued  
DELAWARE RIVER AT TRENTON, N. J.--Continued

Date of collection	Water discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Apr. 1-10, 1948 -----	54,790		3	6.8	101	4.7	0.02	10	3.3	4.7		28	18	3.5	0.0	2.6	72	38	16
Apr. 11-20 -----	34,990		5	7.1	90.9	--	--	--	--	--	--	23	17	--	--	3.0	--	--	--
Apr. 21-30 -----	18,250		4	6.9	102	--	--	--	--	--	--	23	17	--	--	2.6	--	--	--
May 1-10 -----	15,500		4	6.9	118	--	--	--	--	--	--	32	19	--	--	2.6	--	--	--
May 11-20 -----	28,110		8	6.9	106	--	--	--	--	--	--	26	17	--	--	2.7	--	--	--
May 21-31 -----	22,245		3	7.2	99.4	--	--	--	--	--	--	28	16	--	--	1.9	--	--	--
June 1-10 -----	12,684		3	7.1	132	--	--	--	--	--	--	40	19	--	--	2.3	--	--	--
June 11-20 -----	10,954		3	7.0	138	--	--	--	--	--	--	41	21	--	--	2.1	--	--	--
June 21-30 -----	15,130		4	6.8	132	--	--	--	--	--	--	38	17	--	--	2.4	--	--	--
July 1-10 -----	9,853		3	7.1	133	--	--	--	--	--	--	42	19	--	--	2.1	--	--	--
July 11-20 -----	7,139		3	6.8	143	--	--	--	--	--	--	46	20	--	--	2.1	--	--	--
July 21-31 -----	6,555		3	6.9	161	--	--	--	--	--	--	52	23	--	--	2.3	--	--	--
Aug. 1-10 -----	5,976		3	7.0	172	--	--	--	--	--	--	50	25	--	--	2.8	--	--	--
Aug. 11-20 -----	5,550		4	6.8	166	--	--	--	--	--	--	49	25	--	--	3.4	--	--	--
Aug. 21-30 -----	5,649		4	7.1	172	--	--	--	--	--	--	49	27	--	--	3.5	--	--	--
Sept. 1-10 -----	3,216		1	7.4	203	--	--	--	--	--	--	65	30	--	--	3.2	--	--	--
Sept. 11-20 -----	3,435		1	7.4	206	--	--	--	--	--	--	70	30	--	--	2.9	--	--	--
Sept. 21-30 -----	3,086		2	7.2	205	6.8	.03	20	6.9	9.0		61	31	7.4	.2	3.7	127	78	28
Average-----	12,940		4	--	144	--	--	--	--	--	--	40	23	--	--	--	--	--	--



Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	59	56	40	35	34	36	49	57	67	--	79	77
2	57	55	40	36	34	37	52	58	66	--	77	73
3	59	54	41	36	34	36	51	61	68	75	80	73
4	57	54	43	36	34	38	52	59	68	75	81	75
5	62	54	39	36	34	36	48	57	70	77	79	75
6	63	54	40	38	34	36	50	55	70	70	77	75
7	63	54	44	37	34	36	50	55	70	75	72	76
8	64	55	41	36	34	37	52	57	69	73	70	75
9	64	55	42	36	35	39	52	57	--	72	72	75
10	63	52	40	37	35	41	50	57	--	75	72	77
11	62	50	39	36	35	41	52	61	--	77	72	72
12	63	53	39	35	35	38	51	65	--	77	72	72
13	65	51	39	35	34	38	51	70	--	79	72	73
14	64	49	39	35	35	39	50	63	--	79	72	77
15	63	56	35	34	34	39	47	60	--	79	73	72
16	65	54	32	34	35	42	46	61	--	76	75	70
17	69	46	37	34	35	47	47	59	--	77	75	70
18	67	46	37	35	35	43	48	59	--	79	75	68
19	64	45	36	34	36	39	57	58	--	77	75	70
20	68	45	--	34	39	41	50	58	--	77	75	72
21	68	44	36	34	36	43	52	59	--	79	73	73
22	66	43	36	35	35	42	53	60	--	81	75	70
23	64	43	36	35	35	45	55	60	--	77	75	68
24	66	43	36	34	35	46	55	61	--	77	73	68
25	61	43	36	34	36	46	55	63	--	77	75	65
26	63	43	35	34	39	48	55	62	--	77	79	66
27	62	43	35	34	37	49	56	63	--	77	81	64
28	61	41	35	34	39	49	56	63	--	79	81	66
29	60	40	35	34	36	49	57	65	--	80	82	65
30	64	40	34	34	34	46	57	66	--	81	83	67
31	61	--	34	34	--	52	--	66	--	81	82	--
Average	63	49	36	35	35	42	52	60	--	77	76	71

## DELAWARE RIVER BASIN--Continued

## LEHIGH RIVER AT CATASAUQUA, PA.

LOCATION.--At Race Street bridge, Northampton County, approximately 9 miles upstream from gaging station at Bethlehem, Northampton County.  
DRAINAGE AREA.--1,012 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1944 to September 1948.

Water temperatures: October 1944 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 238 Oct. 21-31; minimum, 81.6 Mar. 21-31.  
Water temperatures: Maximum, 76° F. July 21, Aug. 28-29; minimum, freezing point on many days in December, January, and February.

EXTREMES, 1944-48.--Dissolved solids (1944-47): Maximum, 169 parts per million Oct. 1-10, 1944; minimum, 47 parts per million Mar. 11-20, 1946.  
Total hardness (1944-47): Maximum, 106 parts per million Oct. 1-10, 1944; minimum, 26 parts per million Mar. 11-20, 1946.

Specific conductance: Maximum, 254 Oct. 1-10, 1944; minimum, 75.9 Mar. 11-20, 1946.  
Water temperatures: Maximum, 77° F. July 2, 1945; minimum, freezing point on many days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948, based on records for Lehigh River at Bethlehem, Pa., which are given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947	543	56	2	6.9	214	4.6	0.02	21	7.5	8.0		22	70	3.5	0.1	5.6	136	83	65
Oct. 11-20	494	59	6	7.2	243							20	83						
Oct. 21-31	595	58	5	7.0	238							21	79						
Nov. 1-10	1,985	49	3	7.2	146							12	46						
Nov. 11-20	3,018	42	6	6.6	106							8	31						
Nov. 21-30	1,886	38	4	6.5	116							9	35						
Dec. 1-10	1,323	36	3	6.7	137							14	40						
Dec. 11-20	1,253	33	2	6.7	136							16	40						
Dec. 21-31	1,049	32	2	6.6	139							14	41						
Jan. 1-10, 1948	1,287	32	3	6.8	126	5.4	.03	12	3.7	6.4		14	37	4.0		4.1	79	45	34
Jan. 11-20	816	31	2	6.8	144							14	44						
Jan. 21-31	646	31	3	6.5	159							16	47						
Feb. 1-10	632	31	2	6.6	171							18	51						
Feb. 11-20	1,884	32	3	6.7	156							23	43						
Feb. 21-28	2,799	34	3	6.6	109							14	31			4.2			
Mar. 1-10	2,261	35	2	6.8	114							10	32			4.1			
Mar. 11-20	4,248	38	3	6.9	98.5							11	26			4.0			
Mar. 21-31	4,527	45	3	6.7	81.6							7	24			2.4			

Apr. 1-10 -----	4,010	47	3	6.2	91.2	3.7	.06	8.4	2.8	3.3		7	27	2.4	.1	2.6	70	32	27
Apr. 11-20 -----	5,314	46	8	6.4	85.6	--	--	--	--	--		12	24	--	--	2.5	--	--	--
Apr. 21-30 -----	2,332	52	3	6.4	106	--	--	--	--	--		12	20	--	--	2.3	--	--	--
May 1-10 -----	2,673	53	4	6.4	106	--	--	--	--	--		10	26	--	--	2.1	--	--	--
May 11-20 -----	4,745	57	7	6.7	97.2	--	--	--	--	--		11	25	--	--	2.1	--	--	--
May 21-31 -----	3,374	59	4	6.5	95.4	--	--	--	--	--		9	27	--	--	1.9	--	--	--
June 1-10 -----	1,886	64	2	6.3	114	--	--	--	--	--		12	33	--	--	1.9	--	--	--
June 11-20 -----	1,490	65	2	6.5	127	--	--	--	--	--		14	38	--	--	2.8	--	--	--
June 21-30 -----	2,019	68	7	6.5	104	--	--	--	--	--		12	29	--	--	2.2	--	--	--
July 1-10 -----	1,253	70	3	6.5	121	--	--	--	--	--		14	29	--	--	2.4	--	--	--
July 11-20 -----	1,271	72	2	6.6	133	--	--	--	--	--		14	39	--	--	2.7	--	--	--
July 21-31 -----	1,223	73	2	6.4	144	--	--	--	--	--		15	41	--	--	2.9	--	--	--
Aug. 1-10 -----	1,248	69	2	6.3	156	--	--	--	--	--		16	48	--	--	3.3	--	--	--
Aug. 11-20 -----	1,087	69	2	6.5	175	--	--	--	--	--		19	52	--	--	4.1	--	--	--
Aug. 21-31 -----	1,298	72	2	6.4	174	--	--	--	--	--		21	50	--	--	4.0	--	--	--
Sept. 1-10 -----	682	68	2	6.9	220	--	--	--	--	--		27	67	--	--	3.6	--	--	--
Sept. 11-20 -----	585	69	1	6.9	227	--	--	--	--	--		23	72	--	--	3.6	--	--	--
Sept. 21-30 -----	546	62	3	6.5	233	5.2	.06	20	7.5	12		22	74	4.5	.1	5.1	150	81	63
Average -----	1,893	51	3	--	143	--	--	--	--	--		15	43	--	--	--	--	--	--

DELAWARE RIVER BASIN--Continued  
LEHIGH RIVER AT CATASAUQUA, PA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	52	52	33	31	31	35	50	52	63	69	75	70
2	53	53	33	32	31	35	50	53	64	70	74	60
3	54	49	34	31	31	34	45	56	65	70	74	60
4	55	49	36	31	31	36	42	54	63	70	73	68
5	56	49	37	32	31	32	45	55	65	71	71	69
6	57	50	37	33	32	32	50	53	63	73	66	70
7	58	50	37	32	31	31	49	55	63	72	64	71
8	60	52	39	31	32	34	50	51	63	68	65	70
9	60	47	38	32	31	36	49	48	64	68	66	71
10	58	43	36	33	31	39	44	54	63	68	66	70
11	58	43	35	31	31	39	45	59	63	70	67	72
12	58	46	34	31	32	34	46	62	65	72	68	68
13	58	43	32	32	32	32	48	65	67	74	69	69
14	57	41	31	32	33	34	45	56	64	74	69	72
15	58	41	31	31	31	35	43	54	65	70	68	68
16	59	41	33	31	31	40	44	55	66	71	69	67
17	60	41	33	31	32	41	46	54	63	71	69	65
18	62	40	33	31	32	38	46	56	64	70	70	67
19	64	40	33	31	33	40	47	54	66	71	69	68
20	58	39	31	31	34	42	49	54	66	72	71	70
21	62	37	32	32	32	44	54	55	66	76	68	69
22	60	37	31	32	31	46	51	55	66	74	69	65
23	60	39	31	31	31	47	51	54	64	74	68	63
24	58	41	31	31	31	44	51	57	63	72	68	62
25	55	40	32	31	33	45	53	60	68	70	70	60
26	55	40	32	31	36	44	54	58	69	70	72	59
27	55	38	--	31	31	46	55	58	70	71	74	59
28	58	37	31	37	36	46	53	60	69	73	76	60
29	60	36	31	31	36	41	51	64	70	76	76	60
30	59	35	31	--	--	--	43	62	73	75	75	59
31	56	--	33	31	--	46	--	63	--	75	74	--
Average	58	43	33	31	32	39	49	56	65	72	70	66

## DELAWARE RIVER BASIN--Continued

## LEHIGH RIVER AT WALNUTPORT, PA.

LOCATION.--At highway bridge at Walnutport, Northampton County, and 0.1 mile upstream from Trout Creek.

DRAINAGE AREA.--889 square miles.

RECORDS AVAILABLE.--Sediment records: May to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 1,080 tons per day July 14; minimum, 4 tons per day Sept. 8, 13, 15, 17.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in field office at Schuylkill Haven, Pa.

## Suspended sediment, water year October 1947 to September 1948

Day				May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				--	--	--	2,400	19	123
2-----				--	--	--	2,100	30	170
3-----				--	--	--	1,880	26	132
4-----				--	--	--	1,740	29	136
5-----				--	--	--	1,610	34	148
6-----				--	--	--	1,510	29	118
7-----				--	--	--	1,610	19	83
8-----				--	--	--	2,290	53	327
9-----				--	--	--	1,790	32	155
10-----				--	--	--	1,630	31	136
11-----				--	--	--	1,460	22	87
12-----				--	--	--	1,390	24	90
13-----				--	--	--	1,510	24	98
14-----				--	--	--	1,440	21	82
15-----				--	--	--	1,310	19	67
16-----				--	--	--	1,210	15	49
17-----				--	--	--	1,110	15	45
18-----				--	--	--	1,010	14	38
19-----				--	--	--	1,320	23	82
20-----				--	--	--	2,190	49	289
21-----				--	--	--	1,950	26	137
22-----				--	--	--	1,580	28	119
23-----				--	--	--	1,520	26	107
24-----				--	--	--	1,750	35	165
25-----				--	--	--	2,330	62	389
26-----				3,490	29	273	1,970	32	170
27-----				3,030	37	302	1,790	35	169
28-----				2,720	38	278	2,680	145	1,050
29-----				2,520	36	245	2,640	52	370
30-----				3,030	46	375	2,010	21	114
31-----				2,820	19	145	--	--	--
Total -				--	--	1,620	52,730	--	5,250

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## LEHIGH RIVER AT WALNUTPORT, PA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,650	20	89	682	6	11	513	6	8
2-----	1,420	18	69	650	6	11	479	6	8
3-----	1,240	16	53	630	6	10	470	5	6
4-----	1,140	16	49	630	6	10	462	6	8
5-----	1,040	12	34	1,340	51	184	462	5	6
6-----	1,260	26	89	2,440	92	605	438	6	7
7-----	1,440	28	109	1,770	39	186	445	6	7
8-----	1,250	19	64	1,310	28	99	470	3	4
9-----	1,050	18	51	1,020	10	28	560	15	23
10-----	900	16	39	882	8	19	550	13	19
11-----	800	12	26	782	5	11	496	5	7
12-----	782	12	25	1,050	20	57	445	5	6
13-----	1,120	41	124	993	12	32	408	4	4
14-----	2,640	152	1,080	858	8	19	392	5	5
15-----	1,830	28	138	759	8	16	370	4	4
16-----	1,320	25	89	693	14	26	357	5	5
17-----	1,070	16	46	650	10	18	364	4	4
18-----	978	14	37	640	5	9	357	5	5
19-----	965	15	39	795	9	19	378	6	6
20-----	1,070	18	52	1,020	9	25	430	6	7
21-----	965	11	29	937	11	28	415	5	6
22-----	1,920	56	300	1,360	57	209	415	5	6
23-----	1,770	52	248	1,700	30	138	415	9	10
24-----	1,610	49	213	1,260	12	41	430	6	7
25-----	1,270	28	96	1,020	8	22	400	6	6
26-----	1,070	17	49	873	8	19	378	10	10
27-----	993	8	21	764	6	12	357	7	7
28-----	993	8	21	685	6	11	344	7	6
29-----	882	12	29	620	6	10	331	6	5
30-----	795	11	23	570	6	9	357	6	6
31-----	748	9	16	540	9	13	--	--	--
Total -	37,982	--	3,350	29,923	--	1,910	12,688	--	218

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT LANDINGVILLE, PA.

LOCATION.--At gaging station at two-span highway bridge at Landingville, Schuylkill County, 0.1 mile upstream from Mahanion Creek, and 5 miles downstream from mouth of West Branch Schuylkill River.

DRAINAGE AREA.--133 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1947 to September 1948.

Sediment records: September 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 16,010 tons per day Nov. 8; minimum, 24 tons per day July 4-5.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in field office at Schuylkill Haven, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)		Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																					Total	Non-carbonate	
Dec. 10, 1947----	176	--	7	3.85	789	20	5.7	0.22	5.9	72	45	12			0	422	3.0	0.0	0.5	713	425	425	85
Dec. 17-----	198	--	6	3.90	696	20	7.8	0.18	5.2	68	39	--			0	366	6.0	0.0	0.1	663	390	390	77
Dec. 29-----	135	--	1	4.05	736	8.8	3.0	0.16	3.8	64	43	22			0	394	4.0	0.0	0.1	600	368	368	72
Jan. 5, 1948-----	203	--	1	4.10	572	4.8	4.1	0.80	4.9	32	30	5.2			0	285	3.0	0.0	0.2	436	290	290	46
Jan. 17-----	169	--	1	4.15	646	8.0	4.1	0.44	2.5	58	36	9.5			0	326	4.0	0.0	0.1	504	324	324	46
Feb. 19-----	320	--	5	5.0	429	8	1.8	1.2	1.6	38	22	7.1			0	200	6.0	0.0	0.1	315	201	201	10
Feb. 20-----	501	--	5	4.20	369	4.8	3.3	2.4	1.5	29	17	--			0	165	6.0	0.0	0.1	253	173	163	18
Feb. 26-----	426	--	5	4.40	384	5.6	1.9	1.1	1.9	33	20	7.2			0	185	4.0	0.0	0.1	288	183	183	16
Mar. 4-----	426	--	10	4.00	491	9.5	3.1	0.74	2.5	38	23	5.8			0	221	3.0	0.0	0.0	343	222	222	36
Mar. 11-----	335	--	5	4.20	556	11	3.6	1.1	2.5	46	28	7.6			0	260	4.0	0.0	0.0	415	258	258	50
Mar. 17-----	900	--	2	4.40	303	8.5	2.1	0.07	1.5	24	14	2.6			0	126	5.0	0.0	0.7	196	133	133	30
Mar. 23-----	648	--	4	4.40	426	8.0	1.2	0.52	1.9	36	23	6.0			0	193	6.0	0.2	0.0	304	197	197	35
Apr. 2-----	910	--	2	4.30	369	8.0	3.1	0.16	1.5	29	18	4.1			0	164	5.0	0.0	0.0	258	169	169	33
Apr. 8-----	426	--	3	4.30	569	9.0	4.0	0.25	2.9	46	30	11			0	270	7.0	0.1	0.1	420	268	268	62
Apr. 12-----	539	51	1	4.6	473	6.0	--	--	2.9	--	--	--			0	210	--	--	--	--	180	180	30
Apr. 20-----	523	54	2	4.25	541	10	2.9	0.10	2.5	43	29	10			0	256	3.0	0.0	0.4	400	250	250	52
Apr. 23-----	354	--	3	4.30	579	10	3.6	1.3	2.4	51	32	5.0			0	278	5.0	0.0	0.0	432	579	579	51
Apr. 30-----	244	--	5	4.30	681	10	5.1	0.31	3.2	60	37	8.5			0	335	6.0	0.1	0.0	520	339	339	62
May 4-----	306	55	1	4.5	587	10	--	--	--	--	--	--			0	277	--	--	--	--	270	270	49
May 7-----	895	--	6	4.6	334	7.0	2.5	0.22	1.3	29	16	--			0	144	4.0	0.0	0.0	232	155	155	33
May 14-----	1,270	--	5	4.20	357	8.5	2.3	0.52	1.8	28	16	2.7			0	152	2.5	0.1	0.0	246	156	156	33
May 19-----	542	--	5	4.5	475	9.0	3.5	0.38	2.1	48	28	2.4			3	242	7.0	0.0	0.1	365	259	259	86
May 25-----	347	--	1	4.35	583	6.5	1.9	0.30	2.5	54	32	5.4			0	273	7.0	0.0	1.1	438	283	283	84

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT LANDINGVILLE, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
June 2, 1948	273	--	5	4.10	778	11	3.3	0.21	2.9	74	46	8.9	0	0	395	7.0	0.0	0.4	636	402	402	144
June 9	227	--	1	4.45	644	6.0	5.2	14	3.4	63	34	4.6	0	0	322	5.0	0	1.4	507	334	334	55
June 16	164	--	1	4.25	855	5.0	6.4	26	5.2	84	50	9.2	0	0	455	6.0	1	8	710	463	463	77
June 23	157	--	1	4.35	838	8.0	3.7	40	4.2	88	49	11	0	0	451	4.0	1	8	697	451	451	74
June 29	131	--	1	4.40	773	12	4.6	17	4.0	74	45	12	0	0	395	12	0	2.5	619	404	404	82
July 7	91	--	1	4.40	898	12	3.9	1.3	5.2	93	61	4.9	0	0	499	6.0	0	1.4	770	518	518	86
July 13	144	72	1	4.40	1,050	--	--	--	--	--	--	--	0	0	570	--	0	--	--	596	596	102
July 20	110	71	1	4.20	1,050	10	9.8	28	6.6	100	63	10	0	0	572	3.0	2	2	860	579	579	72
July 23	258	--	2	5.0	615	7.0	5.5	4.2	3.6	58	32	--	4	4	300	6.0	0	2.3	473	325	321	46
July 27	144	75	1	4.30	934	--	--	--	--	--	--	--	--	--	395	8.0	0	--	--	380	380	--
July 29	110	--	1	4.00	977	16	6.7	53	6.5	92	57	13	0	0	520	3.5	0	9	808	520	520	126
Aug. 5	225	--	15	4.6	677	7.5	1.2	4.2	4.2	60	37	4.5	0	0	319	3.5	1	0	492	328	328	42
Aug. 8	120	--	1	4.00	1,090	9.5	11	38	6.4	110	65	7.0	0	0	596	7.0	0	8	916	616	616	146
Aug. 13	110	--	2	4.30	991	9.5	4.1	16	5.8	106	60	8.2	0	0	534	6.0	0	7	818	547	547	140
Aug. 19	131	--	2	4.40	778	8.0	1.1	30	4.2	82	42	12	0	0	395	6.0	1	1	606	393	393	78
Sept. 2	105	--	1	3.95	1,160	14	15	37	7.1	117	71	1.7	0	0	649	4.0	1	6	1,010	686	686	179
Sept. 14	58	67	1	3.90	1,070	13	--	--	--	--	--	--	0	0	600	4.0	0	7	--	535	535	137
Sept. 17	61	--	2	4.10	1,180	10	12	14	6.6	118	73	4.8	0	0	647	9.0	0	2.4	949	678	678	152
Sept. 21	58	64	1	4.00	1,080	14	10	42	6.0	97	59	26	0	0	582	6.0	0	1	904	557	557	72
Sept. 23	57	--	3	4.5	1,130	9.5	11	1.6	6.4	109	65	15	0	0	611	9.0	0	3	966	616	616	146
Sept. 28	50	52	4	4.40	924	12	--	--	--	--	--	--	--	0	570	12	0	1	--	517	517	109
Sept. 29	48	64	2	4.20	1,160	5.0	8.0	55	7.3	122	71	--	0	0	615	13	0	1.3	978	659	659	178



DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT LANDINGVILLE, PA.--Continued

Suspended sediment, water year October 1946 to September 1947

Day				August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				--	--	--	110	730	217
2-----				--	--	--	258	3,710	2,580
3-----				--	--	--	157	1,600	678
4-----				--	--	--	146	1,870	737
5-----				--	--	--	138	2,300	857
6-----				--	--	--	127	1,580	542
7-----				--	--	--	120	1,130	366
8-----				--	--	--	105	1,040	295
9-----				--	--	--	103	1,380	384
10-----				--	--	--	103	1,470	409
11-----				--	--	--	105	1,220	346
12-----				--	--	--	107	2,020	583
13-----				--	--	--	101	1,960	532
14-----				--	--	--	99	1,200	321
15-----				--	--	--	101	1,030	281
16-----				--	--	--	133	2,080	747
17-----				--	--	--	91	2,560	629
18-----				--	--	--	84	2,630	642
19-----				--	--	--	86	2,420	562
20-----				--	--	--	75	2,460	496
21-----				--	--	--	91	1,770	435
22-----				--	--	--	146	4,170	1,640
23-----				--	--	--	107	2,470	714
24-----				--	--	--	95	2,780	713
25-----				--	--	--	88	2,950	701
26-----				--	--	--	82	2,510	556
27-----				--	--	--	71	2,060	395
28-----				133	2,230	801	80	1,390	300
29-----				122	2,240	738	78	1,360	284
30-----				176	2,730	1,300	76	3,710	761
31-----				151	1,620	660	--	--	--
Total -				724	--	3,500	3,263	--	18,700

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT LANDINGVILLE, PA.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	66	3,970	707	99	3,350	895	224	710	429
2-----	66	3,780	674	70	1,470	278	210	1,130	641
3-----	66	3,380	602	52	1,250	176	210	2,010	1,140
4-----	68	2,660	488	542	7,840	14,070	208	2,100	1,180
5-----	80	2,230	482	344	3,190	2,960	203	1,780	976
6-----	75	1,720	348	227	2,900	1,780	194	1,520	796
7-----	78	3,320	699	201	3,210	1,740	194	970	508
8-----	75	3,560	721	820	5,630	16,010	220	880	523
9-----	75	3,970	804	783	2,920	6,170	198	1,180	631
10-----	68	4,350	799	566	2,450	3,740	176	2,000	950
11-----	58	3,820	598	531	2,300	3,300	176	2,450	1,160
12-----	60	2,740	444	1,090	3,380	9,950	164	2,290	1,010
13-----	49	1,850	245	765	2,450	5,060	153	1,560	644
14-----	57	3,980	613	618	2,170	3,620	153	1,560	644
15-----	63	3,880	660	542	1,870	2,740	164	1,770	784
16-----	57	3,980	613	485	1,690	2,210	256	3,520	2,430
17-----	61	4,630	762	420	1,350	1,530	198	1,850	989
18-----	64	3,730	644	369	1,870	1,860	185	3,100	1,550
19-----	71	3,220	617	332	1,970	1,770	171	3,080	1,420
20-----	58	2,450	384	306	2,080	1,720	160	1,620	700
21-----	60	4,440	719	278	2,250	1,690	173	925	432
22-----	58	3,330	521	260	2,450	1,720	166	1,270	569
23-----	57	4,620	711	273	970	715	169	2,170	990
24-----	60	4,980	807	321	1,530	1,680	166	2,000	896
25-----	56	4,820	729	386	2,150	2,240	146	1,480	583
26-----	63	3,250	553	315	2,170	1,850	151	1,620	660
27-----	56	2,120	320	288	2,240	1,740	164	1,440	638
28-----	105	6,240	2,210	278	1,270	953	160	1,500	648
29-----	153	6,030	2,490	263	1,900	1,350	135	1,480	539
30-----	110	2,680	796	244	1,000	659	138	3,430	1,280
31-----	153	4,700	1,940	--	--	--	138	3,330	1,240
Total -	2,246	--	23,700	12,068	--	96,180	5,523	--	27,580
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	198	2,380	1,270	96	375	97	501	1,800	2,430
2-----	293	2,550	2,020	100	775	209	482	2,970	3,860
3-----	229	1,480	915	110	1,750	520	456	2,700	3,320
4-----	210	1,530	868	98	1,810	479	426	2,040	2,350
5-----	203	1,400	767	115	1,620	503	344	2,410	2,240
6-----	201	2,350	1,280	110	2,320	689	315	1,420	1,210
7-----	203	2,740	1,500	94	1,450	368	344	1,090	1,010
8-----	192	2,730	1,420	105	1,380	391	344	1,220	1,130
9-----	192	2,030	1,050	96	1,930	500	321	1,630	1,410
10-----	194	1,470	770	100	670	181	321	2,090	1,810
11-----	180	1,860	904	100	690	186	335	1,920	1,740
12-----	169	2,110	963	120	2,540	823	304	2,720	2,230
13-----	180	2,020	982	130	2,390	839	293	2,150	1,700
14-----	166	2,260	1,010	230	4,720	2,930	283	1,500	1,150
15-----	142	1,940	744	230	9,740	6,050	296	1,100	879
16-----	182	3,570	1,750	195	5,180	2,730	688	3,870	8,460
17-----	169	4,000	1,830	240	8,200	5,310	900	2,670	6,490
18-----	164	3,550	1,570	280	6,880	5,200	742	1,820	3,650
19-----	127	3,370	1,160	320	4,850	4,190	728	2,150	4,520
20-----	125	1,230	415	501	4,810	6,510	860	2,030	4,710
21-----	145	2,400	940	463	2,650	3,310	756	1,510	3,080
22-----	153	3,970	1,640	456	2,570	3,160	688	1,960	3,640
23-----	135	2,140	780	406	2,770	3,040	648	1,680	2,940
24-----	125	900	304	360	2,540	2,470	590	1,870	2,980
25-----	120	270	1/87	344	2,880	2,670	504	1,920	2,610
26-----	130	220	1/77	426	3,050	3,510	452	1,740	2,120
27-----	125	220	1/74	441	3,390	4,040	444	1,720	2,060
28-----	115	230	71	562	3,630	5,510	416	950	1,070
29-----	110	400	119	550	1,870	2,780	360	1,220	1,190
30-----	110	455	135	--	--	--	326	2,030	1,790
31-----	102	370	102	--	--	--	312	1,900	1,600
Total -	5,089	--	27,520	7,378	--	69,200	14,829	--	81,380

1/ Estimated

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT LANDINGVILLE, PA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,160	2,880	8,960	234	940	594	286	1,040	803
2-----	910	1,980	4,860	234	680	430	273	800	590
3-----	734	1,570	3,110	324	1,150	1,010	253	1,450	997
4-----	606	500	818	306	1,440	1,190	234	1,380	872
5-----	531	880	1,260	614	2,820	5,080	212	700	401
6-----	485	1,400	1,830	693	1,780	3,330	208	600	337
7-----	448	770	932	895	2,250	5,440	244	1,330	876
8-----	426	760	874	900	2,420	5,880	324	2,030	1,780
9-----	392	1,020	1,080	815	1,160	2,550	227	1,180	723
10-----	354	950	908	684	1,100	2,030	203	1,080	592
11-----	382	530	547	626	2,210	3,740	187	915	462
12-----	539	530	771	594	1,640	2,630	182	580	285
13-----	501	990	1,340	1,050	2,790	7,910	208	405	227
14-----	778	1,940	5,280	1,270	1,600	5,490	173	825	385
15-----	1,190	2,040	6,560	1,130	1,400	4,270	171	750	346
16-----	970	1,610	4,220	998	920	2,480	164	915	405
17-----	830	600	1,340	890	1,020	2,450	150	1,080	437
18-----	670	640	1,160	711	1,240	2,380	150	1,220	494
19-----	582	980	1,540	542	1,110	1,620	241	1,320	859
20-----	523	870	1,230	489	1,520	2,010	234	690	436
21-----	459	880	1,090	501	1,700	2,300	182	900	442
22-----	392	630	667	434	1,170	1,370	185	1,030	515
23-----	354	1,070	1,020	402	280	304	157	930	394
24-----	344	890	827	376	630	640	173	1,200	561
25-----	332	680	610	347	730	684	182	800	393
26-----	288	1,130	879	318	800	687	173	560	262
27-----	273	1,000	737	312	830	699	149	470	189
28-----	296	1,140	911	301	1,170	951	157	860	364
29-----	268	1,180	854	369	1,580	1,570	131	540	191
30-----	244	920	606	363	1,100	1,080	120	570	185
31-----	--	--	--	309	250	208	--	--	--
Total-	16,261	--	56,820	18,031	--	73,010	5,933	--	15,800
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	131	730	258	110	215	64	76	1,650	339
2-----	124	770	258	82	460	102	105	2,170	615
3-----	105	255	72	100	1,070	289	88	1,500	356
4-----	95	95	24	100	4,120	1,110	101	2,070	565
5-----	86	105	24	225	6,210	5,010	101	1,480	404
6-----	88	380	90	182	3,040	1,490	86	610	142
7-----	91	650	160	140	2,170	820	80	550	119
8-----	93	1,370	344	120	1,500	486	101	1,580	431
9-----	95	750	192	88	910	216	124	2,640	951
10-----	91	830	204	85	1,470	338	133	1,970	707
11-----	91	770	189	85	1,250	287	101	1,050	286
12-----	63	850	145	131	2,420	856	71	550	1/105
13-----	144	2,730	1,590	110	2,120	630	63	350	59
14-----	182	3,100	1,520	105	2,100	595	58	650	102
15-----	122	1,770	583	88	1,340	318	61	1,090	180
16-----	103	1,400	389	68	750	138	60	1,030	167
17-----	103	1,220	339	78	2,120	447	61	1,150	190
18-----	120	965	313	80	2,110	456	61	1,160	191
19-----	85	770	177	131	2,180	771	61	490	1/81
20-----	110	1,370	407	116	3,130	980	50	400	54
21-----	101	840	229	160	3,860	1,670	58	1,000	157
22-----	229	3,050	1,890	122	1,490	491	60	740	1/120
23-----	258	2,120	1,480	140	1,890	714	57	880	136
24-----	210	1,220	692	105	1,490	422	56	1,010	153
25-----	169	1,480	675	93	1,300	326	58	760	119
26-----	133	1,050	377	95	1,430	367	61	1,180	194
27-----	144	1,650	641	84	910	206	50	1,340	181
28-----	133	1,850	664	97	1,360	356	50	1,590	215
29-----	110	1,520	451	86	1,060	246	48	1,150	149
30-----	105	1,840	522	75	680	138	57	1,200	185
31-----	103	1,220	339	70	1,010	191	--	--	--
Total-	3,817	--	15,240	3,351	--	20,530	2,197	--	7,650

1/Estimated.

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT LANDINGVILLE, PA.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Oct. 30, 1947-----	2:30 p.m.	60	2,800	2,800			5	13	30	56	88	95	--	--	--
Oct. 31-----	10:15 a.m.	144	4,540	4,540			7	15	55	81	96	95	--	--	--
Nov. 4-----	8:25 a.m.	660	13,600	13,600			--	9	20	71	93	97	--	--	--
Dec. 1-----	12:10 p.m.	190	426	426			3	10	22	37	62	90	--	--	--
Dec. 10-----	11:10 a.m.	162	1,260	1,260			20	45	78	81	93	98	--	--	--
Dec. 12-----	12:10 p.m.	173	1,140	1,140			--	--	81	92	97	--	--	--	--
Dec. 17-----	12:15 p.m.	173	1,520	1,520			24	38	56	73	86	95	98	98	98
Dec. 22-----	10:00 a.m.	138	999	999			7	11	25	45	70	89	--	--	--
Dec. 22-----	10:00 a.m.	138	695	695			--	25	44	75	95	98	--	--	--
Jan. 5, 1948-----	12:50 p.m.	196	790	790			16	32	45	56	86	87	97	--	--
Jan. 5-----	12:35 p.m.	196	930	930			25	38	56	66	84	97	--	--	--
Jan. 5-----	12:45 p.m.	196	1,020	1,020			--	28	39	51	63	72	80	83	83
Jan. 13-----	10:00 a.m.	164	1,890	1,890			10	28	51	87	95	99	--	--	--
Jan. 13-----	12:55 p.m.	164	1,740	1,740			15	37	71	86	94	98	--	--	--
Jan. 28-----	11:50 a.m.	406	212	212			61	78	96	98	99	--	--	--	--
Jan. 30-----	11:45 a.m.	110	455	455			63	80	93	97	--	--	--	--	--
Feb. 3-----	2:35 p.m.	100	1,880	1,880			11	32	76	98	98	--	--	--	--
Feb. 5-----	3:25 p.m.	120	1,430	1,430			12	32	87	90	96	98	--	--	--
Feb. 10-----	12:40 p.m.	228	379	379			46	64	86	88	95	97	--	--	--
Feb. 20-----	4:05 p.m.	466	2,530	2,530			5	14	40	66	85	95	--	--	--
Feb. 22-----	10:30 a.m.	456	628	628			29	54	82	85	90	95	--	--	--
Mar. 11-----	12:30 p.m.	285	1,340	1,340			10	25	46	60	70	95	--	--	--
Mar. 15-----	2:00 p.m.	296	1,920	1,920			14	38	79	94	96	99	--	--	--
Mar. 17-----	11:10 a.m.	938	2,170	2,170			5	10	23	34	58	95	--	--	--
Mar. 17-----	11:25 a.m.	938	2,070	2,070			8	14	22	31	53	90	--	--	--
Mar. 19-----	2:10 p.m.	351	846	846			10	28	31	44	56	70	--	--	--

Apr. 2	921	2,040	2,040	10	15	24	30	56	75	--	--
Apr. 4	375	707	707	14	32	50	60	79	87	--	--
Apr. 15	1,220	1,140	1,140	--	--	--	20	32	60	--	--
Apr. 23	326	1,080	1,080	--	4	7	45	56	69	--	--
Apr. 30	222	888	888	3	11	23	60	73	86	--	--
May 7	1,160	1,940	1,940	3	9	18	47	66	85	--	--
May 14	1,220	699	699	--	--	--	19	38	63	--	--
May 25	338	637	637	--	--	--	50	62	75	--	--
June 9	201	671	671	6	16	36	63	67	82	--	--
June 16	133	1,070	1,070	7	17	39	63	69	74	--	--
June 23	144	1,510	1,510	6	18	45	78	--	--	--	--
June 29	124	539	539	8	22	41	48	71	94	--	--
June 30	110	380	380	10	24	41	62	82	95	--	--
July 7	91	482	482	10	28	48	59	69	87	--	--
July 15	80	1,800	1,800	3	7	11	78	87	97	--	--
July 23	232	2,000	2,000	2	9	18	66	86	97	--	--
July 29	91	916	916	3	8	12	68	80	94	--	--
Aug. 5	203	4,940	4,940	1	3	24	45	78	90	--	--
Aug. 13	88	1,270	1,270	4	18	31	53	81	98	--	--
Aug. 26	73	1,370	1,370	5	15	39	72	81	95	--	--
Sept. 2	84	1,600	1,600	4	15	27	69	78	90	--	--
Sept. 8	93	1,768	1,768	6	22	36	66	86	97	--	--
Sept. 17	51	1,190	1,190	7	14	63	80	86	93	--	--
Sept. 23	54	1,100	1,100	6	23	62	80	84	91	--	--

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT AUBURN, PA.

LOCATION.--At gaging station at bridge on State Highway 895 at Auburn, Schuylkill County, 0.4 mile upstream from Pine Creek, and 3 miles downstream from Plum Creek.

DRAINAGE AREA.--160 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1947 to September 1948.

Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 13,850 tons per day Nov. 8; minimum, 50 tons per day Sept. 27.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in field office at Schuylkill Haven, Pa.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Alumina (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)		Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
												Total	Non-carbonate								Total	Non-carbonate	
Dec. 3, 1947	228		10	4.15	593	15	8.3	0.18	3.8	54	31	--	--	--	0	286	4.0	0.0	0.7	502	324	324	108
Dec. 200	200		1	4.20	668	12	4.7	.12	2.7	62	37	10			0	346	2.0	.0	.6	494	341	341	52
Dec. 18	185		1	4.10	743	16	7.9	.10	3.2	78	42	13			0	429	2.0	.0	.6	--	421	421	61
Dec. 30	145		1	4.10	614	14	4.5	.30	2.5	54	32	12			0	312	2.0	.0	.5	513	301	301	61
Jan. 8, 1948	226		1	4.20	809	14	6.2	.20	2.6	80	45	6			0	428	3.0	.0	.5	697	428	428	74
Feb. 15	260		1	4.40	623	9.6	3.0	.15	1.5	53	28	28			0	313	2.0	.0	1.9	510	268	268	34
Feb. 19	460		1	4.6	346	8.8	1.2	.26	1.7	32	20	--			0	155	2.0	.0	.0	249	173	173	23
Feb. 20	760		1	4.6	277	10	1.2	.41	2.0	32	14	--			0	129	2.0	.0	.0	206	149	149	25
Feb. 27	590		1	4.45	290	9.6	3.7	.04	1.2	33	18	--			0	162	2.0	.0	.0	262	180	180	26
Mar. 5	415		1	4.20	454	9.2		.25	1.6	39	23	--			0	226	2.0	.0	.1	358	254	254	40
Mar. 10	364		9	4.5	237	11	5.7	.18	1.1	30	10	--			0	103	4.0	.0	.9	205	150	150	24
Mar. 10	364		11	4.40	452	15	6.2	.24	4.5	41	26	--			0	210	6.0	.0	.0	395	253	253	34
Mar. 17	1,250		12	4.30	475	18	8.7	.33	3.2	41	26	--			0	232	2.0	.0	.0	448	266	266	89
Mar. 26	483		10	4.30	507	24	8.8	.23	3.3	50	30	--			0	266	4.0	.0	.1	484	305	305	81
Mar. 31	328		11	4.35	398	17	14	.17	2.5	34	24	--			0	193	2.0	.0	.5	399	268	268	76
Apr. 6	518		11	4.20	567	16	15	.17	3.1	52	30	--			0	272	4.0	.0	.5	481	346	346	104
Apr. 23	447		9	4.15	648	17	9.9	.18	4.0	66	36	--			0	343	4.0	.0	.4	595	379	379	98
Apr. 30	272		1	4.40	621	5.5	3.9	.15	3.3	59	34	3.5			0	305	4.0	.0	.7	489	316	316	62
May 7	1,060		1	5.2	285	4.5	1.2	.14	1.3	26	13				6	119	4.0	.1	.5	202	128	123	23
May 14	1,280		1	4.7	295	2.5	1.0	.10	1.5	26	13	2.2			0	122	3.0	.0	.5	204	127	127	34
May 21	650		1	4.40	477	6.0	5.7	.14	1.9	41	24				0	230	2.0	.0	.2	352	238	238	61
May 25	419		1	4.30	601	11	5.5	.05	3.1	51	30	13			0	294	7.0	.0	1.4	470	289	289	80

June 3	263	1	4.25	598	17	6.0	0.08	3.6	68	38	3.6	0	349	8.0	-0	1.5	570	368	358	84
June 4	443	1	4.5	486	9.1	5.7	.15	1.7	45	24	8.4	0	215	7.0	-0	1.7	562	214	217	35
June 14	180	1	4.30	719	13	5.3	.22	1.8	66	43	7.9	0	372	9.0	-0	1.1	562	284	281	36
June 16	171	1	4.30	352	14	4.8	.26	5.2	91	52	2.2	0	439	2.0	-0	1.3	672	455	455	58
June 21	208	2	4.40	599	11	1.8	.15	3.5	53	37	1.1	0	289	6.0	-0	.5	442	202	202	40
June 2	178	1	4.35	767	15	6.3	.28	3.8	67	45	4.8	0	379	8.0	-0	.7	592	396	396	54
July 6	113	1	4.20	856	8.0	4.3	.29	2.0	82	51	3.1	0	426	6.0	-0	.8	682	446	446	62
July 15	145	1	4.30	896	11	8.5	.85	5.2	87	53	4.2	0	477	6.0	-0	.4	731	496	496	92
July 23	301	1	5.1	558	5.0	2.7	1.7	3.6	51	28	--	0	257	2.0	-0	.1	408	268	268	56
July 29	115	1	4.10	983	18	11	.31	6.0	90	54	7.7	0	512	3.5	-0	3.0	790	524	524	88
Aug. 5	202	1	4.5	924	10	4.9	1.9	6.0	94	54	2.3	4	476	4.0	-0	.5	922	500	497	82
Aug. 10	90	1	4.05	969	20	12	.41	6.9	98	59	5.2	0	553	4.5	-0	1.0	1,010	572	572	148
Aug. 17	80	5	4.5	983	9.0	5.9	.58	5.2	98	59	--	0	500	4.0	-1	.0	790	531	531	110
Aug. 27	88	1	4.25	940	16	16	.45	5.4	92	52	4.5	0	530	5.5	-0	.8	1,020	545	545	116
Sept. 2	110	1	4.10	1,140	16	7.3	.12	7.6	120	73	1.8	0	632	3.0	-0	.1	992	658	658	108
Sept. 9	125	5	4.8	1,070	10	6.4	4.8	6.4	106	63	2.0	0	559	3.0	-0	2.2	882	584	584	134
Sept. 15	62	1	4.00	1,080	16	16	.10	6.4	101	50	8.1	0	547	7.0	-0	2.4	892	564	564	108
Sept. 24	92	1	4.0	1,050	8.0	11	2.3	6.8	106	61	6.2	0	575	7.0	-0	.0	912	595	595	78
Sept. 29	57	1	4.0	1,010	15	8.4	3.1	6.1	107	59	9.2	0	564	6.0	-0	.1	856	576	576	52

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT AUBURN, PA.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	--	--	--	145	2,060	807	257	550	381
2-----	--	--	--	104	1,200	338	260	800	1/562
3-----	--	--	--	80	2,300	497	228	1,045	643
4-----	--	--	--	790	4,600	13,190	228	850	524
5-----	--	--	--	670	1,750	3,160	215	1,250	726
6-----	--	--	--	391	1,050	1,110	220	1,550	921
7-----	--	--	--	272	1,400	1,030	210	1,000	567
8-----	--	--	--	1,070	3,330	13,850	251	650	440
9-----	--	--	--	1,190	1,800	5,780	226	600	367
10-----	--	--	--	770	780	1,620	212	900	516
11-----	--	--	--	640	950	1,640	212	1,250	716
12-----	--	--	--	1,460	2,060	8,560	205	1,400	775
13-----	--	--	--	1,030	1,170	3,250	202	1,300	710
14-----	64	4,000	691	790	1,000	1/2,130	198	950	508
15-----	78	4,460	940	655	880	1/1,560	195	500	263
16-----	69	4,660	869	562	900	1/1,370	272	650	478
17-----	62	4,770	799	467	820	1/1,030	218	1,000	589
18-----	69	3,720	694	415	980	1/1,000	200	1,150	621
19-----	73	2,200	435	360	1,100	1/1,070	192	1,200	621
20-----	66	1,350	241	314	1,220	1/1,030	185	1,550	775
21-----	62	1,620	270	288	1,100	1/856	202	1,150	626
22-----	64	2,450	424	266	920	662	190	800	410
23-----	60	4,130	670	278	750	562	198	1,300	694
24-----	60	4,400	713	364	400	394	188	2,050	1,040
25-----	64	3,500	605	513	500	691	176	1,500	713
26-----	64	1,900	329	403	800	869	178	900	432
27-----	57	1,670	257	349	750	707	178	1,480	710
28-----	75	5,350	1,080	324	450	394	161	1,250	543
29-----	153	5,450	2,690	298	600	483	136	850	313
30-----	125	1,650	556	272	650	478	145	1,500	589
31-----	171	1,960	904	--	--	--	150	2,100	850
Total -	1,466	--	13,170	15,530	--	70,220	6,288	--	18,620
Day	January			February			March		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	200	3,210	1,730	115	530	165	690	1,150	2,140
2-----	340	2,230	2,050	115	680	211	625	1,600	2,700
3-----	270	1,050	767	125	1,310	443	590	1,150	1,830
4-----	250	1,250	842	115	1,300	405	526	900	1,280
5-----	245	700	464	130	950	335	415	800	896
6-----	240	1,200	778	130	1,530	537	368	670	667
7-----	239	1,200	775	110	1,530	454	411	800	888
8-----	226	1,150	702	120	1,470	475	403	650	707
9-----	212	1,450	829	115	590	183	375	950	961
10-----	210	1,400	794	120	520	168	364	1,300	1,280
11-----	188	1,500	761	120	570	185	364	700	688
12-----	180	1,450	705	140	1,450	548	335	1,170	1,060
13-----	165	1,350	675	150	1,690	686	321	1,050	910
14-----	171	1,700	766	250	3,210	2,170	304	850	697
15-----	153	1,130	472	260	3,150	2,210	314	700	594
16-----	183	1,950	964	230	1,000	621	906	4,330	12,260
17-----	171	3,000	1,390	280	2,670	2,020	1,250	3,240	10,900
18-----	170	2,150	968	350	7,700	7,280	1,030	1,200	3,340
19-----	135	950	346	460	3,900	4,840	1,020	1,600	4,410
20-----	135	500	162	760	2,650	5,440	1,120	1,350	4,080
21-----	160	250	108	685	700	1,300	1,000	1,050	2,840
22-----	170	450	207	640	1,270	2,200	890	620	1,490
23-----	155	2,150	899	536	1,250	1,610	785	1,070	2,270
24-----	145	3,450	1,350	455	1,000	1,230	685	1,050	1,940
25-----	140	2,800	1,060	439	1,320	1,560	562	1,050	1,590
26-----	150	380	154	554	2,300	3,440	483	850	1,110
27-----	145	160	63	590	1,700	2,710	483	350	456
28-----	135	220	80	745	2,730	5,490	471	450	572
29-----	130	320	112	790	1,650	3,520	383	450	464
30-----	130	380	133	--	--	--	338	820	748
31-----	125	420	142	--	--	--	328	1,270	1,130
Total -	5,690	--	21,310	9,629	--	52,640	18,139	--	66,900

1/ Estimated.



DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT AUBURN, PA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,430	3,090	12,170	254	1,400	961	311	400	335
2-----	1,230	920	3,060	245	930	616	288	1,020	794
3-----	928	750	1,880	331	830	742	263	1,050	745
4-----	730	430	848	338	1,150	1,050	248	1,250	837
5-----	610	250	410	735	1,800	4,240	231	860	537
6-----	518	860	1,200	928	1,200	3,010	239	630	408
7-----	475	1,000	1,280	1,060	1,900	5,440	269	590	429
8-----	443	700	837	1,110	1,230	3,690	443	2,060	2,470
9-----	419	850	961	956	700	1,810	269	850	618
10-----	387	700	732	805	550	1,200	237	1,600	1,020
11-----	415	400	448	690	1,100	2,050	208	1,400	786
12-----	665	775	1,390	610	960	1,580	210	1,270	721
13-----	660	1,150	2,050	1,090	2,100	6,180	234	1,000	632
14-----	901	1,660	4,040	1,290	1,150	4,010	180	940	456
15-----	1,470	1,500	5,950	1,200	950	3,080	185	1,900	950
16-----	1,240	750	2,510	1,100	700	2,080	171	1,370	632
17-----	1,060	700	2,000	1,060	700	2,000	159	870	373
18-----	879	550	1,300	928	850	2,130	157	1,350	572
19-----	750	350	707	800	900	1,940	254	2,440	1,670
20-----	665	1,100	1,980	675	750	1,370	266	2,330	1,670
21-----	590	1,000	1,590	650	600	1,050	208	570	321
22-----	536	1,250	1,810	558	600	904	210	400	227
23-----	447	750	904	495	370	494	195	1,150	605
24-----	427	900	1,040	463	400	500	202	1,820	994
25-----	411	550	610	419	900	1,020	242	1,420	929
26-----	338	600	548	356	750	721	210	1,000	567
27-----	311	1,300	1,090	331	1,050	940	178	350	168
28-----	331	1,600	1,430	314	1,200	1,020	205	600	332
29-----	294	1,300	1,030	407	1,600	1,760	192	600	310
30-----	272	850	624	455	900	1,110	173	570	266
31-----	--	--	--	364	340	335	--	--	--
Total -	19,832	--	56,430	21,017	--	59,030	6,837	--	21,370
Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	180	730	354	115	200	1/62	80	1,750	378
2-----	178	850	408	88	400	1/95	110	2,410	716
3-----	148	530	212	108	2,350	685	96	1,770	459
4-----	136	350	129	115	2,700	838	106	1,610	461
5-----	125	250	84	202	3,980	3,200	113	1,600	488
6-----	108	250	73	198	3,620	1,940	92	610	151
7-----	121	950	310	145	2,340	916	92	550	137
8-----	113	1,200	367	125	880	297	108	1,510	440
9-----	113	1,350	413	94	640	163	125	1,360	459
10-----	108	1,350	394	90	1,200	292	159	2,140	919
11-----	115	950	294	88	1,750	416	113	1,510	461
12-----	84	740	168	128	3,870	1,340	92	1,190	296
13-----	141	2,000	761	113	2,600	793	69	500	93
14-----	218	3,770	2,220	106	1,620	464	66	460	82
15-----	145	1,700	664	94	1,800	457	62	800	134
16-----	128	1,950	675	71	650	125	62	770	129
17-----	123	1,800	597	80	2,490	538	67	1,230	222
18-----	130	1,250	437	82	2,810	622	66	1,200	214
19-----	90	1,180	281	159	4,600	1,970	69	930	173
20-----	117	2,600	821	125	3,220	1,090	52	490	69
21-----	128	2,900	1,000	176	2,030	965	60	730	118
22-----	298	4,570	4,090	136	1,380	507	62	1,080	181
23-----	301	3,380	2,750	150	2,220	891	59	1,090	174
24-----	301	2,500	2,030	113	1,760	537	62	990	166
25-----	202	1,400	764	102	1,550	427	59	1,090	174
26-----	154	650	270	110	1,750	520	62	810	136
27-----	161	2,000	869	88	1,410	335	51	360	50
28-----	161	2,300	999	98	1,350	357	51	670	92
29-----	115	2,000	621	96	1,310	340	57	1,460	225
30-----	110	1,600	535	76	980	201	73	2,000	394
31-----	121	1,200	392	76	1,230	252	--	--	--
Total -	4,673	--	23,980	3,547	--	21,640	2,395	--	8,190

1/ Estimated.

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT AUBURN, PA.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis			
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000
Oct. 30, 1947	1:00 p. m.	371	2,510			13	22		52	85	97	98	--			
Nov. 24	11:10 a. m.	275	256				12	21	53	73	88	96	--			
Dec. 2	1:35 p. m.	232	1,080			24	57		88	93	98	--	--			
Dec. 8	11:30 a. m.	226	1,717			10	20	40	62	80	90	--	--			
Dec. 14	1:00 p. m.	1,290	828			15	45	95	98	99	--	--	--			
Dec. 18	12:30 p. m.	1,180	1,480			24	45	87	94	98	--	--	--			
Dec. 23	1:05 p. m.	165	2,380			13	32	78	83	87	92	--	--			
Dec. 30	10:50 a. m.	121	1,430				25	62	87	89	95	--	--			
Jan. 8, 1948	9:30 a. m.	205	1,910				16	38	82	86	90	95	--			
Jan. 16	2:30 p. m.	195	1,320				26	52	90	94	98	99	--			
Jan. 18	12:50 p. m.	192	1,240				8	15	31	51	84	97	--			
Jan. 26	4:15 p. m.	421	1,335				43	65	81	85	91	95	--			
Feb. 2	2:00 p. m.	353	557				29	65	91	93	96	98	--			
Feb. 10	11:50 a. m.	299	1,160				20	44	80	87	94	96	--			
Feb. 11	2:30 p. m.	108	532				40	75	88	95	98	--	--			
Feb. 19	11:30 a. m.	460	2,290				2	14	45	74	95	98	--			
Feb. 20	12:35 p. m.	795	2,720					8	26	44	69	89	--			
Feb. 27	2:00 p. m.	580	895				--	15	23	25	50	81	94			
Mar. 5	12:30 p. m.	421	959				12	28	47	52	70	95	--			
Mar. 10	1:30 p. m.	399	787				--	--	55	64	74	85	96			
Mar. 17	2:30 p. m.	1,190	1,570				7	12	21	35	49	80	--			
Mar. 26	3:40 p. m.	467	540				--	22	27	49	72	87	96			
Mar. 31	3:05 p. m.	368	755				9	27	55	80	87	91	98			
Apr. 6	1:55 p. m.	495	504				6	27	41	69	81	90	98			
Apr. 15	10:15 a. m.	1,490	1,830				2	6	9	16	26	48	81			
Apr. 30	11:15 a. m.	1,324	568				7	19	39	46	57	70	79			

Date	1,340	1,190	4	12	20	31	47	48	91
May 14	1,340	1,190	--	--	--	--	--	--	--
May 15	675	378	--	--	--	43	62	61	94
May 21	388	742	12	22	59	85	92	91	94
May 25	388	742	12	22	59	85	92	91	94
June 1	278	1,656	3	8	62	93	96	98	98
June 4	278	1,656	3	8	62	93	96	98	98
June 8	415	597	14	46	54	57	68	88	96
June 11	192	712	8	18	50	86	94	98	--
June 16	192	712	8	18	50	86	94	98	--
June 21	231	356	10	30	45	65	78	94	--
June 24	231	356	10	30	45	65	78	94	--
July 8	121	1,070	6	36	61	82	--	--	--
July 15	139	1,210	14	44	60	80	90	97	--
July 29	134	1,870	32	40	50	58	65	70	77
Aug. 5	143	2,820	3	6	54	76	87	93	97
Aug. 10	113	1,060	7	19	35	74	85	91	95
Aug. 27	90	969	9	26	53	66	77	86	89
Sept. 2	106	2,080	5	15	27	89	93	99	--
Sept. 9	130	1,360	5	19	37	72	85	93	97
Sept. 15	76	1,270	3	10	25	36	44	50	70
Sept. 24	75	1,350	5	10	43	76	82	92	97
Sept. 29	57	1,190	14	37	64	82	83	83	84

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT BERNE, PA.

LOCATION. --At highway bridge at Berne, Berks County, half a mile upstream from Mill Creek, and 6½ miles downstream from Little Schuylkill River.

DRAINAGE AREA. --385 square miles.

RECORDS AVAILABLE. --Chemical analyses: December 1947 to September 1948.

Water temperatures: February to September 1948.

Sediment Records: October 1947 to September 1948.

EXTRA. 1947-48. --Sediment loads: Maximum, 80,180 tons per day Nov. 12; minimum, 36 tons per day July 5.

REMARKS. --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in field office at Schuylkill Haven, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
Dec. 11, 1947	426	--	7	4.10	541	10	13	0.84	--	42	23	--	--	0	245	6.0	0.0	--	387	278	278	63
Dec. 16	748	--	4	4.40	495	20	5.4	6.0	--	38	20	6.3	--	0	223	4.0	--	--	367	224	224	39
Dec. 22	444	--	4	4.00	533	20	11	1.2	--	40	24	--	--	0	239	6.0	--	--	378	268	268	41
Dec. 31	402	--	6	4.00	619	15	10	.94	--	41	18	42	--	0	307	8.0	--	--	458	240	240	79
Jan. 7, 1948	502	--	7	4.20	487	12	9.1	.85	--	39	20	--	--	0	215	6.0	--	--	341	236	236	44
Jan. 12	410	--	8	3.90	578	5.0	12	1.4	--	41	25	--	--	0	264	6.0	--	--	416	282	282	78
Jan. 20	310	--	5	3.90	636	10	11	1.2	--	45	26	12	--	0	296	6.0	--	--	462	290	290	103
Feb. 13-17	509	34	1	4.00	575	8.4	4.8	.04	3.0	45	25	20	3.5	0	261	9.0	.1	1.4	400	252	252	50
Feb. 18-20	1,600	38	1	4.30	271	6.8	1.0	.04	1.1	21	12	9.4	3.0	0	110	2.0	.1	.3	172	111	111	20
Feb. 21-29	1,360	41	1	4.30	314	8.6	3.1	.02	1.4	22	12	8.3	1.9	0	131	1.5	--	.1	204	126	126	36
Mar. 1-10	1,140	40	1	4.35	356	8.4	3.0	.02	1.6	26	15	8.5	1.8	0	152	2.5	.1	.2	237	147	147	30
Mar. 11-20	1,580	44	1	4.30	336	8.2	2.9	.02	1.7	24	14	7.4	1.8	0	142	1.5	.1	.1	223	139	139	34
Mar. 21-31	1,150	52	1	4.35	356	8.6	3.7	.02	1.7	25	16	7.9	1.9	0	155	2.0	.1	.1	237	153	153	39
Apr. 1-10	1,540	53	3	3.80	316	8.7	3.0	.03	1.4	22	14	6.2	1.6	0	133	1.0	.1	.2	202	140	140	36
Apr. 11-20	1,790	51	1	4.15	316	9.3	3.8	.03	1.4	21	14	5.9	1.5	0	130	1.0	.1	.2	199	137	137	39
Apr. 21-30	822	58	1	4.20	479	9.6	5.3	.03	2.5	37	23	10	2.0	0	218	2.5	.1	.4	334	224	224	50
May 1-4	658	58	3	4.25	519	9.6	5.6	.05	2.7	41	27	11	2.1	0	240	2.0	.1	1.0	369	252	252	57
May 5-10	2,200	52	1	4.25	266	8.0	2.7	.05	1.1	17	11	5.6	1.8	0	107	1.0	.1	.2	164	107	107	32
May 11-20	2,050	61	1	4.25	332	9.4	3.9	.04	1.5	22	15	6.1	1.4	0	140	1.0	.1	.2	215	143	143	38
May 21-31	969	--	15	4.10	432	10	5.0	.78	4.2	35	21	6.0	1.1	0	207	3.0	.1	.6	321	215	215	61

June 1-10-----	592	--	5	4.00	540	5.2	5.2	.06	4.5	43	26	7.1	1.0	0	251	3.5	.0	1.5	394	256	256	64
June 11-17-----	437	--	10	4.00	616	11	9.7	.06	4.0	50	29	7.2	1.2	0	283	2.8	.0	1.5	449	310	310	64
June 18-27-----	411	--	3	4.30	322	8.6	8.2	.15	3.1	52	28	--	--	0	272	4.0	.1	1.2	413	298	298	59
June 28-July 7-----	316	--	5	4.13	561	8.4	8.8	.17	3.2	50	30	3.2	3.2	0	299	6.5	.0	3.1	456	315	315	76
July 8-17-----	250	--	2	3.30	718	12	12	.27	4.2	64	39	7.0	7.0	0	386	8.5	.1	3.4	578	400	400	97
July 18-31-----	327	--	5	3.30	725	11	7.8	.21	4.2	63	42	15	15	0	392	6.0	.1	3.6	584	388	388	108
Aug. 1-10-----	264	--	5	4.00	736	12	8.3	.21	4.3	63	44	20	20	0	415	4.5	.0	2.9	608	398	398	102
Aug. 11-20-----	220	--	3	3.95	783	13	6.6	.22	4.6	73	45	16	16	0	425	5.5	.1	2.6	658	418	418	112
Aug. 21-31-----	271	--	2	4.00	675	13	6.0	.23	5.8	61	36	6.2	6.2	0	345	5.0	.0	1.7	542	354	354	82
Sept. 1-10-----	193	--	5	4.20	836	18.2	18.3	.25	5.8	77	47	16	16	0	460	6.0	.0	.3	708	452	452	--
Sept. 11-20-----	156	66	7	4.20	873	14	13	.46	2.7	86	50	8.0	8.0	0	487	7.0	.0	1.5	755	501	501	122
Sept. 21-30-----	138	58	7	4.00	851	16	13	.15	5.8	84	46	6.3	6.3	0	466	6.0	.0	2.9	730	485	485	120

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT BERNE, PA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	--	--	--	--	--	54	58	72	--	--	--
2	--	--	--	--	--	36	52	58	72	--	--	--
3	--	--	--	--	--	42	50	--	68	--	--	--
4	--	--	--	--	--	38	48	--	73	--	--	--
5	--	--	--	--	--	36	54	--	72	--	--	--
6	--	--	--	--	--	38	54	--	68	--	--	--
7	--	--	--	--	--	40	55	54	66	--	--	--
8	--	--	--	--	--	40	54	50	70	--	--	--
9	--	--	--	--	--	44	--	54	68	--	--	--
10	--	--	--	--	--	46	--	48	73	--	--	--
11	--	--	--	--	--	36	--	68	72	--	--	63
12	--	--	--	--	--	38	48	72	75	--	--	64
13	--	--	--	--	33	40	--	65	71	80	--	68
14	--	--	--	--	33	40	44	55	72	--	--	70
15	--	--	--	--	32	42	47	55	73	--	--	64
16	--	--	--	--	36	48	48	54	66	--	--	62
17	--	--	--	--	35	46	54	62	71	--	--	80
18	--	--	--	--	34	48	54	56	--	--	--	65
19	--	--	--	--	39	45	54	60	--	--	--	70
20	--	--	--	--	40	54	60	64	--	76	--	70
21	--	--	--	--	--	--	58	64	--	--	--	66
22	--	--	--	--	36	54	60	64	--	--	--	67
23	--	--	--	--	40	50	56	64	--	--	--	56
24	--	--	--	--	39	54	56	66	--	--	--	80
25	--	--	--	--	43	54	62	65	--	--	--	55
26	--	--	--	--	42	50	60	65	--	--	--	55
27	--	--	--	--	44	55	58	67	--	--	--	56
28	--	--	--	--	--	48	54	68	--	78	--	56
29	--	--	--	--	42	46	55	66	--	--	--	58
30	--	--	--	--	--	46	54	56	--	--	--	56
31	--	--	--	--	--	54	--	70	--	--	--	--
Average	--	--	--	--	--	45	54	61	--	--	--	--

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT BERNE, PA.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	162	790	346	502	2,040	2,760	587	420	666
2-----	149	1,040	418	379	770	788	560	750	1,130
3-----	149	1,070	430	325	260	288	534	870	1,250
4-----	154	890	370	1,140	8,030	45,980	522	904	1,280
5-----	149	790	318	1,430	3,020	11,700	489	1,100	1,450
6-----	136	800	294	870	1,750	4,110	496	1,050	1,410
7-----	154	600	249	664	900	1,610	470	462	586
8-----	149	1,020	410	2,290	6,170	78,430	554	448	670
9-----	158	1,600	683	3,610	3,500	34,100	515	830	1,150
10-----	158	1,850	789	1,880	1,200	6,090	432	745	869
11-----	144	1,420	552	1,450	2,750	11,800	426	915	1,050
12-----	144	790	307	4,400	7,260	90,180	408	1,070	1,180
13-----	124	800	268	2,500	1,870	12,600	400	980	1,060
14-----	140	795	301	1,690	1,650	7,530	390	955	1,010
15-----	144	1,410	548	1,360	1,660	6,100	380	505	518
16-----	140	1,400	529	1,190	1,270	4,080	748	2,350	4,750
17-----	132	1,500	535	995	640	1,720	594	1,430	2,290
18-----	144	1,460	568	862	800	1,860	470	1,220	1,550
19-----	195	1,670	879	748	850	1,720	450	1,220	1,480
20-----	149	1,470	591	678	960	1,760	450	1,320	1,600
21-----	140	895	338	615	940	1,560	502	1,500	2,030
22-----	140	1,450	548	567	770	1,180	444	750	899
23-----	172	1,500	697	622	800	1,340	438	920	1,090
24-----	172	1,360	632	755	1,100	3,380	438	1,260	1,490
25-----	176	1,390	660	1,330	3,320	11,900	420	340	386
26-----	176	1,560	741	1,030	990	2,750	432	290	338
27-----	172	1,700	789	894	825	1,990	482	240	312
28-----	205	1,380	764	806	760	1,650	476	500	643
29-----	636	4,650	7,980	748	750	1,510	384	500	518
30-----	438	3,700	4,380	678	675	1,240	374	680	687
31-----	657	2,930	5,200	--	--	--	402	820	890
Total -	6,058	--	32,110	37,008	--	352,700	14,667	--	36,230
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	408	3,430	3,780	270	140	1/102	1,520	1,460	5,990
2-----	995	3,600	9,670	280	160	1/121	1,390	1,310	4,920
3-----	678	1,350	2,470	310	200	1/167	1,330	1,470	5,280
4-----	560	660	998	280	300	1/227	1,260	1,240	4,220
5-----	528	480	684	300	350	1/284	1,040	1,180	3,310
6-----	522	1,180	1,660	310	473	396	950	1,080	2,800
7-----	502	1,570	2,130	270	500	1/364	1,020	1,050	2,890
8-----	476	1,570	2,020	280	475	1/359	1,030	800	2,220
9-----	444	1,250	1,500	270	450	1/328	934	960	2,420
10-----	460	930	1,160	280	440	333	942	1,110	2,820
11-----	420	820	930	280	460	348	959	1,140	2,950
12-----	410	485	537	300	920	745	878	1,160	2,750
13-----	440	850	1,010	330	1,100	980	830	1,130	2,530
14-----	410	1,220	1,350	450	1,780	2,160	798	800	1,720
15-----	360	950	923	635	2,520	4,320	814	1,100	2,420
16-----	390	640	674	515	1,550	2,160	1,750	4,520	32,430
17-----	390	625	658	615	2,200	3,650	3,380	2,770	25,300
18-----	380	715	734	1,000	2,460	6,640	2,130	1,500	8,630
19-----	320	570	492	1,500	4,950	20,000	2,080	1,680	9,480
20-----	310	295	247	2,290	4,830	29,900	2,190	1,700	10,100
21-----	360	405	394	1,600	2,270	9,810	1,810	680	3,320
22-----	370	530	529	1,360	2,770	10,200	1,560	680	2,860
23-----	340	300	275	1,140	1,470	4,530	1,600	960	4,150
24-----	330	170	151	950	1,750	4,490	1,370	1,090	4,030
25-----	320	160	138	926	1,540	3,850	1,080	1,230	3,590
26-----	350	155	146	1,240	1,840	6,160	918	1,020	2,530
27-----	350	150	142	1,380	2,080	7,750	968	760	1,990
28-----	330	150	134	1,820	3,880	19,100	1,010	670	1,830
29-----	310	150	126	1,820	2,890	14,200	838	650	1,470
30-----	300	150	122	--	--	--	790	650	1,390
31-----	290	150	117	--	--	--	755	750	1,530
Total -	13,053	--	35,900	23,001	--	153,700	39,934	--	163,900

1/ Estimated.

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT BERNE, PA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3,450	3,080	34,520	502	700	949	713	110	212
2-----	2,660	1,800	12,900	541	570	833	643	370	642
3-----	1,660	770	3,450	734	420	833	587	480	761
4-----	1,430	870	3,360	854	670	1,540	554	475	711
5-----	1,320	1,070	3,810	1,800	2,240	14,610	522	520	733
6-----	1,180	1,020	3,250	2,450	1,330	8,800	482	580	755
7-----	1,080	820	2,390	2,640	2,040	17,370	470	365	463
8-----	977	490	1,290	2,780	1,800	13,500	878	1,650	4,300
9-----	902	360	877	1,940	1,120	5,870	567	770	1,180
10-----	783	370	782	1,560	650	2,740	502	730	990
11-----	790	430	917	1,310	690	2,440	456	850	1,050
12-----	1,420	1,250	4,790	1,140	1,020	3,140	450	840	1,020
13-----	1,450	530	2,070	2,470	1,430	9,540	522	830	1,170
14-----	1,970	970	5,160	3,330	2,020	18,200	420	260	295
15-----	3,610	2,750	26,800	2,840	1,120	8,590	438	585	692
16-----	2,410	1,090	7,090	2,240	700	4,230	402	870	944
17-----	2,060	800	4,450	2,310	700	4,370	368	660	656
18-----	1,570	680	2,880	1,850	1,070	5,350	340	550	505
19-----	1,380	540	2,010	1,600	940	4,060	629	1,280	2,170
20-----	1,260	700	2,380	1,400	670	2,530	734	1,460	2,890
21-----	1,150	850	2,640	1,390	570	2,140	463	440	550
22-----	1,010	710	1,940	1,210	640	2,090	420	430	488
23-----	902	640	1,560	1,050	1,670	4,740	426	730	840
24-----	862	720	1,680	1,000	700	1,890	390	880	9.7
25-----	846	550	1,260	926	680	1,700	548	965	1,430
26-----	748	240	485	814	500	1,100	402	720	781
27-----	685	520	962	741	520	1,040	357	350	338
28-----	734	880	1,740	699	630	1,190	402	1,080	1,170
29-----	699	800	1,510	862	1,120	2,610	463	950	1,190
30-----	587	850	1,350	1,120	1,960	5,930	330	195	174
31-----	--	--	--	846	760	1,740	--	--	--
Total -	41,585	--	140,300	46,949	--	155,700	14,878	--	30,030
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	325	170	149	220	695	413	158	330	141
2-----	335	215	194	180	315	153	185	540	270
3-----	285	120	92	205	400	221	185	655	327
4-----	270	80	58	215	720	418	205	520	289
5-----	240	55	36	414	1,280	2,090	190	545	281
6-----	250	57	38	560	2,320	3,510	167	312	141
7-----	260	152	107	280	560	424	158	130	55
8-----	245	222	147	220	325	193	180	510	248
9-----	220	257	153	167	155	70	210	545	308
10-----	205	246	136	180	195	95	295	1,160	923
11-----	200	188	102	190	335	172	225	550	335
12-----	180	108	52	265	570	408	176	255	121
13-----	220	310	184	245	690	456	140	190	72
14-----	496	2,820	3,780	200	635	343	140	140	53
15-----	290	520	408	176	575	273	149	140	56
16-----	235	320	203	144	400	156	149	210	85
17-----	205	370	205	167	225	102	144	300	117
18-----	220	320	190	167	660	297	149	410	165
19-----	185	190	95	346	1,810	1,690	149	420	169
20-----	210	200	113	300	725	589	140	285	108
21-----	240	560	362	522	1,800	2,540	149	160	64
22-----	699	2,960	5,590	352	800	761	149	350	141
23-----	601	1,380	2,240	368	890	886	136	400	147
24-----	476	830	1,070	300	570	462	136	435	160
25-----	357	440	424	270	480	351	136	500	184
26-----	275	225	167	225	475	289	140	420	159
27-----	285	380	292	220	440	261	124	350	117
28-----	280	525	397	210	440	249	124	340	114
29-----	255	580	400	195	385	203	136	350	129
30-----	245	480	319	158	290	124	149	520	209
31-----	245	600	397	162	175	77	--	--	--
Total -	9,034	--	18,100	7,823	--	18,300	4,873	--	5,690



DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT BERNE, PA.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis			
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000
Oct. 31, 1947	2:15 p.m.	563	3,460	3,460	--	18	49	84	97	--	--	--	--	--	--	--
Nov. 13	2:05 p.m.	2,710	681	681	--	13	19	30	38	56	95	--	--	--	--	--
Nov. 21	10:20 p.m.	636	956	956	--	62	95	97	98	99	--	--	--	--	--	--
Nov. 23	2:00 p.m.	2,450	1,700	1,700	--	7	10	16	30	55	--	--	--	--	--	--
Nov. 26	1:50 p.m.	1,030	691	691	--	52	80	84	91	95	--	--	--	--	--	--
Nov. 26	1:55 p.m.	1,020	644	644	--	30	62	87	90	95	97	--	--	--	--	--
Dec. 4	1:20 p.m.	514	867	867	--	28	50	80	93	98	--	--	--	--	--	--
Dec. 15	12:25 p.m.	380	754	754	--	7	13	35	65	87	95	--	--	--	--	--
Dec. 22	12:30 p.m.	470	558	558	--	22	38	74	93	98	99	--	--	--	--	--
Dec. 24	1:05 p.m.	476	965	965	--	24	65	97	98	99	--	--	--	--	--	--
Dec. 31	10:40 a.m.	390	1,530	1,530	--	22	51	87	98	--	--	--	--	--	--	--
Jan. 7, 1948	2:15 p.m.	507	1,480	1,480	--	20	38	92	98	99	--	--	--	--	--	--
Jan. 20	1:00 p.m.	335	190	190	--	46	69	85	95	99	--	--	--	--	--	--
Jan. 29	1:25 p.m.	374	127	127	--	43	74	81	91	95	98	--	--	--	--	--
Jan. 30	3:15 p.m.	424	175	175	--	50	59	75	85	87	90	--	--	--	--	--
Feb. 6	1:45 p.m.	385	480	480	--	40	78	96	--	--	--	--	--	--	--	--
Feb. 10	10:25 a.m.	274	429	429	--	57	92	96	--	--	--	--	--	--	--	--
Feb. 11	1:30 p.m.	294	407	407	--	35	77	97	--	--	--	--	--	--	--	--
Feb. 16	16:00 p.m.	282	3,000	3,000	--	5	14	60	94	96	--	--	--	--	--	--
Feb. 17	1:15 p.m.	1,605	1,840	1,840	--	8	22	78	96	98	--	--	--	--	--	--
Feb. 20	2:40 p.m.	2,240	3,420	3,420	--	5	10	19	30	55	85	--	--	--	--	--
Feb. 25	10:40 a.m.	926	1,570	1,570	--	17	32	50	60	68	90	--	--	--	--	--
Mar. 8	1:00 p.m.	1,100	2,980	2,980	--	--	6	26	46	77	93	--	--	--	--	--
Mar. 15	10:00 a.m.	838	482	482	--	9	21	35	49	62	80	--	--	--	--	--
Mar. 16	3:45 p.m.	3,650	5,690	5,690	--	3	6	20	37	62	90	--	--	--	--	--
Mar. 17	12:35 p.m.	3,550	2,260	2,260	--	5	10	19	29	47	90	--	--	--	--	--
Mar. 26	12:20 p.m.	934	1,010	1,010	--	18	31	42	46	59	68	--	--	--	--	--
Mar. 31	1:30 p.m.	910	805	805	--	29	48	64	66	72	79	--	--	--	--	--

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT BERNE, PA.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis			
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000	
Apr. 6, 1948																	
Apr. 22	11:15 p. m.	1,350	1,370	1,370			28	47	56	59	67	72	--				
May 7	1:25 p. m.	986	588	588			41	62	83	89	93	96	--				
May 7	10:30 a. m.	2,170	935	935			--	--	10	12	16	23	46	--			
May 19	11:30 a. m.	1,630	428	428			--	23	35	36	49	66	--				
May 24	11:00 a. m.	995	577	577			18	52	63	69	73	76	--				
June 3																	
June 9	9:45 a. m.	594	678	678			22	53	89	94	95	96	99				
June 12	1:30 p. m.	574	373	373			8	32	66	83	92	98	--				
June 21	10:05 a. m.	456	367	367			8	31	61	84	91	93	98				
June 28	11:15 a. m.	534	3,140	3,140			1	6	20	34	35	36	43				
July 7	11:15 a. m.	270	331	331			12	43	81	98	99	--	--				
July 15	10:30 a. m.	310	399	399			11	45	68	89	95	97	99				
July 21	11:00 a. m.	240	162	162			26	58	78	88	96	--	--				
July 30	11:10 a. m.	245	313	313			11	26	69	88	93	95	98				
Aug. 4																	
Aug. 4	10:45 a. m.	230	582	582			11	39	76	97	--	--	--				
Aug. 12	12:25 p. m.	265	456	456			8	21	51	95	99	--	--				
Aug. 17	10:25 a. m.	167	193	193			17	46	70	86	96	--	--				
Aug. 26	9:55 a. m.	255	453	453			18	51	76	91	97	98	98				
Sept. 1	10:45 a. m.	167	394	394			17	46	71	90	93	96	98				
Sept. 10	11:30 a. m.	335	1,690	1,690			5	14	35	92	98	--	--				
Sept. 16	12:55 p. m.	154	272	272			17	53	73	87	94	93	94				
Sept. 23	12:00 m.	136	478	478			10	43	73	81	95	95	97				

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT POTTSTOWN, PA.

LOCATION--At gaging station at Hanover Street Bridge in Pottstown, Montgomery County, 70 feet from west bank of river, and a third of a mile downstream from Manatany Creek.

DRAINAGE AREA--1,177 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1944 to September 1948.

Water temperatures: October 1944 to September 1948.

Water hardness: Maximum 380 parts per million Oct. 11-20; minimum, 135 parts per million May 11-20.

EXTRIMES 1947-48--Dissolved solids: Maximum 380 parts per million Oct. 11-20; minimum, 85 parts per million Feb. 21-29, May 11-20.

Total hardness: Maximum 380 parts per million Oct. 11-20; minimum, 85 parts per million Feb. 21-29, May 11-20.

Water temperatures: Maximum 85° F. Aug. 29; minimum, freezing point on many days during January and February.

EXTRIMES 1944-48--Dissolved solids: Maximum 393 parts per million Oct. 11-20, 1944; minimum, 79 parts per million Mar. 1-10, 1945.

Total hardness: Maximum 393 parts per million Oct. 11-20, 1944; minimum, 79 parts per million Mar. 1-10, 1945.

Water temperatures: Maximum 85° F. Aug. 29, 1948; minimum, freezing point on many days in winter months.

REMARKS--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947-----	506	59	3	6.7	543	7.6	0.05	55	23	19		44	197	15	0.1	12	371	232	196
Oct. 11-20-----	445	62	5	7.2	553	6.4	.04	54	24	20		50	203	12	.1	10	380	233	192
Oct. 21-31-----	643	60	5	7.1	516	5.2	.08	53	22	16		54	181	12	.2	8.4	348	223	178
Nov. 1-10-----	3,252	53	3	6.8	255	4.4	.06	26	9.4	6.7		82	82	5.5	.2	3.8	164	104	82
Nov. 11-20-----	3,587	45	3	6.9	255	5.2	.10	25	10	7.2		22	84	5.8	.0	6.9	166	104	85
Nov. 21-30-----	2,281	42	5	6.7	299	8.2	.01	31	12	8.1		32	99	6.2	.1	7.5	195	127	100
Dec. 1-10-----	1,297	40	2	6.9	343	5.6	.05	36	14	10		38	112	9.5	.1	10	221	147	116
Dec. 11-20-----	1,164	36	2	6.9	348	5.6	.03	37	14	9.6		34	116	9.9	.1	9.8	224	150	122
Dec. 21-31-----	1,899	35	4	6.7	354	8.4	.01	37	14	11		40	118	7.5	.1	8.5	233	150	117
Jan. 1-10, 1948-----	1,656	37	3	6.8	305	7.8	.02	32	12	9.2		40	94	8.6	.1	7.5	200	129	96
Jan. 11-20-----	918	33	6	7.0	360	8.6	.01	38	14	10		42	115	9.5	.1	8.6	238	152	118
Jan. 21-31-----	906	32	5	6.6	420	11	.06	41	16	16		48	129	14	.0	11	274	168	129
Feb. 1-10-----	702	32	7	6.6	448	11	.07	44	18	16		48	147	12	.1	12	298	184	144
Feb. 11-20-----	2,588	36	6	6.5	342	8.8	.07	33	13	12		39	102	11	.0	9.9	220	136	104
Feb. 21-29-----	3,972	38	2	6.5	215	8.2	.04	22	7.3	7.0		35	56	5.4	.1	6.5	156	85	96
Mar. 1-10-----	3,365	38	2	6.6	231	14	.03	23	7.9	8.1		37	61	5.6	.1	6.9	173	90	60
Mar. 11-20-----	3,318	44	2	6.6	244	4.2	.09	24	8.7	7.5		34	69	5.5	.1	5.4	176	96	68
Mar. 21-31-----	3,814	51	2	6.7	238	8.0	.03	23	8.5	7.1		30	69	4.8	.1	5.4	176	92	63

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT POTTSTOWN, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Apr. 1-10, 1948 -----	3,816	52	2	6.8	240	5.6	0.04	24	9.2	3.7		24	72	5.2	0.1	4.4	171	88	78
Apr. 11-20 -----	4,818	51	2	6.9	229	7.0	.04	23	9.0	5.9		30	66	6.6	.1	6.1	165	94	70
Apr. 21-30 -----	2,477	56	2	6.8	294	7.4	.03	29	12	5.6		35	93	4.2	.1	3.2	204	122	93
May 1-10 -----	4,478	56	2	6.7	248	6.8	.03	23	8.8	3.7		31	73	4.3	.1	6.1	175	103	77
May 11-20 -----	3,839	59	2	6.6	209	8.2	.08	21	6.0	4.6		28	61	3.5	.1	4.7	135	65	62
May 21-31 -----	3,136	60	3	6.4	261	9.4	.08	27	11	10		36	90	4.2	.0	6.7	198	115	83
June 1-10 -----	2,295	66	3	6.5	289	6.4	.14	28	12	8.6		38	91	4.8	.1	6.3	215	119	88
June 11-20 -----	1,968	68	2	6.7	319	9.8	.07	31	12	14		46	102	5.5	.1	7.4	236	127	89
June 21-30 -----	2,027	72	2	6.9	302	8.4	.06	30	12	8.3		46	88	5.0	.1	7.1	216	124	86
July 1-10 -----	1,090	74	3	7.1	366	9.6	.09	37	16	7.6		56	108	7.2	.1	7.4	233	158	112
July 11-20 -----	966	77	4	6.8	396	16	.08	39	17	13		55	126	9.0	.1	7.2	271	187	122
July 21-31 -----	1,025	78	4	6.5	414	11	.09	39	17	18		50	140	9.5	.1	7.4	287	187	126
Aug. 1-10 -----	1,351	73	3	6.4	386	10	.08	40	17	12		53	127	9.8	.1	6.6	267	170	126
Aug. 11-20 -----	1,078	74	4	6.3	377	9.6	.10	39	16	13		57	120	9.5	.1	7.0	257	163	116
Aug. 21-31 -----	1,495	78	3	6.6	345	10	.09	35	14	14		56	107	8.5	.1	6.5	237	145	99
Sept. 1-10 -----	429	851	2	6.5	429	8.8	.09	43	17	14		57	135	10	.1	6.6	287	177	130
Sept. 11-20 -----	757	71	3	6.7	452	10	.10	43	18	20		64	144	12	.1	7.5	308	181	129
Sept. 21-30 -----	545	64	4	6.5	486	10	.09	48	19	19		65	154	14	.1	6.9	328	198	145
Average -----	2,075	55	3	6.7	343	8.4	0.06	34	14	11		42	109	8.1	0.1	7.4	233	142	108

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	52	54	34	38	31	37	55	58	66	79	77	69
2	54	--	--	35	32	38	54	60	67	71	76	77
3	55	51	38	37	31	38	49	58	67	74	77	67
4	57	54	42	37	31	40	--	58	65	75	70	70
5	58	53	41	35	31	35	51	56	66	75	70	70
6	59	54	42	36	33	38	56	54	64	77	66	76
7	63	59	42	37	33	39	50	55	66	75	69	75
8	64	54	43	35	34	38	48	51	67	69	73	74
9	63	53	41	37	32	39	52	51	67	74	69	75
10	62	46	39	38	32	43	50	58	66	73	77	73
11	57	46	37	35	33	43	49	62	68	78	71	71
12	57	47	37	33	34	37	52	61	69	76	73	72
13	60	47	37	34	32	39	53	66	70	76	76	74
14	60	45	35	34	38	40	49	57	69	76	76	75
15	58	44	33	32	36	38	48	57	69	75	73	69
16	63	45	38	33	34	48	50	57	69	79	74	67
17	66	45	36	34	38	53	51	57	66	78	75	65
18	69	43	37	33	38	45	53	59	68	78	75	68
19	69	43	37	32	33	45	51	58	68	75	74	70
20	65	42	35	31	39	50	55	57	68	75	71	77
21	63	41	32	36	37	53	59	58	68	78	74	70
22	62	43	32	36	37	53	58	57	67	80	73	64
23	60	45	38	33	34	53	57	57	67	77	70	64
24	58	44	37	30	35	50	55	61	71	78	77	64
25	53	43	35	31	39	50	58	60	--	75	77	63
26	56	42	32	31	43	50	52	61	--	73	80	61
27	58	40	36	32	40	55	58	62	--	78	80	59
28	61	39	32	32	40	50	55	60	--	80	81	61
29	65	41	33	31	41	46	51	64	--	80	85	66
30	63	37	33	31	47	53	58	65	77	79	77	--
31	57	--	37	31	--	52	--	59	--	78	77	--
Average	60	46	37	34	35	45	53	59	68	76	75	69

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## SCHUYKILL RIVER AT POTTSTOWN, PA.--Continued

Suspended sediment, water year October 1947 to September 1948

Day							March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----							4,350	810	9,510
2-----							4,060	900	9,870
3-----							4,060	936	10,300
4-----							3,780	729	7,440
5-----							3,180	612	5,250
6-----							2,730	540	3,980
7-----							2,790	648	4,880
8-----							3,180	558	4,790
9-----							2,850	536	4,130
10-----							2,670	567	4,090
11-----							2,730	660	4,860
12-----							2,610	504	3,550
13-----							2,370	423	2,710
14-----							2,130	432	2,480
15-----							2,080	378	2,120
16-----							2,430	576	3,780
17-----							4,970	1,450	19,500
18-----							4,500	1,100	13,400
19-----							4,060	846	9,270
20-----							5,300	1,560	22,300
21-----							4,810	963	12,500
22-----							4,500	792	9,620
23-----							4,060	792	8,680
24-----							2,060	936	10,300
25-----							3,500	594	5,610
26-----							3,040	513	4,210
27-----							3,250	576	5,050
28-----							4,810	842	10,900
29-----							3,640	522	5,130
30-----							3,300	432	3,850
31-----							2,980	288	2,320
Total -							108,780	--	226,400
	April			May			June		
1-----	4,740	935	12,000	1,800	165	802	3,040	195	1,600
2-----	6,190	1,090	18,200	1,690	150	686	2,550	172	1,180
3-----	4,970	748	10,000	2,080	262	1,470	2,250	154	934
4-----	4,060	663	7,270	2,550	465	3,200	2,080	158	888
5-----	3,640	484	4,760	4,710	660	8,390	1,910	180	929
6-----	3,370	450	4,090	6,380	795	13,700	1,740	161	756
7-----	3,240	493	4,310	6,810	713	13,100	1,690	169	772
8-----	2,850	442	3,400	7,790	585	12,300	2,800	338	2,550
9-----	2,730	374	2,760	6,000	480	7,780	2,430	450	2,950
10-----	2,370	323	2,070	4,970	360	4,830	1,860	218	1,090
11-----	2,250	323	1,960	4,200	300	3,400	1,690	142	648
12-----	3,520	782	7,430	3,640	525	5,160	1,580	150	640
13-----	4,060	748	8,200	8,410	795	18,100	2,020	206	1,120
14-----	4,580	663	8,220	8,420	559	12,700	1,740	218	1,020
15-----	6,420	1,120	25,500	6,970	435	6,190	1,640	188	832
16-----	7,170	748	14,500	6,000	334	5,410	1,580	172	734
17-----	5,820	552	8,660	6,570	390	6,920	1,530	98	405
18-----	4,650	612	7,680	5,470	330	4,870	1,330	82	294
19-----	4,060	493	5,400	4,650	360	4,520	2,490	244	1,640
20-----	3,640	374	3,670	4,060	345	3,780	4,060	675	7,400
21-----	3,300	400	3,560	3,920	375	3,970	3,300	412	3,670
22-----	2,980	391	3,140	3,640	360	3,540	2,430	248	1,630
23-----	2,670	366	2,640	3,110	330	2,770	2,190	270	1,600
24-----	2,490	493	3,320	2,790	401	3,020	1,960	180	953
25-----	2,490	493	3,320	2,730	270	1,990	1,860	172	864
26-----	2,370	314	2,010	2,550	255	1,760	1,740	210	986
27-----	2,130	340	1,950	2,310	240	1,500	1,580	300	1,280
28-----	2,130	425	2,440	2,190	210	1,240	2,040	640	3,530
29-----	2,250	340	2,060	2,080	232	1,300	1,690	195	891
30-----	1,960	255	1,350	5,260	488	6,930	1,480	142	567
31-----	--	--	--	3,920	345	3,650	--	--	--
Total -	111,110	--	185,900	137,670	--	171,000	62,280	--	44,350

## DELAWARE RIVER BASIN--Continued

## SCHUYKILL RIVER AT POTTSTOWN, PA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,330	94	338	757	61	125	750	31	63
2-----	1,280	98	338	743	47	94	690	31	58
3-----	1,180	76	242	1,180	166	529	690	29	54
4-----	1,100	60	178	1,440	255	991	723	38	74
5-----	1,040	42	118	1,540	344	1,430	798	38	82
6-----	1,010	60	164	2,790	969	7,300	736	24	48
7-----	1,120	89	269	1,700	544	2,500	696	25	47
8-----	1,020	72	198	1,330	162	580	723	28	55
9-----	938	53	134	1,100	98	292	1,080	89	259
10-----	885	55	131	930	68	171	1,620	210	918
11-----	834	34	77	848	42	96	1,330	183	656
12-----	827	34	76	1,280	132	456	970	78	204
13-----	880	76	201	1,380	110	410	798	42	90
14-----	1,510	264	1,080	1,040	85	239	738	44	87
15-----	1,280	94	324	878	44	104	677	36	66
16-----	938	75	190	805	38	83	626	35	59
17-----	848	40	92	757	34	69	614	32	53
18-----	834	38	86	757	34	69	595	30	48
19-----	820	42	93	1,080	106	308	614	28	46
20-----	784	42	89	1,950	291	1,530	614	26	43
21-----	777	42	88	2,310	323	2,010	601	26	42
22-----	848	119	273	2,130	408	2,350	565	24	37
23-----	1,900	518	2,660	2,370	344	2,200	560	28	42
24-----	1,690	221	1,010	2,130	259	1,490	542	32	47
25-----	1,160	136	427	1,580	126	537	530	27	39
26-----	946	89	227	1,280	85	294	513	21	29
27-----	862	72	168	1,120	72	218	524	18	25
28-----	834	61	137	986	81	216	519	21	29
29-----	798	75	161	908	34	83	513	23	32
30-----	743	44	88	841	32	73	583	38	60
31-----	716	42	81	791	32	68	--	--	--
Total -	31,382	--	9,740	40,731	--	26,920	21,530	--	3,390

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT POTTSTOWN, PA.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Mar. 18, 1948-----	11:30 a.m.	4,500	390	390			15	25	41	64	84	96	98		
Mar. 25-----	4:00 p.m.	3,370	909	909			4	8	13	18	22	37	83		
May 12-----	1:05 p.m.	3,640	376	376			3	15	28	40	49	64	89		
May 28-----	9:50 a.m.	2,190	474	474			9	14	20	23	26	33	59		
June 7-----	4:00 p.m.	1,640	226	226			16	25	36	41	44	53	78		



## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT MANAYUNK, PHILADELPHIA, PA.

LOCATION.--At concrete bridge at Green Lane Avenue in Manayunk, Philadelphia County.

DRAINAGE AREA.--1,893 square miles (at Fairmount Dam).

RECORDS AVAILABLE.--Sediment records: November 1947 to September 1948.

EXTREMES, 1947-48--Sediment loads: Maximum 115,000 tons per day May 14; minimum, 31 tons per day Jan. 25.

REMARKS.--Water discharge records computed on basis of discharge of Schuylkill River at Philadelphia (Fairmount Dam), given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in field office at Schuylkill Haven, Pa.

## Suspended sediment, water year October 1947 to September 1948

Day				November			December		
	Mean discharge (second-foot)	Mean concentration	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----				1,240	--	--	2,270	55	338
2-----				1,360	--	--	2,010	65	354
3-----				1,060	--	--	1,900	48	246
4-----				2,620	--	--	1,820	45	221
5-----				7,330	--	--	1,780	32	154
6-----				4,490	--	--	1,720	35	163
7-----				3,000	--	--	1,630	25	110
8-----				5,200	--	--	1,640	20	89
9-----				10,100	--	--	1,700	70	321
10-----				6,570	--	--	1,780	47	226
11-----				4,730	--	--	1,530	15	62
12-----				10,900	--	--	1,450	15	59
13-----				8,560	--	--	1,380	20	75
14-----				5,750	--	--	1,260	22	75
15-----				4,580	--	--	1,190	28	90
16-----				3,870	265	2,770	2,860	170	1,310
17-----				3,510	282	2,870	3,420	172	1,590
18-----				2,940	100	<u>1</u> /794	2,820	147	1,040
19-----				2,490	83	559	2,090	70	394
20-----				2,280	55	338	1,800	40	194
21-----				2,060	40	222	1,590	28	120
22-----				1,900	30	154	1,550	25	105
23-----				2,070	30	168	1,560	43	181
24-----				2,360	70	446	1,480	37	148
25-----				4,700	348	4,420	1,370	35	<u>1</u> /130
26-----				4,940	385	5,140	1,230	35	<u>1</u> /116
27-----				3,820	255	2,830	1,130	35	<u>1</u> /108
28-----				3,220	148	1,290	1,040	30	<u>1</u> /84
29-----				2,830	90	688	1,020	30	<u>1</u> /83
30-----				2,570	75	521	939	30	76
31-----				--	--	--	905	25	<u>1</u> /61
Total--				123,030	--	22,810	51,664	--	8,320

1/ Estimated.

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT MANAYUNK, PHILADELPHIA, PA.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,090	20	1/59	959	15	1/39	6,710	600	10,900
2-----	6,420	562	9,740	1,040	15	1/42	6,140	550	9,100
3-----	6,010	500	8,110	1,080	15	44	8,550	850	19,600
4-----	3,680	411	4,080	1,150	15	46	6,840	490	9,050
5-----	3,030	180	1,470	1,090	15	1/44	5,430	350	5,130
6-----	2,620	85	602	1,130	18	55	4,320	230	2,680
7-----	2,400	105	680	1,120	18	1/55	4,220	180	2,050
8-----	2,130	60	346	1,080	15	1/44	5,000	240	3,240
9-----	1,920	35	181	1,030	15	1/42	4,630	205	2,560
10-----	1,840	105	521	899	15	1/36	4,430	160	1,910
11-----	1,900	50	256	938	15	38	4,480	152	1,840
12-----	2,120	40	229	919	15	1/37	4,950	250	3,340
13-----	2,360	55	351	955	15	39	3,910	185	1,950
14-----	2,310	60	375	2,010	57	310	3,480	130	1,220
15-----	1,850	50	250	4,260	225	2,590	3,220	100	869
16-----	1,420	50	192	4,080	200	2,200	3,420	110	1,020
17-----	1,560	45	190	5,690	600	9,220	5,680	525	8,050
18-----	1,670	40	180	9,780	1,320	34,900	6,470	1,150	20,100
19-----	1,270	30	103	11,900	1,750	56,200	5,360	500	7,240
20-----	1,040	25	70	13,300	2,180	78,300	7,050	750	14,300
21-----	1,360	20	73	8,640	1,230	28,700	6,810	750	13,800
22-----	1,820	15	1/74	6,420	700	12,100	5,970	400	6,450
23-----	1,750	--	1/71	5,220	450	6,340	5,430	300	4,400
24-----	1,080	--	1/44	4,340	350	4,100	5,600	380	5,750
25-----	768	--	1/31	3,980	200	2,150	5,490	270	4,000
26-----	940	--	1/38	5,490	443	6,570	4,320	100	1,170
27-----	1,150	--	1/46	6,250	505	8,520	4,160	300	3,370
28-----	1,440	--	1/58	8,470	1,690	38,600	7,650	1,100	22,700
29-----	1,320	--	1/53	9,130	1,150	28,400	6,070	450	7,380
30-----	1,160	--	1/47	--	--	--	4,740	250	3,200
31-----	1,080	15	1/44	--	--	--	4,470	220	2,650
Total-	62,508	--	28,560	122,350	--	310,500	165,000	--	201,000
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	8,910	1,000	24,100	2,500	35	236	5,210	225	3,160
2-----	10,800	1,280	37,300	2,290	35	1/217	4,100	100	1,110
3-----	7,660	750	15,500	2,470	35	233	3,490	65	613
4-----	6,020	670	10,900	3,280	90	796	3,230	53	462
5-----	5,210	400	5,630	5,530	670	10,000	2,970	45	362
6-----	4,860	220	2,890	11,200	1,000	30,200	2,680	25	181
7-----	4,480	165	2,000	11,900	1,000	32,100	2,490	35	235
8-----	4,120	185	2,060	12,700	1,250	42,900	2,570	40	278
9-----	3,630	262	2,570	8,860	800	19,100	3,900	140	1,470
10-----	3,420	190	1,760	7,050	400	7,610	2,880	90	699
11-----	3,130	130	1,100	5,810	250	3,920	2,420	45	294
12-----	4,630	265	3,310	4,990	200	2,690	2,300	30	186
13-----	6,540	460	8,120	17,800	1,825	87,700	4,470	125	1,510
14-----	5,940	400	6,420	16,900	2,520	115,000	3,250	75	659
15-----	12,300	1,540	51,100	10,200	700	19,300	2,780	45	338
16-----	10,200	1,050	28,900	8,560	850	19,600	2,840	50	383
17-----	7,970	620	13,300	12,200	1,100	36,200	2,580	50	348
18-----	6,560	450	7,970	8,580	355	8,220	2,280	35	215
19-----	5,370	325	4,710	6,890	285	5,300	3,410	92	848
20-----	4,790	230	2,980	5,930	240	3,840	8,610	730	17,000
21-----	4,390	170	2,010	5,410	205	2,990	6,410	530	9,170
22-----	3,970	145	1,560	5,160	180	2,510	4,170	260	2,930
23-----	3,590	125	1,210	4,490	100	1,210	3,490	130	1,230
24-----	3,320	95	850	4,010	100	1,080	3,190	80	688
25-----	3,170	75	643	3,760	95	964	2,790	70	526
26-----	3,080	75	624	3,550	85	815	2,550	55	378
27-----	2,950	60	478	3,300	65	578	2,420	70	456
28-----	2,810	45	340	3,100	55	459	3,210	125	1,080
29-----	2,660	40	288	2,870	40	310	3,560	200	1,920
30-----	2,600	45	316	5,810	361	5,660	2,520	105	716
31-----	--	--	--	10,100	375	26,600	--	--	--
Total-	159,080	--	240,900	217,200	--	488,300	102,770	--	49,440

1/ Estimated.

DELAWARE RIVER BASIN--Continued  
SCHUYLKILL RIVER AT MANAYUNK, PHILADELPHIA, PA.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,280	75	462	1,270	20	69	1,120	23	70
2-----	2,100	45	255	1,420	24	92	1,060	22	63
3-----	1,850	30	150	1,460	40	158	1,000	18	49
4-----	1,680	30	136	3,740	267	2,700	1,000	20	54
5-----	1,540	30	125	2,530	137	937	1,010	19	52
6-----	1,500	25	101	4,120	208	2,310	1,120	17	51
7-----	1,510	25	102	3,490	137	1,290	1,070	24	69
8-----	1,560	25	105	2,400	32	207	980	29	77
9-----	1,430	30	116	2,010	41	222	1,120	28	85
10-----	1,320	25	89	1,670	26	117	3,700	230	2,300
11-----	1,240	30	100	1,410	26	99	2,880	100	778
12-----	1,130	35	107	1,410	28	107	1,790	50	242
13-----	1,060	40	114	2,490	50	335	1,380	30	112
14-----	3,460	285	2,660	1,950	34	179	1,150	32	99
15-----	4,080	295	3,250	1,510	22	90	1,010	32	87
16-----	1,870	110	556	1,310	28	99	934	31	78
17-----	1,430	40	154	1,240	28	94	888	29	70
18-----	1,360	40	147	1,180	26	83	891	27	65
19-----	1,320	35	<u>1</u> /125	1,250	27	91	864	29	68
20-----	1,240	35	117	1,960	33	175	852	27	62
21-----	1,160	25	78	2,940	94	745	861	25	58
22-----	1,240	25	84	3,290	102	907	803	27	59
23-----	2,550	90	621	3,800	233	2,390	788	26	55
24-----	3,130	162	1,370	3,140	121	1,030	804	28	61
25-----	2,220	46	275	2,450	92	<u>1</u> /608	758	26	53
26-----	1,600	40	173	1,950	40	<u>1</u> /211	724	22	43
27-----	2,230	42	253	1,700	25	115	707	27	52
28-----	1,550	30	126	1,510	21	86	731	25	49
29-----	1,310	28	99	1,370	23	85	721	22	43
30-----	1,200	43	139	1,300	22	77	786	24	51
31-----	1,070	31	90	1,220	24	79	--	--	--
Total -	54,220	--	12,280	64,490	--	15,790	33,502	--	5,060

1/ Estimated.

## DELAWARE RIVER BASIN--Continued

## SCHUYLKILL RIVER AT BELMONT FILTERS, PHILADELPHIA, PA.

LOCATION --At Belmont Filters, Philadelphia, Philadelphia County, 1.6 miles upstream from gaging station at Fairmount Dam, Philadelphia County.

DRAINAGE AREA --1,890 square miles

RECORDS AVAILABLE --Chemical analyses: October 1945 to September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES 1947-48 --Dissolved solids: Maximum 358 parts per million Oct. 11-20; minimum, 123 parts per million Feb. 21-29.

Water temperatures: Maximum, 215 parts per million Oct. 11-20; minimum, 76 parts per million Feb. 21-29.

Total hardness: Maximum, 82° F. Aug. 30; minimum, freezing point Jan. 27-Feb. 14, 18.

EXTREMES 1944-48 --Dissolved solids: Maximum, 358 parts per million Oct. 11-20, 1947; minimum, 123 parts per million Feb. 21-29, 1948.

Total hardness: Maximum, 215 parts per million Oct. 11-20, 1947; minimum, 76 parts per million Feb. 21-29, 1948.

Water temperatures: Maximum, 83° F. Aug. 16, 18, 1947; minimum, freezing point on many days in winter months.

REMARKS --Samples collected at raw water intake on west side of river at Belmont Filters by city of Philadelphia. Records of discharge for water year

October 1947 to September 1948 based on records for Schuylkill River at Philadelphia, Pa., which are given in Water-Supply Paper 1111. Records of

specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947 -----	335	61	8	7.1	515	7.2	0.04	49	21	21		61	163	18	0.1	11	342	209	159
Oct. 11-20 -----	284	65	4	7.9	537	4.8	.06	50	22	24		61	174	20	.3	9.2	358	215	165
Oct. 21-31 -----	502	66	5	6.9	523	5.2	.06	50	21	23		64	166	20	.2	8.7	346	211	159
Nov. 1-10 -----	3,995	57	4	7.0	286	4.4	.06	29	11	11		41	85	9.8	.1	6.0	189	118	84
Nov. 11-20 -----	4,655	49	4	7.1	231	6.8	.08	22	9.0	7.5		32	65	6.0	.1	6.9	145	92	66
Nov. 21-30 -----	2,741	42	2	7.2	286	5.6	.06	28	12	8.4		40	83	8.5	.0	7.8	184	119	86
Dec. 1-10 -----	1,514	39	2	7.0	319	8.0	.03	34	13	9.7		49	92	11	.0	10	198	138	98
Dec. 11-20 -----	1,654	38	3	7.0	326	7.6	.03	34	13	11		52	90	12	.1	10	204	138	96
Dec. 21-31 -----	1,961	34	2	7.1	334	6.0	.05	36	13	9.4		50	95	11	.1	10	210	143	102
Jan. 1-10, 1948 -----	2,817	34	3	7.0	271	5.2	.06	32	11	4.3		44	72	11	.1	9.7	169	125	91
Jan. 11-20 -----	1,448	34	4	6.9	311	9.8	.1	31	12	11		54	80	11	.2	8.8	200	127	82
Jan. 21-31 -----	1,938	33	2	6.7	363	12	.06	35	14	14		62	93	13	.1	11	233	145	94
Feb. 1-10 -----	732	32	3	6.8	402	12	.07	39	16	16		66	110	14	.1	12	259	163	109
Feb. 11-20 -----	5,056	33	6	6.6	307	10	.08	28	11	14		78	78	12	.1	8.7	194	115	76
Feb. 21-29 -----	611	37	2	7.2	199	8.6	.04	19	6.9	7.9		35	46	6.0	.0	9.7	123	76	47
Mar. 1-10 -----	5,302	36	2	6.7	209	8.6	.03	19	7.4	9.0		37	49	6.0	.1	9.3	129	78	48
Mar. 11-20 -----	4,487	41	3	6.8	235	9.2	.03	23	8.5	7.2		39	58	6.0	.1	8.7	147	92	60
Mar. 21-31 -----	5,204	50	2	6.7	221	8.4	.19	22	8.3	6.6		35	58	6.0	.0	7.2	138	89	60

Apr. 1-10 -----	5,594	51	2	7.0	224	7.8	.04	22	8.8	7.2	39	59	5.9	.0	6.2	146	91	59
Apr. 11-20 -----	6,423	51	0	7.2	238	8.2	.04	22	8.7	6.8	40	52	5.1	.0	4.9	141	91	56
Apr. 21-30 -----	2,852	55	2	7.3	287	7.0	.04	26	19.2	8.8	46	73	5.2	.0	5.8	174	130	52
May 1-10 -----	6,474	57	2	7.2	287	7.6	.04	23	9.2	8.8	46	73	5.3	.0	4.2	135	145	58
May 11-20 -----	9,464	56	2	6.7	195	13	.06	19	6.8	7.1	38	48	5.0	.1	4.9	141	143	46
May 21-31 -----	4,364	60	2	6.8	262	11	.05	25	9.8	8.1	42	70	6.2	.1	5.1	189	103	66
June 1-10 -----	3,020	66	3	7.0	266	10	.04	26	9.8	9.6	51	67	7.0	.1	5.4	198	105	63
June 11-20 -----	3,180	70	3	6.7	277	9.6	.07	26	10.7	9.7	51	65	7.0	.1	6.3	213	106	62
June 21-30 -----	3,095	71	3	6.8	253	11	.08	26	9.2	11	52	63	6.0	.1	6.3	190	98	55
July 1-10 -----	1,348	79	1	7.2	317	14	.06	32	13	7.0	62	77	8.0	.1	7.4	220	133	82
July 11-20 -----	1,488	76	2	6.9	323	12	.06	32	13	9.0	61	80	9.2	.1	8.0	204	133	83
July 21-31 -----	1,422	78	3	7.1	334	8.4	.06	32	14	12	64	83	9.2	.1	13	223	137	85
Aug. 1-10 -----	2,093	76	3	6.9	320	11	.06	31	13	8.0	57	79	9.8	.1	6.4	217	131	84
Aug. 11-20 -----	1,250	74	3	6.9	345	11	.06	34	14	7.6	68	81	9.5	.1	6.5	240	142	87
Aug. 21-31 -----	1,909	77	3	7.0	308	11	.08	31	12	6.7	62	70	8.8	.1	6.2	207	127	76
Sept. 1-10 -----	1,002	76	3	7.1	400	12	.08	39	16	12	76	101	12	.1	7.0	235	163	101
Sept. 11-20 -----	1,949	73	6	6.9	352	9.6	.06	34	14	10	70	82	12	.1	6.2	214	142	85
Sept. 21-30 -----	453	69	4	6.8	444	10	.10	43	17	19	90	113	16	.1	5.1	280	177	149
Average -----	2,899	55	3	7.0	312	8.9	0.06	31	12	11	52	83	9.7	0.1	7.8	204	127	84

DELAWARE RIVER BASIN--Continued  
 SCHUYLKILL RIVER AT BELMONT FILTERS, PHILADELPHIA, PA.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	60	63	40	34	32	40	48	57	62	79	78	81
2	51	60	41	34	32	38	51	56	66	79	80	81
3	59	60	40	34	32	38	50	56	68	78	78	78
4	59	59	38	34	32	38	50	56	63	79	79	76
5	60	59	38	34	32	33	51	56	66	79	77	76
6	60	57	39	34	32	34	51	56	68	79	77	76
7	62	54	34	34	32	34	51	59	67	79	75	73
8	63	54	40	34	32	34	51	57	67	78	73	73
9	60	54	40	33	32	37	51	57	68	78	72	74
10	62	53	38	34	32	37	53	57	68	78	73	74
11	65	53	41	34	32	38	52	55	67	75	73	75
12	64	52	41	34	32	37	52	57	70	76	76	74
13	64	52	41	35	32	36	52	57	70	75	72	74
14	69	52	39	35	32	40	52	55	70	76	74	72
15	62	47	39	34	34	40	51	56	70	78	74	73
16	62	47	39	34	34	39	51	57	71	78	75	73
17	64	47	36	34	34	41	50	57	71	77	75	73
18	65	49	36	33	32	45	51	57	72	77	75	72
19	67	44	36	33	35	45	51	56	68	76	75	72
20	67	43	36	33	36	45	50	57	68	76	75	72
21	67	43	36	34	37	48	55	57	68	76	75	73
22	76	43	36	34	37	48	55	56	68	78	75	73
23	75	43	36	33	35	45	51	57	68	77	75	71
24	66	43	35	34	33	51	51	57	69	79	74	70
25	66	43	35	33	37	51	56	62	--	78	74	70
26	62	43	35	33	36	51	56	60	--	78	74	67
27	62	43	34	32	36	51	56	62	--	77	74	67
28	62	41	33	32	38	51	56	63	72	77	80	68
29	63	41	33	32	40	52	57	63	72	78	80	67
30	62	40	33	32	--	51	56	63	79	78	82	65
31	63	--	33	32	--	51	--	62	--	78	80	--
Average	64	49	37	33	34	43	52	58	69	78	76	73

DELAWARE RIVER BASIN--Continued  
LITTLE SCHUYLKILL RIVER AT DREHERSVILLE, PA.

LOCATION --At gaging station at highway bridge at Dreherstown, Schuylkill County, 2½ miles downstream from Indian Run, and 5½ miles upstream from mouth.  
DRAINAGE AREA --122 square miles.  
RECORDS AVAILABLE --Chemical analyses: December 1947 to September 1948.  
Sediment records: October 1947 to September 1948.  
EXTREMES 1947-48 --Sediment loads: Maximum 23,130 tons per day Nov. 8; minimum, 7 tons per day July 12.  
REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in field office at Schuylkill Haven, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																			Total	Non-carbonate	
Dec. 5, 1947	215	7	4.10	533	9.2	--	0.18	--	36	24	--	--	0	242	2.0	0.0	1.0	404	--	--	96
Dec. 9	191	5	4.10	529	14	--	.21	--	39	19	--	--	0	236	6.0	.0	1.2	368	--	--	85
Dec. 15	141	6	3.90	637	12	--	.16	--	41	29	--	--	0	289	5.0	.0	2.0	468	--	--	104
Dec. 24	185	6	4.10	541	12	--	.30	--	40	17	--	--	0	236	4.0	.0	1.3	390	--	--	68
Dec. 30	144	5	4.00	583	12	--	.21	--	42	25	--	--	0	252	4.0	.0	.8	441	--	--	81
Jan. 9, 1948	194	5	4.10	508	9.2	--	.18	--	32	20	--	--	0	215	4.0	.0	1.2	349	--	--	76
Jan. 14	169	15	4.05	617	12	--	.66	--	45	26	--	--	0	246	7.0	.0	1.8	432	--	--	79
Jan. 22	145	5	3.90	607	14	--	.36	--	44	25	--	--	0	238	11	.0	1.2	423	--	--	79
Feb. 15	250	7	4.10	535	11	--	.35	--	39	21	--	--	0	200	18	.0	2.0	359	--	--	61
Feb. 26	385	7	4.00	311	9.2	--	.18	--	20	14	--	--	0	130	4.0	.0	.8	200	--	--	43
Mar. 3	447	8	4.05	306	10	0.6	.56	1.1	20	11	11	--	0	120	4.0	.0	.3	195	106	106	54
Mar. 9	325	7	4.05	326	10	1.3	.36	1.3	24	15	9.8	--	0	144	5.0	.0	.7	229	136	136	64
Mar. 16	710	7	4.30	242	7.5	2.0	1.2	.9	18	9.7	4.3	--	0	102	4.0	.1	.0	172	102	102	40
Mar. 22	682	5	4.15	246	9.5	4.2	.43	.6	17	10	1.6	--	0	105	4.0	.0	.9	170	112	112	52
Mar. 30	300	7	3.90	379	6.0	4.6	.17	1.6	28	19	2.8	--	0	174	4.0	.1	2.5	272	183	183	80
Apr. 5	498	10	4.00	296	9.5	3.0	.24	.5	19	11	5.3	--	0	114	4.0	.0	4.0	192	116	116	58
Apr. 13	474	1	4.00	309	4.0	4.1	.18	1.1	26	16	5.4	--	0	156	7.0	--	.6	205	161	161	70
Apr. 15	1,240	1	4.25	193	4.8	3.0	.22	4.4	19	10	2.1	--	0	99	7.0	--	.2	122	108	108	46
Apr. 22	339	5	3.85	427	6.5	5.3	.26	1.6	36	21	1.5	--	0	201	7.0	--	.8	314	216	216	110
Apr. 28	267	1	3.90	467	6.5	4.9	.17	2.1	35	22	5.7	--	0	209	7.0	--	.4	344	215	215	110
May 3	247	1	4.05	448	5.0	9.1	.20	1.8	37	17	11	--	0	226	5.0	.0	2.0	328	221	221	95
May 14	918	1	4.05	273	3.5	4.1	.19	1.1	20	8.6	2.2	--	0	106	6.0	.0	.7	178	115	115	54
May 24	334	1	4.00	388	10	7.3	.15	1.0	26	16	4.9	--	0	171	7.0	.0	1.8	281	179	179	89

DELAWARE RIVER BASIN--Continued  
LITTLE SCHUYLKILL RIVER AT DREHERSVILLE, PA.--Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Alumina (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																			Total	Non-carbonate	
June 4, 1948	176	1	3.80	576	12	13	0.06	2.8	40	27	4.7	0	0	273	7.0	0.0	3.0	389	288	288	155
June 9	191	1	4.00	539	11	11	.10	2.9	41	23	6.1	0	0	260	7.0	.0	1.9	422	269	269	133
June 15	147	1	4.10	562	15	10	.09	2.5	52	30	12	0	0	272	7.0	.0	1.8	450	263	263	128
June 22	153	1	4.00	655	6.4	13	.13	3.5	52	33	3.5	0	0	335	6.0	.0	.3	508	350	350	118
June 28	153	1	3.90	631	9.6	16	.22	3.4	40	26	0	0	0	294	6.0	.0	.1	486	309	309	120
July 8	86	1	3.65	849	11	19	.14	5.2	62	43	3.3	0	0	440	5.0	.0	.5	664	458	458	180
July 15	78	1	3.65	813	10	18	.21	3.7	61	35	3.5	0	0	397	6.0	.0	.8	594	415	415	169
July 21	94	1	3.65	908	12	19	.28	5.1	62	45	2.5	0	0	444	6.0	.1	1.5	694	466	466	215
July 28	88	1	3.65	852	12	20	.45	4.9	66	41	--	0	0	426	4.0	.0	1.1	656	416	416	212
Aug. 8	74	1	3.50	898	12	19	.14	4.3	69	35	7.1	0	0	433	5.0	.0	4.9	627	446	446	166
Aug. 12	99	1	3.45	880	8.5	19	.21	4.4	70	38	3.0	0	0	440	8.0	.0	1.0	654	463	463	242
Aug. 19	107	1	3.55	837	9.0	17	4.3	4.1	66	36	4.2	0	0	424	5.0	.0	2.8	670	442	442	175
Aug. 27	64	1	3.75	958	10	23	.26	5.8	78	46	7.5	0	0	518	7.0	.0	1.5	792	534	534	216
Aug. 31	61	1	3.65	968	10	21	.41	5.7	84	52	8.2	0	0	547	6.0	.0	1.0	828	561	561	192
Sept. 9	78	1	3.70	994	8.5	18	.44	6.4	88	49	11	0	0	534	8.0	.0	.8	819	544	544	262
Sept. 16	57	1	3.70	997	10	22	.14	5.0	90	45	11	0	0	543	8.0	.0	.9	824	554	554	278
Sept. 24	50	1	3.70	986	15	29	.70	7.6	90	43	2.7	0	0	562	6.0	.0	1.3	831	589	589	218



## DELAWARE RIVER BASIN--Continued

## LITTLE SCHUYLKILL RIVER AT DREHERSVILLE, PA.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	66	2,980	532	225	6,400	3,890	251	510	346
2-----	64	2,350	405	150	4,350	1,760	243	950	624
3-----	66	2,440	435	144	3,650	1,420	240	1,080	699
4-----	66	2,500	446	403	7,650	10,380	233	1,600	1,010
5-----	64	1,400	242	352	3,250	3,090	215	1,250	726
6-----	57	780	120	300	2,500	2,020	201	1,600	869
7-----	66	2,260	402	275	6,000	4,460	188	1,660	842
8-----	68	2,900	532	1,030	7,000	23,130	218	840	494
9-----	71	3,120	599	1,000	4,250	11,500	191	850	437
10-----	68	2,400	440	696	4,000	7,520	169	1,100	502
11-----	66	2,470	440	579	3,500	5,470	169	1,120	510
12-----	64	1,620	281	1,260	5,820	19,800	159	1,420	610
13-----	59	1,590	253	872	4,100	9,650	150	1,400	567
14-----	66	2,740	489	682	3,350	6,170	144	1,050	408
15-----	64	2,030	351	566	2,550	3,900	141	450	171
16-----	64	2,830	489	492	2,180	2,900	296	1,400	1,120
17-----	66	2,620	467	442	1,600	1,910	201	1,400	759
18-----	68	3,140	578	378	950	969	194	1,230	645
19-----	74	2,270	454	317	910	778	191	1,180	608
20-----	61	1,240	204	291	710	559	191	1,200	618
21-----	61	3,560	586	271	1,100	805	211	1,250	713
22-----	61	2,500	410	259	960	672	188	950	483
23-----	61	2,290	378	267	1,180	850	188	2,100	1,070
24-----	59	2,770	440	317	1,000	856	185	1,620	810
25-----	59	2,700	429	390	1,220	1,290	169	1,550	707
26-----	54	1,620	236	326	900	791	181	750	367
27-----	54	1,270	185	308	800	664	181	1,850	904
28-----	86	4,900	1,140	304	750	616	159	2,250	967
29-----	162	4,740	2,070	291	2,050	1,610	141	780	297
30-----	169	3,700	1,690	267	1,170	842	144	500	194
31-----	326	5,700	5,020	--	--	--	150	2,280	923
Total -	2,460	--	20,740	13,454	--	130,300	5,882	--	20,000
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	162	2,680	1,170	105	115	33	492	1,600	2,120
2-----	296	3,250	2,600	115	175	54	464	1,220	1,530
3-----	218	1,950	1,150	120	225	73	447	620	748
4-----	181	1,660	810	110	350	104	410	670	742
5-----	188	1,140	578	110	420	125	352	940	894
6-----	188	1,870	950	115	755	234	334	700	632
7-----	194	2,140	1,120	105	860	244	348	890	837
8-----	188	1,460	740	105	620	176	348	620	583
9-----	194	1,590	832	110	510	151	326	530	467
10-----	198	2,320	1,240	105	500	142	326	990	872
11-----	166	1,260	564	98	700	185	321	1,450	1,260
12-----	169	515	235	105	1,600	454	304	900	740
13-----	181	970	475	110	1,970	586	291	720	567
14-----	169	1,340	610	160	1,900	821	283	900	688
15-----	147	430	171	250	830	562	291	500	394
16-----	160	330	143	220	1,190	707	710	3,520	9,960
17-----	155	1,000	418	300	3,040	2,460	1,010	2,020	5,510
18-----	145	1,680	659	380	4,100	4,210	805	1,220	2,650
19-----	135	535	195	600	4,090	6,630	835	1,290	2,910
20-----	130	550	193	654	3,020	5,330	932	970	2,440
21-----	150	980	397	474	2,260	2,890	782	770	1,630
22-----	145	2,280	894	400	1,520	1,640	682	340	626
23-----	135	1,120	408	334	1,400	1,260	626	380	643
24-----	130	265	93	287	1,200	929	553	375	559
25-----	125	100	34	296	1,210	967	447	350	421
26-----	140	125	47	385	1,920	2,000	390	295	310
27-----	140	195	74	405	1,900	2,080	390	325	343
28-----	130	150	53	560	2,440	3,690	366	680	672
29-----	120	100	32	579	1,860	2,910	321	300	260
30-----	120	120	39	--	--	--	300	340	275
31-----	110	120	36	--	--	--	283	450	343
Total -	5,009	--	16,960	7,697	--	41,650	14,769	--	42,630

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## LITTLE SCHUYLKILL RIVER AT DREHERSVILLE, PA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,160	1,960	6,750	204	430	237	201	445	241
2-----	932	500	1,260	188	340	173	181	780	381
3-----	689	360	670	247	320	213	175	458	217
4-----	534	370	535	229	385	238	178	430	207
5-----	498	215	289	504	1,130	2,130	172	430	200
6-----	458	445	551	553	635	948	159	250	107
7-----	410	730	807	696	950	2,080	188	600	305
8-----	375	260	263	745	580	1,170	300	855	691
9-----	344	180	167	586	570	902	191	460	237
10-----	313	235	199	480	340	440	172	750	348
11-----	321	205	178	410	300	332	159	1,640	705
12-----	553	600	896	366	310	305	153	1,120	462
13-----	474	270	346	782	1,180	2,410	169	375	171
14-----	790	800	2,080	918	500	1,240	138	175	65
15-----	1,240	600	2,010	842	285	648	147	855	340
16-----	888	360	864	731	450	888	135	1,010	387
17-----	696	375	705	738	325	648	127	370	127
18-----	540	530	772	626	200	338	118	280	89
19-----	474	280	359	534	215	310	194	1,400	734
20-----	420	340	386	452	280	343	178	1,800	864
21-----	380	300	308	464	370	464	141	215	82
22-----	339	205	188	380	375	383	153	705	292
23-----	317	180	154	366	400	394	156	975	410
24-----	308	285	237	334	560	505	153	920	381
25-----	296	195	156	330	690	616	156	730	308
26-----	267	280	202	275	320	238	124	615	206
27-----	247	315	210	251	360	244	138	660	246
28-----	267	280	202	225	460	281	153	825	340
29-----	240	330	214	243	630	413	130	715	251
30-----	211	275	157	267	450	324	113	162	49
31-----	--	--	--	211	310	177	--	--	--
Total-	14,981	--	22,120	14,177	--	20,030	4,852	--	9,420
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	104	110	31	74	600	120	64	630	109
2-----	104	105	29	71	318	61	64	1,290	223
3-----	91	60	15	74	675	135	66	630	112
4-----	91	47	12	78	630	133	71	500	96
5-----	84	36	8	166	2,620	1,940	61	235	39
6-----	94	105	27	132	1,030	367	57	120	18
7-----	91	314	77	84	320	73	61	135	22
8-----	86	371	86	74	165	33	68	765	140
9-----	78	359	76	71	75	14	78	600	126
10-----	71	259	50	71	230	44	94	970	246
11-----	66	43	8	74	400	80	76	365	75
12-----	68	39	7	99	700	187	59	120	19
13-----	96	630	163	78	815	172	57	70	11
14-----	144	1,540	599	71	460	88	59	240	38
15-----	78	160	34	61	115	19	57	220	34
16-----	76	211	43	59	95	15	57	540	83
17-----	74	166	33	66	515	92	59	670	107
18-----	74	62	12	68	880	161	57	685	105
19-----	68	45	8	107	1,280	370	52	495	69
20-----	71	150	29	91	620	152	48	310	40
21-----	94	450	114	135	1,900	691	52	410	58
22-----	178	2,150	1,030	88	470	112	50	600	81
23-----	150	720	292	88	825	196	50	710	96
24-----	124	560	187	78	425	90	50	550	74
25-----	102	380	105	74	460	92	52	770	108
26-----	88	1,140	270	66	440	78	54	785	114
27-----	94	645	164	64	575	99	45	1,100	134
28-----	88	920	219	57	380	59	48	730	94
29-----	84	740	168	52	135	19	50	790	107
30-----	81	620	136	52	90	13	57	650	100
31-----	84	820	186	61	430	71	--	--	--
Total-	2,878	--	4,220	2,484	--	5,780	1,773	--	2,680

DELAWARE RIVER BASIN--Continued  
LITTLE SCHUYLKILL RIVER AT DREHERSVILLE, PA.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis			
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
Oct. 30, 1947	1:40 p.m.	107	2,650	2,650		8	14	26	41	69	90						
Nov. 25	11:30 a.m.	340	529	529		14	24	45	63	82	90						
Dec. 5	1:20 p.m.	201	784	784		19	36	57	74	83	88						
Dec. 9	1:55 p.m.	185	948	948		15	30	49	62	68	72						
Dec. 24	10:30 a.m.	165	3,200	3,200		8	18	72	88	92	96						
Dec. 24	10:30 a.m.	165	1,510	1,510		17	34	54	72	83	92						
Dec. 24	12:25 p.m.	165	1,790	1,790		20	33	51	63	82	93	97		99			
Dec. 24	12:30 p.m.	165	1,440	1,440		16	38	59	72	88	99						
Dec. 24	12:30 p.m.	165	1,080	1,080		28	46	81	92	96	99						
Dec. 30	2:25 p.m.	127	907	907		19	41	71	78	95	98						
Jan. 9, 1948	11:45 a.m.	169	1,400	1,400		4	10	23	66	80	91	98					
Jan. 14	12:30 p.m.	162	953	953		31	46	66	84	96	--	--					
Jan. 22	9:50 a.m.	141	2,430	2,430		9	22	67	88	94	97	99					
Jan. 22	10:30 a.m.	141	2,880	2,880		10	16	73	87	93	97	99					
Jan. 29	10:20 a.m.	120	135	135		--	--	--	19	25	34	86					
Feb. 5	9:40 a.m.	110	395	395		13	28	40	54	67	82	94					
Feb. 17	10:45 a.m.	324	523	523		8	27	57	77	85	94	--					
Feb. 26	2:55 p.m.	344	871	871		3	11	23	34	47	67	91					
Feb. 28	2:15 p.m.	682	766	766		8	34	57	65	86	95	98					
Mar. 3	3:40 p.m.	447	801	801		3	8	14	19	27	41	74					
Mar. 9	12:40 p.m.	308	530	530		5	19	33	43	49	59	77					
Mar. 16	12:30 p.m.	1,170	3,960	3,960		8	11	20	40	70	85	89					
Mar. 22	1:25 p.m.	584	222	222		16	22	29	35	56	77	--					
Apr. 5	4:25 p.m.	498	141	141		19	23	36	60	70	81	90					
Apr. 13	4:15 p.m.	479	405	405		14	26	36	43	48	58	75					
Apr. 14	7:35 a.m.	572	1,710	1,710		3	5	7	9	91	96	--					

DELAWARE RIVER BASIN--Continued  
LITTLE SCHUYLKILL RIVER AT DREHERSVILLE, PA.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
May 15, 1948	12:10 p. m.	820	849	849				6	14	29	89	92	94	96	
May 18	11:15 a. m.	626	123	123				18	27	36	43	60	83	--	
May 24	2:00 p. m.	344	203	203				32	50	69	73	83	86	--	
May 26	4:30 p. m.	275	177	177				45	55	78	94	98	--	--	
June 4	10:45 a. m.	178	428	428				15	37	71	90	95	97	--	
June 9	9:45 a. m.	194	471	471				12	35	67	86	91	94	98	
June 22	2:45 p. m.	138	1,050	1,050				3	8	13	83	93	97	99	
July 21	2:10 p. m.	99	455	455				40	60	66	93	96	98	--	
July 30	1:40 p. m.	71	570	570				--	77	83	98	99	--	--	
Aug. 12	2:30 p. m.	121	908	908				7	18	34	80	90	99	--	
Aug. 27	8:30 a. m.	59	551	551				24	58	88	97	99	--	--	
Aug. 31	10:30 a. m.	54	351	351				18	63	95	98	--	--	--	
Sept. 9	1:45 p. m.	61	411	411				15	39	66	86	92	95	98	
Sept. 16	3:00 p. m.	48	440	440				11	38	78	91	94	96	99	
Sept. 24	11:00 a. m.	45	1,110	1,110				--	11	19	50	97	98	99	

## DELAWARE RIVER BASIN--Continued

## PERKIOMEN CREEK AT GRATERS FORD, PA.

LOCATION.--At gaging station at bridge on State Highway 29 at Graters Ford, Montgomery County, and 2 1/2 miles north of Collegeville, Montgomery County.

DRAINAGE AREA.--279 square miles.

RECORDS AVAILABLE.--Sediment records: April to October 1948.

REMARKS.--Records of discharge for water year given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in field office at Schuylkill Haven, Pa.

## Suspended sediment, water year October 1947 to September 1948

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	190	2	1.0	565	9	14
2-----	--	--	--	176	2	.9	375	4	4.0
3-----	--	--	--	356	5	4.8	295	3	2.4
4-----	--	--	--	384	4	4.2	267	4	2.9
5-----	--	--	--	4,620	347	4,330	237	5	3.2
6-----	--	--	--	1,800	60	292	209	5	2.8
7-----	--	--	--	3,230	230	2,010	213	12	6.9
8-----	--	--	--	1,780	78	375	400	17	18
9-----	--	--	--	1,010	10	27	245	7	4.6
10-----	--	--	--	810	8	17	205	6	3.3
11-----	--	--	--	519	4	5.6	172	3	1.4
12-----	--	--	--	381	6	6.2	172	2	.9
13-----	--	--	--	9,430	28	713	410	14	15
14-----	--	--	--	2,780	32	240	263	6	4.3
15-----	--	--	--	1,730	16	75	319	8	6.9
16-----	--	--	--	2,000	12	65	281	6	4.6
17-----	--	--	--	2,570	26	180	267	4	2.9
18-----	--	--	--	1,630	10	44	197	3	1.6
19-----	--	--	--	1,090	6	18	1,160	234	733
20-----	370	6	6.0	689	6	11	3,630	336	3,290
21-----	344	5	4.6	519	6	8.4	788	63	134
22-----	299	6	4.8	415	4	4.5	463	14	17
23-----	263	6	4.3	349	3	2.8	415	11	12
24-----	259	6	4.2	304	7	5.8	375	10	10
25-----	267	5	3.6	285	9	6.9	319	6	5.2
26-----	254	6	4.1	272	9	6.6	250	6	4.0
27-----	233	5	3.1	241	7	4.6	245	7	4.6
28-----	229	7	4.3	221	3	1.8	328	18	16
29-----	237	5	3.2	221	4	2.4	489	95	125
30-----	213	3	1.7	1,840	48	238	354	83	79
31-----	--	--	--	1,400	24	91	--	--	--
Total -	2,968	--	43.9	43,242	--	8,790	13,908	--	4,455

## DELAWARE RIVER BASIN--Continued

## PERKIOMEN CREEK AT GRATERS FORD, PA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	263	33	23	71	13	2.5	44	12	1.4
2-----	209	18	10	91	11	2.7	40	11	1.2
3-----	172	15	7.0	424	52	60	42	8	.9
4-----	159	10	4.3	274	66	49	43	9	1.1
5-----	146	8	3.2	380	56	57	83	13	2.9
6-----	136	7	2.6	532	84	121	60	8	1.3
7-----	198	10	5.3	185	26	13	56	10	1.5
8-----	149	20	8.0	252	57	39	54	8	1.2
9-----	127	13	4.5	149	25	10	91	14	3.4
10-----	110	8	2.4	110	18	5.3	310	83	69
11-----	101	6	1.6	96	14	3.6	202	49	27
12-----	94	5	1.3	470	88	112	113	15	4.6
13-----	104	6	1.7	321	51	44	83	12	2.7
14-----	421	246	280	159	24	10	69	23	4.3
15-----	149	50	20	121	19	6.2	54	17	2.5
16-----	116	141	44	99	14	3.8	50	13	1.8
17-----	104	22	6.2	88	10	2.4	46	12	1.5
18-----	113	14	4.3	86	10	2.3	46	11	1.4
19-----	101	12	3.3	124	17	5.7	47	8	1.0
20-----	88	10	2.4	140	12	4.5	48	10	1.3
21-----	81	10	2.2	166	18	8.1	45	11	1.4
22-----	120	9	2.9	212	17	9.7	44	7	.8
23-----	374	48	48	446	72	87	40	8	.9
24-----	229	50	31	162	20	8.7	38	7	.7
25-----	118	27	8.6	113	14	4.3	37	8	.8
26-----	94	16	4.0	94	14	3.6	32	8	.7
27-----	88	14	3.3	78	12	2.5	36	7	.7
28-----	83	12	2.7	71	11	2.1	36	8	.8
29-----	74	10	2.0	60	11	1.8	35	7	.6
30-----	71	10	1.9	52	9	1.3	60	14	2.3
31-----	63	12	2.1	50	10	1.4	--	--	--
Total -	4,455	--	544	5,676	--	684	1,984	--	142

DELAWARE RIVER BASIN--Continued

LOCATION.--At gaging station at Pennsylvania Railroad bridge at Chadds Ford, Delaware County.  
DRAINAGE AREA.--287 square miles.  
RECORDS AVAILABLE.--Chemical analyses: January to September 1948.  
REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111.  
Chemical analyses in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color pH	Specific conductance (micro-mhos at 25° C.)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																		Total	Non-carbonate	
Jan. 14, 1948	506	--	18 7.1	136	11	0.37		15	4.4	2.9		37	18	5.0	0.2	6.5	87	56		
Feb. 19	1,440	40	8 6.7	196.4	6.6	.04		8.0	3.3	5.1		22	15	3.1		7.5	61	34		
Mar. 10	655	44	4 7.0	135	10	.05		12	4.6	5.9		34	19	5.0	.2	7.9	83	49		
Apr. 13	590	--	8 7.4	123	8.8	.06		12	4.2	3.7		34	16	4.2	.1	5.8	82	47		
May 11	569	--	3 7.0	132	12	.04		12	4.5	5.7		37	16	4.8	.1	5.9	91	48		
June 7	485	--	3 6.9	131	14	.04		12	4.5	5.4		38	16	5.2	.2	5.5	87	48		
June 24	477	--	6 6.9	139	14	.09		13	4.8	6.4		43	17	5.6	.1	6.3	103	52		
July 28	427	--	5 6.6	136	13	.05		13	5.4	5.5		44	16	5.9	.0	6.8	94	55		
Aug. 20	489	70	6 6.7	146	12	.06		14	5.3	6.5		46	18	5.9	.0	7.7	100	57		
Sept. 24	226	--	6 6.7	242	18	.06		26	9.0	8.2		83	26	7.6	.1	17	168	102		

DELAWARE RIVER BASIN--Continued  
BRANDYWINE CREEK AT WILMINGTON, DEL.

LOCATION--At gaging station at Henry Clay Bridge in Wilmington, New Castle County.

DRAINAGE AREA--114 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1947 to September 1948.

Sediment loads: December 1946 to September 1948.

EXTREMES, 1947-48--Sediment loads: Maximum, 13,700 tons per day Sept. 10; minimum, less than 1 ton per day on many days.

EXTREMES, 1946-48--Sediment loads: Maximum, 13,700 tons per day Sept. 10, 1946; minimum, less than 1 ton per day on many days.

REMARKS--Records of discharge for water year October 1946 to September 1947 given in Water-Supply Paper 1081 and for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in field office at Schuylkill Haven, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Tem- per-a- ture (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Alum- inum (Al)	Iron (Fe)	Man- ga- nese (Mn)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dis- solved solids	Hardness as CaCO <sub>3</sub>		Total acid- ity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbon- ate	
Oct. 2, 1947----	128	54	5	8.1	168	8.8		0.08		15	5.5	9.8		58	18	7.5	0.1	5.1	99	60		
Nov. 30-----	253	--	5	8.2	187	13		.09		16	5.6	13		55	25	9.2	.2	4.2	114	63		
Dec. 4-----	241	38	4	7.4	162	12		.06		15	5.5	6.9		46	21	6.8	.1	7.0	102	60		
Jan. 2, 1948----	2,780	--	18	6.4	91.6	5.5		.20		7.6	2.7	4.7		14	18	3.0	.2	6.6	52	30		
Feb. 3-----	247	32	3	7.4	150	12		.04		13	5.0	7.8		40	20	6.0	.1	9.4	98	53		
Mar. 3-----	1,110	--	--	--	122	--		--		--	--	--		28	25	--	--	--	--	56		
Mar. 3-----	1,110	--	--	--	307	--		--		--	--	--		67	40	--	--	--	--	108		
Mar. 4-----	934	38	6	7.6	123	11		.06		13	4.5	1.5		28	19	4.9	.2	5.0	84	51		
Apr. 2-----	1,060	55	16	7.2	113	10		.16		11	3.7	3.9		27	18	3.5	.1	6.4	79	43		
May 2-----	400	61	4	7.3	135	8.8		.06		12	4.6	5.6		40	16	5.5	.0	5.2	90	49		
June 2-----	622	67	10	6.6	130	13		.08		12	4.5	4.9		37	17	4.5	.1	5.6	88	48		
July 1-----	990	--	35	7.1	142	14		.58		13	5.0	5.1		42	18	4.5	.2	4.9	107	53		
Aug. 2-----	558	73	6	6.6	137	12		.14		13	5.4	6.1		46	16	5.3	.0	7.5	96	55		
Sept. 1-----	241	--	6	6.7	155	10		.10		15	6.0	6.2		53	17	6.1	.0	7.3	106	62		



## DELAWARE RIVER BASIN--Continued

## BRANDYWINE CREEK AT WILMINGTON, DEL.--Continued

Suspended sediment, water year October 1946 to September 1947

Day	Suspended sediment, water year October 1946 to September 1947						December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----							--	6	--
2-----							--	21	--
3-----							--	19	--
4-----							--	23	--
5-----							--	--	--
6-----							185	7	3.5
7-----							180	7	3.4
8-----							180	15	7.3
9-----							185	8	4.0
10-----							180	8	3.9
11-----							180	10	4.9
12-----							180	7	3.4
13-----							185	7	3.5
14-----							210	6	3.4
15-----							185	3	1.5
16-----							166	3	1.4
17-----							166	6	2.7
18-----							176	7	3.3
19-----							166	7	3.1
20-----							166	4	1.8
21-----									
22-----							984	110	323
23-----							986	114	296
24-----							399	18	19
25-----							308	7	5.8
26-----							268	4	2.9
27-----									
28-----							235	3	1.9
29-----							210	4	2.3
30-----							220	5	3.0
31-----							257	5	3.5
							344	2	1.9
							290	4	3.1
Total -							7, 190	--	714
	January			February			March		
1-----	252	3	2.1	428	5	5.8	252	3	2.1
2-----	257	2	1.4	350	8	7.6	332	3	2.7
3-----	296	4	3.2	320	40	35	444	12	14
4-----	406	8	8.8	300	48	39	350	3	2.8
5-----	371	6	6.0	300	41	33	344	3	2.8
6-----	320	4	3.5	320	8	6.9	392	19	20
7-----	274	2	1.5	320	22	19	509	2	2.8
8-----	279	7	5.3	320	38	33	563	3	4.6
9-----	274	6	4.4	259	32	22	460	3	3.7
10-----	230	5	3.1	312	16	13	500	3	4.0
11-----	230	5	3.1	280	48	36	563	6	9.1
12-----	235	6	3.8	260	162	114	601	4	6.5
13-----	246	6	4.0	250	134	90	667	8	14
14-----	357	91	107	250	85	57	1, 620	233	1, 180
15-----	527	177	185	275	18	13	1, 290	188	628
16-----	612	22	25	302	22	18	770	17	35
17-----	460	8	9.9	302	10	8.2	601	21	34
18-----	364	6	5.9	274	2	1.5	518	6	8.4
19-----	314	4	3.4	274	2	1.5	476	2	2.6
20-----	900	54	165	233	3	1.9	452	8	9.8
21-----	944	73	163	104	3	.8	444	2	2.4
22-----	391	20	21	292	12	9.4	468	4	5.0
23-----	338	48	44	326	10	8.8	428	7	8.1
24-----	357	12	12	302	8	6.5	428	8	9.2
25-----	344	7	6.5	279	8	6.0	590	15	24
26-----	364	8	7.9	296	26	21	563	25	38
27-----	710	7	13	268	68	49	406	5	5.5
28-----	468	8	10	262	14	9.9	357	5	4.8
29-----	378	9	9.2	--	--	--	378	15	15
30-----	350	8	7.6	--	--	--	385	12	12
31-----	428	7	8.1	--	--	--	344	8	7.4
Total -	12, 276	--	854	8, 058	--	667	16, 495	--	2, 120

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## BRANDYWINE CREEK AT WILMINGTON, DEL.--Continued

## Suspended sediment, water year October 1946 to September 1947--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	344	15	14	1,620	579	3,670	371	2	2.0
2-----	406	10	11	740	63	126	350	10	9.4
3-----	689	5	9.3	509	10	14	350	16	15
4-----	460	3	3.7	492	9	12	332	20	18
5-----	420	5	5.7	623	58	113	320	14	12
6-----	500	20	27	601	25	41	344	39	53
7-----	413	20	22	484	32	42	524	93	177
8-----	350	2	1.9	399	8	8.6	1,040	479	1,340
9-----	413	2	2.2	364	1	1.0	645	145	253
10-----	452	2	2.4	344	5	4.6	428	24	28
11-----	378	2	2.1	326	7	6.2	371	20	20
12-----	371	1	1.0	314	8	6.8	468	44	56
13-----	344	1	.9	308	1	.8	338	32	29
14-----	338	2	1.8	320	8	6.9	468	83	139
15-----	378	1	1.0	320	10	8.6	1,470	490	1,880
16-----	550	28	42	308	7	5.8	656	74	143
17-----	631	15	34	296	8	6.4	436	34	40
18-----	484	10	13	350	11	10	392	25	26
19-----	399	5	5.4	387	57	69	392	26	28
20-----	371	8	8.0	993	128	343	344	25	23
21-----	399	5	5.4	873	109	242	320	25	22
22-----	500	7	9.4	1,360	623	2,560	314	22	19
23-----	413	2	2.2	971	104	288	290	20	16
24-----	371	1	1.0	590	5	8.0	290	21	16
25-----	371	2	2.0	518	18	25	326	19	17
26-----	399	8	8.6	1,010	862	2,440	302	18	15
27-----	378	5	5.1	572	350	550	290	15	12
28-----	350	2	1.9	452	98	124	274	13	9.6
29-----	332	2	1.8	453	5	6.1	296	13	10
30-----	873	196	1,690	572	1	1.5	268	11	8.0
31-----	--	--	--	413	1	1.1	--	--	--
Total -	13,277	--	1,940	17,882	--	10,700	13,029	--	4,440
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	252	10	6.8	205	12	6.6	195	5	2.6
2-----	235	9	5.7	190	12	6.2	246	1	.7
3-----	215	8	4.6	180	14	6.8	220	1	.6
4-----	200	7	3.8	185	2	1.0	171	11	5.1
5-----	200	8	4.3	190	2	1.0	185	19	9.5
6-----	195	6	3.2	185	8	4.0	262	10	7.1
7-----	195	3	1.6	176	8	3.8	210	14	7.9
8-----	1,540	538	2,460	232	15	15	200	6	3.2
9-----	492	65	86	280	35	35	190	1	.5
10-----	357	25	24	246	19	13	185	11	5.5
11-----	302	17	14	200	13	7.0	176	13	6.2
12-----	274	17	13	185	12	6.0	157	4	1.7
13-----	262	18	13	185	5	2.5	144	4	1.6
14-----	262	23	16	205	14	7.7	136	7	2.6
15-----	252	16	11	185	9	4.5	132	12	4.3
16-----	378	96	118	162	11	4.8	320	27	23
17-----	308	33	27	629	194	466	220	10	5.9
18-----	268	21	15	262	42	30	157	3	1.3
19-----	344	26	28	205	20	11	144	1	.4
20-----	704	115	218	190	3	1.5	136	1	.4
21-----	326	82	72	190	12	6.2	132	1	.4
22-----	284	45	35	185	14	7.0	166	1	.5
23-----	314	39	33	176	11	5.2	215	1	.6
24-----	262	19	13	166	14	6.3	171	1	.5
25-----	235	23	15	157	17	7.2	195	1	.5
26-----	225	20	12	144	16	6.2	205	8	4.4
27-----	215	12	7.0	180	30	15	153	4	1.6
28-----	215	11	6.4	190	16	8.2	140	1	.4
29-----	215	14	8.1	162	13	5.7	136	3	1.1
30-----	215	9	5.2	176	16	8.2	136	1	.4
31-----	205	13	7.2	268	18	13	--	--	--
Total -	9,946	--	3,290	6,471	--	722	5,435	--	100

## DELAWARE RIVER BASIN--Continued

## BRANDYWINE CREEK AT WILMINGTON, DEL.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	124	5	1.7	136	15	5.5	235	9	5.7
2-----	128	3	1.0	128	52	18	230	24	15
3-----	124	1	.3	132	51	18	241	33	21
4-----	124	3	1.0	2,550	1,220	13,000	241	5	3.2
5-----	124	1	.3	1,050	204	945	235	2	1.3
6-----	121	1	.3	386	21	22	241	4	2.6
7-----	121	3	1.0	259	8	5.6	230	4	2.5
8-----	117	5	1.6	1,650	265	2,060	259	4	2.8
9-----	117	5	1.6	1,030	122	332	265	2	1.4
10-----	114	5	1.5	435	25	29	230	4	2.5
11-----	114	1	.3	391	36	63	265	1	.7
12-----	110	5	1.5	1,640	284	1,270	259	4	2.8
13-----	117	1	.3	614	51	85	235	3	1.9
14-----	114	1	.3	407	14	15	205	3	1.7
15-----	114	1	.3	351	5	4.8	195	3	1.6
16-----	117	2	.6	358	9	8.7	874	99	234
17-----	117	3	.9	323	6	5.2	502	32	43
18-----	124	4	1.4	283	5	3.8	351	16	15
19-----	121	3	1.0	265	5	3.6	309	2	1.7
20-----	114	4	1.2	247	4	2.7	259	2	1.4
21-----	114	5	1.5	235	4	2.5	241	3	1.9
22-----	104	2	.6	235	3	1.9	235	3	1.9
23-----	104	1	.3	414	12	13	253	3	2.1
24-----	110	8	2.4	421	9	10	247	2	1.3
25-----	101	1	.3	606	9	15	210	2	1.1
26-----	101	4	1.1	400	3	3.2	235	2	1.3
27-----	114	4	1.2	316	3	2.6	247	5	3.3
28-----	128	13	4.5	295	3	2.4	230	3	1.9
29-----	393	73	77	277	3	2.2	200	3	1.6
30-----	210	14	7.9	253	3	2.1	205	3	1.7
31-----	149	2	.8	--	--	--	247	3	2.0
Total -	4,004	--	116	16,087	--	18,000	8,410	--	382
Day	January			February			March		
	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	522	35	148	255	31	21	686	14	26
2-----	2,780	495	4,300	253	32	22	866	15	35
3-----	1,030	45	135	247	3	2.0	1,110	43	124
4-----	590	12	19	235	1	.6	934	22	54
5-----	518	4	5.6	250	1	.7	686	6	11
6-----	458	2	2.5	265	1	.7	606	8	13
7-----	421	3	3.4	260	1	.7	774	14	29
8-----	365	3	3.0	259	2	1.4	1,030	9	25
9-----	393	3	3.2	240	2	1.3	710	10	19
10-----	414	1	1.1	235	3	1.9	766	13	27
11-----	351	3	2.8	235	2	1.3	726	12	24
12-----	323	7	6.1	259	13	9.1	934	15	38
13-----	765	13	28	271	14	10	654	15	26
14-----	638	1	1.7	1,460	95	1,610	598	17	27
15-----	414	4	4.5	1,940	170	1,030	582	14	22
16-----	370	4	4.0	902	35	94	606	9	15
17-----	379	3	3.1	1,920	19	180	638	7	12
18-----	358	1	1.0	2,450	80	670	566	6	9.2
19-----	250	7	4.7	1,640	265	1,200	558	6	9.0
20-----	280	2	1.5	1,420	128	564	638	7	12
21-----	380	2	2.1	798	25	58	574	9	14
22-----	420	5	5.7	606	19	31	542	8	12
23-----	350	3	2.8	542	15	22	566	14	21
24-----	165	4	1.8	495	13	17	782	21	44
25-----	245	4	2.6	542	13	19	630	26	44
26-----	335	11	9.9	846	51	150	542	26	38
27-----	310	4	3.3	814	220	548	622	38	68
28-----	280	2	1.5	1,250	256	887	1,010	32	108
29-----	280	6	4.5	1,030	91	310	646	13	23
30-----	270	37	27	--	--	--	566	9	14
31-----	250	54	36	--	--	--	534	9	13
Total -	14,904	--	4,780	21,919	--	7,460	21,682	--	956

## NORTH ATLANTIC SLOPE BASINS

## DELAWARE RIVER BASIN--Continued

## BRANDYWINE CREEK AT WILMINGTON, DEL.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,570	264	1,400	407	6	6.6	870	32	80
2-----	1,060	79	250	400	11	12	622	20	34
3-----	726	20	39	510	8	11	574	14	22
4-----	598	11	18	558	9	14	582	13	20
5-----	566	7	11	2,150	522	5,370	550	13	19
6-----	542	7	10	1,580	228	1,920	518	10	14
7-----	526	9	13	1,700	218	1,470	502	10	14
8-----	488	20	26	1,600	112	630	558	16	24
9-----	488	8	11	886	20	48	518	10	14
10-----	458	5	6.2	742	8	16	480	10	13
11-----	458	8	9.9	686	8	15	458	6	7.4
12-----	662	12	28	646	9	16	450	8	9.7
13-----	705	28	63	1,400	111	588	1,030	98	327
14-----	934	74	220	1,540	115	514	654	29	80
15-----	1,040	62	201	894	33	102	526	11	16
16-----	694	22	48	816	16	43	558	12	18
17-----	582	11	17	1,410	78	291	574	15	23
18-----	518	9	13	1,070	103	304	472	11	14
19-----	488	9	12	806	34	92	1,750	695	4,590
20-----	488	7	9.2	702	17	32	1,130	253	1,110
21-----	480	8	10	726	19	37	670	26	47
22-----	458	14	17	686	17	31	542	20	29
23-----	435	18	21	638	14	24	534	18	26
24-----	450	8	9.7	606	12	20	510	16	22
25-----	458	10	12	598	12	19	540	75	125
26-----	450	10	12	606	17	28	465	167	227
27-----	442	7	8.3	582	13	20	435	338	400
28-----	450	7	8.5	558	30	45	931	277	670
29-----	442	4	4.8	534	23	33	1,240	556	2,100
30-----	428	7	8.1	1,320	24	100	914	300	740
31-----	--	--	--	2,000	50	438	--	--	--
Total -	18,084	--	2,520	29,357	--	12,290	20,157	--	10,800
Day	July			August			September		
	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	990	550	1,190	510	31	43	241	18	12
2-----	566	78	119	558	24	36	235	18	11
3-----	495	51	68	480	32	41	230	17	11
4-----	472	36	46	686	51	94	247	21	14
5-----	450	34	41	550	37	55	316	22	19
6-----	458	35	43	765	30	62	277	21	16
7-----	472	42	54	442	21	25	259	20	14
8-----	442	36	43	421	20	23	277	25	19
9-----	407	31	34	393	20	21	534	53	89
10-----	386	31	32	358	14	14	3,710	1,080	13,700
11-----	372	25	25	351	11	10	1,500	133	785
12-----	365	25	25	536	48	69	590	24	38
13-----	358	22	21	488	53	70	435	12	14
14-----	1,800	520	3,140	372	16	16	379	14	14
15-----	1,340	370	1,710	337	36	33	337	11	10
16-----	518	48	67	323	14	12	316	11	9.4
17-----	442	32	36	323	15	13	309	12	10
18-----	442	30	36	316	13	11	309	12	10
19-----	414	30	34	450	20	24	316	7	6.0
20-----	393	23	24	435	42	49	309	9	7.5
21-----	386	29	30	810	66	144	302	7	5.7
22-----	372	23	23	465	58	73	289	6	4.7
23-----	495	20	27	714	74	143	277	7	5.2
24-----	1,070	185	425	465	40	50	271	8	5.9
25-----	502	52	70	365	21	21	265	7	5.0
26-----	407	23	25	337	16	15	259	4	2.8
27-----	606	118	222	309	15	13	253	4	2.7
28-----	502	26	35	289	15	12	253	4	2.7
29-----	393	19	20	283	15	11	247	6	4.0
30-----	358	16	15	271	15	11	365	23	23
31-----	344	15	14	253	15	10	--	--	--
Total -	16,817	--	7,700	13,655	--	1,220	13,907	--	14,900

DELAWARE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Chemical analyses, in parts per million, water year October 1947 to September, 1949																					
Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																				Total	Non-carbonate
LACKAWAXEN RIVER AT KIMBLES																					
Nov. 13, 1947	726		16	6.5	72.6	3.1		0.04	8.1	1.1	3.1			12	15	3.0	0.1	1.8	49	25	15
Dec. 10	1,740		6	6.5	50.8	.4		.01	5.8	.9	2.7			12	9.9	1.5	.0	1.7	32	18	8
Jan. 7, 1948	1,660		8	6.8	50.7	.2		.01	6.0	.9	2.4			14	10	1.2	.0	.4	33	19	7
Feb. 4	1,540		3	5.8	49.7	.3		.05	5.8	.9	2.0			12	9.3	.9	.2	1.4	30	18	8
Mar. 31	640		6	6.5	59.6	2.8		.03	6.7	1.0	2.5			12	12	1.6	.1	1.8	38	21	11
Apr. 28	1,870		5	6.9	61.1	1.6		.02	7.1	1.2	3.3			16	12	2.5	.0	.8	40	23	10
May 26	2,190		10	6.2	59.3	3.1		.02	7.4	1.0	2.4			16	11	1.2	.1	1.7	42	23	9
June 23	425		6	6.3	51.8	3.4		.02	6.4	1.0	1.6			12	10	1.2	.1	1.6	38	20	10
July 21	1,460		3	7.0	53.2	2.0		.07	6.7	1.3	2.4			15	11	1.5	.0	1.7	36	22	10
Aug. 18	1,580		6	6.5	70.0	2.0		.18	8.3	1.5	3.3			22	11	2.3	.0	1.7	46	27	9
Sept. 16	1,300		6	6.4	53.8	1.3		.05	6.6	1.4	2.4			17	9.9	1.5	.1	.9	37	22	8

LEHIGH RIVER AT GLENDON

Oct. 19, 1947	635	71	4	7.1	346			0.08	31	13	--	72	75	12		12		12		131	72
Nov. 25	3,700	43	5	7.2	167			.28	18	8.3	--	32	38	3		6.5		32		67	40
Dec. 30	1,110	36	5	7.4	201			.06	21	9.4	3.4	42	41	11		7.3		91		57	
Feb. 2, 1948	803	35	3	6.9	250			.16	23	10	1.1	61	51	8		9.1		98		48	
Feb. 27	4,210	38	5	6.9	155			.15	16	6.1	3.9	34	33	4		6.9		65		37	
Mar. 10	2,690	42	4	6.9	164			.12	18	6.4	3.0	38	31	6		7.3		71		40	
Apr. 15	11,300	46	4	6.8	108			.22	9.5	4.9	2.6	21	24	3		3.8		44		27	
May 21	4,120	57	2	7.2	140			.16	--	--	--	28	29	3		4.8		53		30	
June 29	3,510	74	4	7.1	138			.41	--	--	--	27	31	4		3.9		49		30	
Aug. 5	1,760	72	3	7.3	263			.08	24	9.8	6.6	57	48	8		8.1		100		54	
Sept. 10	1,080	75	2	6.8	295			.10	27	11	12	69	59	9		10		113		56	

COOKS CREEK NEAR SPRINGTOWN

July 9, 1948		72	2	7.6	203	13						98	13	3.0		5.2				95	15
--------------	--	----	---	-----	-----	----	--	--	--	--	--	----	----	-----	--	-----	--	--	--	----	----

COOKS CREEK NEAR RIEGELSVILLE

July 9, 1948		70	3	7.8	222	12		0.04	23	11	5.1	105	18	2.9	0.0	5.9	131	103	17		
--------------	--	----	---	-----	-----	----	--	------	----	----	-----	-----	----	-----	-----	-----	-----	-----	----	--	--

## DELAWARE RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	Total acidity as H <sub>2</sub> SO <sub>4</sub>
TINICUM CREEK AT TINICUM																				
July 9, 1948 ----		72	5	7.4	173			0.07	16	7.6				60	29		3.1		71	22
TOHICKON CREEK NEAR QUAKERTOWN																				
July 9, 1948 ----		80	21	7.8	283	16		0.03	27	11	13			101	35	12	0.1	4.5	182	113
TOHICKON CREEK AT TORICKON																				
July 9, 1948 ----		81	13	7.0	207			0.05	22	8.7	8.9			80	28	8		4.9		91
TOHICKON CREEK NEAR PIPERSVILLE																				
Feb. 27, 1948 --	450	33	30	6.6	123			0.18		13	4.4	5.2		26	30	4		4.6		51
July 9, 1948 ----	23	82	12	7.7	184	12		.03	17	7.6	8.3			68	27	4.8	0.1	1.0	119	74
TOHICKON CREEK AT POINT PLEASANT																				
July 9, 1948 ----		80	8	7.0	193			0.06		18	10	5.0		70	26	8		1.5		86
SCOTTS CREEK NEAR TULLYTOWN																				
July 12, 1948 ---		85	8	6.5	197			0.15		18	8.4	6.1		35	44	12		1.7		79
MILL CREEK AT BRISTOL (U. S. HIGHWAY 13)																				
July 12, 1948 ---		79	50	6.7	114	14		0.56		8.4	3.8	6.6		26	13	7.8	0.2	5.7	88	37
NESHAMINY CREEK NEAR EDISON																				
Nov. 25, 1947 --		44	27	6.6	236			0.39		--	--	1.3		30	47	12		11		84
Apr. 15, 1948 --		46	28	6.7	166			0.39		14	7.9	16		27	37	8		5.1		67
July 12, 1948 ----		84	5	7.6	197	6.6		.04	14	5.6				50	30	12	0.0	5.1	116	58

## NESHAMINY CREEK NEAR LANGHORNE

Oct. 30, 1947	123	59	55	7.0	197		0.30	15	6.0	--	50	31	10		5.4		62	21
Dec. 9	146	38	4	7.3	187		.04	16	8.1	5.9	39	33	9.0		8.6		73	41
Jan. 14, 1948	502	33	8	7.2	165		.07	15	7.3	3.4	28	33	8.0		7.6		67	44
Feb. 19	2,110	38	30	6.1	107		.31	9.6	4.6	2.8	16	23	4		7.6		43	30
Mar. 25	475	58	3	7.1	175		.15	16	6.6	7.0	34	36	8		6.9		67	39
Apr. 30	153	58	2	7.6	184		.14	16	6.3	7.5	44	29	8		5.6		66	30
June 4	211	63	3	7.5	179		.15	17	6.6	6.4	44	29	9		5.6		70	34
July 12	96	81	4	7.5	183	9.4	.03	15	5.7	12	48	29	8.5	0.1	6.0	112	61	22
Aug. 13	246	77	5	7.1	197		.12	17	7.3	5.5	54	22	9.5		4.6		72	28

## NESHAMINY CREEK AT HULMEVILLE

July 12, 1948		80	5	6.8	197		0.08	16	6.6	13	55	27	12		6.2		67	22
---------------	--	----	---	-----	-----	--	------	----	-----	----	----	----	----	--	-----	--	----	----

## NESHAMINY CREEK AT CROYDON

July 12, 1948		78	4	7.5	181	8.6	0.03	14	5.8	12	48	27	8.2	0.1	6.9	111	59	19
---------------	--	----	---	-----	-----	-----	------	----	-----	----	----	----	-----	-----	-----	-----	----	----

## LITTLE NESHAMINY CREEK AT HARTSVILLE

July 12, 1948			3	7.5	165	13	0.06	13	4.9	9.8	42	25	7.2	0.0	4.0	106	53	18
---------------	--	--	---	-----	-----	----	------	----	-----	-----	----	----	-----	-----	-----	-----	----	----

## POQUESSING CREEK AT PHILADELPHIA

July 12, 1948		72	3	7.3	143	15	0.04	9.4	4.4	9.9	23	17	12	0.0	12	97	42	23
---------------	--	----	---	-----	-----	----	------	-----	-----	-----	----	----	----	-----	----	----	----	----

## PENNYPACK CREEK AT PHILADELPHIA

July 12, 1948			15	9.3	297	16	0.14	14	5.2	41	1/113	29	12	0.0	6.4	193	56	0
---------------	--	--	----	-----	-----	----	------	----	-----	----	-------	----	----	-----	-----	-----	----	---

1/ Includes equivalent of 24 parts per million of carbonate (CO<sub>3</sub>).

DELAWARE RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued  
 Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>			Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	Total	
SCHUYLKILL RIVER AT POTTSVILLE																							
Apr. 12, 1948	570	54	1	3.85	564	--	--	--	--	--	--	--	--	0	256	--	--	--	--	210	210	68	
Apr. 20	580	52	2	3.95	561	11	6.9	0.15	--	42	29	1.7	--	0	262	3.0	0.1	0.4	401	274	274	71	
May 4	369	52	1	4.00	685	--	--	--	--	--	--	--	--	0	327	--	--	--	--	315	315	97	
July 13	48.8	57	1	3.65	1,210	--	--	--	--	--	--	--	--	0	647	--	--	--	--	613	613	164	
July 20	36.9	64	1	3.40	1,260	13	17	.52	8.0	108	72	9.2	--	0	683	4.0	.2	.1	1,030	697	697	152	
July 27	57.0	68	1	3.60	988	12	--	--	--	--	--	--	--	0	509	4.0	.1	--	--	410	410	--	
Sept. 14	27.8	64	1	3.20	1,070	16	--	--	--	--	--	--	--	0	602	2.0	.0	.2	--	364	364	216	
Sept. 21	20.6	60	1	4.00	1,060	14	15	.51	6.9	96	59	4.7	--	0	566	4.0	.0	.3	871	585	585	168	
Sept. 28	24.5	55	4	3.65	1,070	14	--	--	--	--	--	--	--	0	648	2.0	.0	.5	--	675	675	213	
SCHUYLKILL RIVER AT MOUNT CARBON																							
Apr. 12, 1948	608	54	1	4.40	546	--	--	--	--	--	--	--	--	0	250	--	--	--	--	210	210	56	
Apr. 20	587	55	3	4.10	544	11	4.8	0.12	3.2	44	29	3.5	--	0	257	4.0	0.0	0.4	392	266	266	83	
May 4	394	52	1	4.35	669	--	--	--	--	--	--	--	--	0	316	--	--	--	--	300	300	99	
July 13	32.0	66	1	3.95	1,040	--	--	--	--	--	--	--	--	0	540	--	--	--	--	603	603	132	
July 20	39.4	64	8	3.55	1,100	13	14	1.3	7.0	95	63	3.6	--	0	581	5.0	.2	.3	872	605	605	124	
July 27	60.8	68	1	4.10	905	20	--	--	--	--	--	--	--	0	451	3.0	.1	--	--	345	345	--	
Sept. 14	29.7	65	15	4.00	874	14	--	--	--	--	--	--	--	0	435	6.0	.0	.7	--	407	407	122	
Sept. 21	22.0	62	7	4.10	903	13	8.5	2.1	5.5	77	49	16	--	0	464	4.0	.0	.8	729	461	461	102	
Sept. 28	26.4	56	7	4.45	980	13	--	--	--	--	--	--	--	0	472	2.0	.0	.6	--	501	501	115	



## SCHUYLKILL RIVER AT PORT CLINTON

Apr. 12, 1948	914	54	1	4.7	345	--	--	--	--	--	--	--	--	--	--	--	--	0	139	--	--	--	--	123	123	21
Apr. 20	751	56	2	4.40	418	8.8	2.3	0.10	--	2.2	34	21	6.4	--	--	--	3.5	0	190	0.0	0.5	295	--	189	189	33
May 4	398	56	1	4.9	469	--	--	--	--	--	--	--	--	--	--	--	--	2	207	--	--	--	207	207	18	
July 13	130	78	1	4.8	748	--	--	--	--	--	--	--	--	--	--	--	--	2	360	--	1	--	350	--	--	--
July 20	140	74	1	4.30	798	8.0	3.0	.25	4.4	71	45	15	--	--	--	--	4.5	0	399	4.5	2	610	--	390	390	52
July 27	155	76	1	4.6	726	15	--	--	--	--	--	--	--	--	--	--	8.0	0	261	8.0	1	--	--	380	380	--
Sept. 14	77.0	70	3	4.15	817	12	--	--	--	--	--	--	--	--	--	--	6.0	0	405	6.0	0	3.8	--	453	453	94
Sept. 21	69.8	66	1	4.5	822	10	5.5	.45	4.2	71	47	12	41.0	--	--	--	4.0	0	414	4.0	0	665	--	410	410	70
Sept. 28	66.7	54	4	4.5	743	8.6	--	--	--	--	--	--	--	--	--	--	4.0	0	449	4.0	0	.2	--	553	553	85

## SCHUYLKILL RIVER AT HANBURG

Apr. 13, 1948	1,320	48	1	4.8	308	--	--	--	--	--	--	--	--	--	--	--	1	132	--	--	--	--	98	--	27
Apr. 20	1,100	56	2	4.30	377	8.4	--	4.6	0.10	2.0	30	16	--	--	2.8	--	0	166	3.5	--	0.6	--	172	172	41
May 4	825	57	1	4.5	434	--	--	--	--	--	--	--	--	--	--	--	0	197	--	--	3	--	177	177	38
July 13	222	79	1	4.00	770	--	--	--	--	--	--	--	--	--	--	--	0	344	--	--	0	--	407	407	112
July 20	214	75	1	3.95	794	9.0	--	9.8	.34	4.4	65	44	--	--	7.7	--	0	402	6.0	--	2.0	618	412	412	94
July 27	298	77	2	4.20	738	8.0	--	--	--	--	--	--	--	--	--	--	0	376	6.0	--	4	--	380	380	--
Sept. 14	149	70	1	3.35	918	15	--	--	--	--	--	--	--	--	--	--	0	490	6.0	--	0	--	351	351	162
Sept. 21	161	68	2	3.80	960	14	--	19	.35	6.0	72	51	--	--	6.0	--	0	506	6.0	--	0	820	515	515	138
Sept. 28	155	58	4	4.05	857	11	--	--	--	--	--	--	--	--	--	--	0	488	2.0	--	.3	--	378	378	190

## SCHUYLKILL RIVER AT LEESPORT

Apr. 13, 1948	1,700	50	1	4.8	286	--	--	--	--	--	--	--	--	--	--	--	0	119	--	--	--	--	94	94	18
Apr. 20	1,510	57	2	4.40	353	7.6	--	0.6	0.07	1.8	28	16	--	--	9.8	--	0	151	4.5	--	1.5	--	144	144	34
May 4	961	58	1	4.8	426	--	--	--	--	--	--	--	--	--	--	--	0	177	--	--	--	--	165	165	40
July 13	241	81	1	4.30	676	--	--	--	--	--	--	--	--	--	--	--	0	335	--	--	--	--	371	371	86
July 20	240	77	1	4.15	713	--	--	2.9	.33	3.6	58	41	21	--	--	--	0	362	5.5	--	1.0	559	340	340	90
July 27	296	80	3	4.30	641	10	--	--	--	--	--	--	--	--	--	--	0	282	4.0	--	1	--	254	254	--
Sept. 14	158	74	2	4.00	760	13	--	--	--	--	--	--	--	--	--	--	0	391	2.0	--	1.9	--	378	378	128
Sept. 21	136	68	1	4.30	824	13	--	15	.37	5.2	72	46	--	--	--	--	0	432	6.0	--	.8	695	465	465	88
Sept. 28	130	61	2	4.40	784	10	--	--	--	--	--	--	--	--	--	--	0	456	4.0	--	.7	--	400	400	147

DELAWARE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Instantaneous discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
SCHUYLKILL RIVER AT READING NEAR MUELENBERG STATION																						
Apr. 13, 1948	2,410	50	1	6.9	234	7.0		--	--	23	12	8.1	--	12	87	--	--	--	--	--	80	--
Apr. 20	2,010	56	4	5.9	270	7.8	0.04	--	--	23	12	8.1	--	7	106	3.5	0.0	4.1	180	107	101	--
May 4	1,320	57	1	6.0	324	9.0	--	--	--	--	--	--	--	4	128	--	--	--	--	134	--	
July 13	371	78	1	7.4	501	5.0	--	--	--	--	--	--	--	9	219	--	.1	--	--	234	--	
July 20	360	74	1	6.1	525	9.6		07		50	30	6.6		6	238	5.0	.2	2.5	386	248	243	
July 27	426	77	1	6.7	480	8.0	--	--	--	--	--	--	--	38	209	6.0	.3	--	--	226	--	
Sept. 14	294	73	1	6.9	494	7.5	--	--	--	--	--	--	--	30	263	6.0	.0	4.8	--	244	--	
Sept. 21	245	68	5	6.7	528	5.9	.23			58	29	6.4		26	236	6.0	.0	3.0	391	264	243	
Sept. 28	200	65	3	6.4	532	6.4	--	--	--	--	--	--	--	17	247	6.0	.0	2.0	--	310	--	
SCHUYLKILL RIVER TWO MILES BELOW ANGELICA CREEK NEAR READING																						
Apr. 14, 1948	3,650	48	1	7.4	232	7.0		--	--	--	--	--	--	31	64	--	--	--	--	--	82	--
Apr. 21	2,750	58	2	6.9	277	7.8	0.06	--	--	27	11	9.4	--	36	88	5.0	0.0	6.0	183	113	83	--
May 5	2,640	56	1	6.9	262	8.0	--	--	--	--	--	--	--	41	72	--	--	--	--	110	--	
July 14	1,150	76	10	6.5	409	8.8		--	--	--	--	--	--	45	148	7.0	.2	7.8	--	174	--	
July 20	749	82	45	6.5	521	8.4		.10		52	24	17		95	164	12	.2	.2	395	228	151	
July 27	627	82	20	6.7	475	12		--	--	--	--	--	--	86	148	11	.1	--	--	178	--	
Sept. 14	586	79	40	6.6	486	8.9		--	--	--	--	--	--	91	134	12	.0	.9	--	323	--	
Sept. 21	446	72	20	7.1	530	8.2	.33			55	21	14		102	144	14	.0	2.2	361	224	140	
Sept. 28	416	71	60	6.8	504	6.8	--	--	--	--	--	--	--	96	171	16	.0	.9	--	283	--	
SCHUYLKILL RIVER AT MONOCACY																						
Apr. 14, 1948	4,020	--	1	7.4	234	8.0		--	--	--	--	--	--	34	64	--	--	--	--	--	81	--
Apr. 21	3,000	58	2	6.6	272	8.2	0.06	--	--	27	11	7.6	--	32	87	5.5	0.0	5.8	179	113	86	--
May 5	3,990	53	1	6.8	148	10	--	--	--	--	--	--	--	26	35	--	--	--	--	56	--	
July 14	1,120	--	12	6.6	352	12		--	--	--	--	--	--	49	114	9.0	.2	6.8	--	147	--	
July 21	639	78	12	6.9	469	9.6	.05			46	23	13		60	145	18	.2	7.1	321	209	160	
July 28	628	79	4	6.8	432	8.0		--	--	--	--	--	--	68	123	14	.1	--	--	218	--	
Sept. 15	593	68	5	7.3	453	8.6		--	--	--	--	--	--	60	140	16	.0	6.4	--	183	--	
Sept. 22	485	65	6	7.4	473	8.9	.25		0.04	53	21	6.8		80	135	16	.0	6.0	300	219	153	
Sept. 29	360	65	6	7.0	422	4.5		--	--	--	--	--	--	78	138	18	.0	5.5	--	146	--	

## SCHUYLKILL RIVER AT STOWE

Apr. 14, 1948	--	4,080	47	1	7.2	228	8.0	--	--	--	--	--	--	--	--	--	33	60	--	--	--	--	--	80	--
Apr. 21	----	3,040	59	3	6.7	262	8.4	0.07	26	11	--	7.2	--	--	--	--	32	84	--	0.0	6.0	170	110	84	--
May 5	----	4,050	54	1	6.7	199	11	--	--	--	--	--	--	--	--	--	30	53	--	--	--	--	76	--	--
July 14	----	1,140	78	13	6.6	330	8.0	--	--	--	--	--	--	--	--	--	50	102	--	2	5.0	--	144	--	--
July 21	----	639	78	10	7.1	446	8.0	.07	45	19	--	14	--	--	--	--	62	143	--	2	6.2	299	190	140	--
July 28	----	638	80	1	7.0	441	8.0	--	--	--	--	--	--	--	--	--	52	132	--	1	6.0	--	204	--	--
Sept. 15	----	602	68	6	7.2	428	8.9	--	--	--	--	--	--	--	--	--	66	132	--	0	5.2	--	207	--	--
Sept. 22	----	493	62	8	7.2	472	8.6	.28	0.05	50	17	22	--	--	--	--	78	149	--	0	5.7	304	195	131	--
Sept. 29	----	489	64	5	7.1	430	5.6	--	--	--	--	--	--	--	--	--	81	150	--	0	7.4	--	196	--	--

## SCHUYLKILL RIVER AT PHOENIXVILLE

Apr. 14, 1948	--	4,490	49	1	7.1	235	8.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</
---------------	----	-------	----	---	-----	-----	-----	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----

## SCHUYLKILL RIVER BELOW FRENCH CREEK AT PHOENIXVILLE

Apr. 14, 1948	----	4,630	48	1	7.1	228	9.0		--	--	--	--	--	--	--	--	33	58		--	--	--	--	--	84	--
Apr. 21	----	3,450	59	5	7.0	252	7.8		0.07			24	9.4		9.2		35	74			5.5	0	6.2	161	99	66
May 5	----	7,000	56	1	6.8	257	9.0										54	77		--	--	--	--	102	--	
July 14	----	1,350	74	40	6.3	142	13		--	--	--	--	--	--	--	--	31	28			4.0	.2	3.8	--	60	--
July 21	----	814	78	7	7.2	379	12		.06			36	15	14			59	108			12	.1	5.9	256	152	103
July 28	----	896	79	7	7.1	184	8.0		--	--	--	--	--	--	--	--	66	27			11	0	--	--	109	--
Sept. 15	----	701	69	3	7.3	367	10										69	99			10	0	3.4	--	219	--
Sept. 22	----	578	65	5	7.4	401	9.8		.19			44	20	5.8			72	114			12	0	5.6	285	192	133
Sept. 29	----	510	65	5	6.8	260	9.4					--	--	--	--	--	69	52			14	0	4.8	--	199	--

DELAWARE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																				Total	Non-carbonate
SCHUYKILL RIVER AT PORT KENNEDY																					
Apr. 14, 1948	14,600	48	1	7.0	217	9.0								34	56						74
Apr. 21	3,660	59	3	6.8	237	8.8		0.06		22	9.0	9.9		37	68	5.5	0.0	5.7	152	92	62
May 5	12,100	55	1	6.8	172	11								34	43					69	
July 14	3,560	80	12	6.6	245	9.2								61	55	7.0	0.2	4.8		99	
July 21	811	80	6	7.4	372	10		.07		37	15	12		62	109	9.0	0.2	2.2	253	154	103
July 28	1,150		8	7.3	316	10								62	84	8.0	0.0			168	
Sept. 15	683	70	3	7.2	363	8.8								68	91	10	0.0	1.8		146	
Sept. 22	448	66	5	7.4	408	7.2		.57	0.09	44	19	5.9		78	110	14	0.0	5.1	294	190	126
Sept. 29	425	66	5	6.6	371	4.6								84	114	14	0.0	6.2		219	
SCHUYKILL RIVER AT CONSHOHOCKEN																					
Apr. 15, 1948	15,100	46	1	6.8	205	7.0								49	43					68	
Apr. 21	3,760	58	3	6.9	232	8.2		0.07		23	9.0	8.2		39	64	6.0	0.0	6.9	145	94	62
May 5	12,400	56	1	6.8	255	9.0								47	71					104	
July 14	3,560	79	13	6.4	210	10								44	52	5.0	0.1	4.0		84	
July 21	838	80	10	7.3	379	10		.08		36	16	14		72	103	10	0.2	6.6	253	156	96
July 28	1,190	81	4	7.1	316	12								64	98	8.0	0.2			161	
Sept. 15	707	74	5	7.1	350	9.5								72	88	10	0.0	2.4		183	
Sept. 22	463	70	5	7.2	431	7.4		.32	0.11	48	22	4.0		92	113	16	0.0	5.2	306	211	136
Sept. 29	439	69	15	6.7	362	5.1								96	105	18	0.0	6.2		196	

## SCHUYLKILL RIVER AT GIRARD AVENUE IN PHILADELPHIA

Apr. 15, 1948 ---	15,500	48	1	7.0	202	9.0	0.06	--	--	--	40	46	--	--	--	69	--
Apr. 22 -----	3,890	58	5	7.0	248	9.0	0.06	--	24	--	--	42	66	6.5	0.1	154	63
May 6 -----	12,800	55	1	6.8	166	9.0	--	--	--	--	32	39	--	6.0	--	60	--
July 15 -----	4,960	76	20	6.6	240	9.6	--	--	--	--	56	58	--	3.8	--	98	--
July 21 -----	861	82	12	7.2	374	11	.07	--	36	15	15	75	97	13	1	152	90
July 28 -----	1,220	80	10	7.1	287	5.0	--	--	--	--	--	76	53	8.0	0	148	--
Sept. 15 -----	725	66	5	7.1	343	9.2	--	--	--	--	--	78	85	12	0	183	--
Sept. 22 -----	475	70	10	7.4	431	8.0	.32	0.10	45	21	7.0	96	106	18	0	283	120
Sept. 29 -----	450	69	10	6.7	403	5.2	--	--	--	--	--	97	100	18	0	199	--
																196	--

## SCHUYLKILL RIVER AT PASSAYUNK AVENUE IN PHILADELPHIA

Apr. 15, 1948 ---		--	1	6.9	220	9.0	--	--	--	--	46	49	--	--	--	76	--
Apr. 22 -----		--	4	6.6	267	9.2	0.08	--	24	9.3	13	44	71	9.0	0.0	168	62
May 6 -----		55	1	6.8	173	10	--	--	--	--	--	35	38	--	0	58	--
July 15 -----		77	19	6.5	229	9.6	--	--	--	--	--	56	57	8.0	.2	84	--
July 21 -----		86	12	6.9	448	12	.11	--	35	15	34	92	114	20	3	280	74
July 28 -----		82	7	7.1	313	10	--	--	--	--	--	62	81	14	0	152	--
Sept. 15 -----		79	28	6.8	446	11	--	--	--	--	--	100	91	36	0	159	--
Sept. 22 -----		78	45	7.2	513	10	.91	0.25	47	17	34	124	115	30	0	320	88
Sept. 29 -----		--	120	7.1	499	8.9	--	--	--	--	--	129	110	36	0	196	--

## MILL CREEK AT PORT CARBON

Apr. 20, 1948 ---	36.9		3	4.20	529						0	259	3.0				94
-------------------	------	--	---	------	-----	--	--	--	--	--	---	-----	-----	--	--	--	----

## TUMBLING RUN NEAR POTTSVILLE

Apr. 20, 1948 ---		50	8	7.7	43.2						12	10	1.0				
-------------------	--	----	---	-----	------	--	--	--	--	--	----	----	-----	--	--	--	--

DELAWARE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Instantaneous discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at (25° C.))	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acid-its as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
WEST BRANCH SCHUYLKILL RIVER AT CRESSONA																						
Apr. 12, 1948	---	54	--	5.0	523	7.0	--	--	--	--	--	9.7	--	1	233	--	--	--	--	207	--	8
Apr. 20	187	50	3	4.30	599	9.2	2.4	0.12	2.8	47	35	9.7	--	0	287	3	0.0	0.4	436	282	--	30
May 4	98.6	50	1	4.6	658	9.0	--	--	--	--	--	--	--	0	306	--	.1	--	--	300	300	32
July 13	51.9	68	1	5.5	983	4.0	--	--	--	--	--	--	--	8	507	--	.0	--	--	570	--	--
July 20	40.5	64	1	4.15	1,190	9.0	3.0	.23	5.6	115	77	18	--	0	644	2	.3	.1	965	634	634	38
July 27	36.7	87	2	4.30	1,080	20	--	--	--	--	--	--	--	0	362	10	.1	--	--	372	372	--
Sept. 14	18.6	64	1	3.85	1,200	13	--	--	--	--	--	--	--	0	679	10	.0	.3	--	484	484	91
Sept. 21	24.8	61	10	3.20	1,580	12	10	1.5	5.5	137	78	39	--	0	813	2	.0	.3	1,200	768	768	190
Sept. 28	14.9	53	3	4.5	1,170	9.5	--	--	--	--	--	--	--	0	541	4	.0	.3	--	623	623	53
LITTLE SCHUYLKILL RIVER AT TAMAQUA																						
Apr. 13, 1948	235	45	1	4.9	90.2	5.0	--	--	--	--	--	--	--	1	25	--	--	--	--	26	--	9
Apr. 20	179	52	5	4.45	90.1	3.2	0.2	0.28	0.25	5.4	2.1	4.5	--	0	28	3	0.0	2.7	51	25	25	15
May 4	76.0	50	1	4.35	135	7.0	--	--	--	--	--	--	--	0	42	--	--	--	--	34	34	23
July 13	27.4	70	1	4.00	249	4.0	--	--	--	--	--	--	--	0	90	--	.0	--	--	141	141	60
July 20	23.3	69	2	3.90	235	8.6	5.8	.17	.85	11	6.3	--	--	0	89	3	.1	2.1	146	94	94	50
July 27	33.8	59	1	4.5	181	6.0	--	--	--	--	--	--	--	0	54	9	.0	--	--	380	380	--
Sept. 14	9.8	64	1	3.90	248	9.0	--	--	--	--	--	--	--	0	91	4	.0	.6	--	134	134	55
Sept. 21	9.2	62	1	4.20	253	7.9	3.3	.40	.92	13	7.9	8.5	--	0	95	6	.0	1.0	181	97	97	58
Sept. 28	6.8	56	5	4.25	202	6.6	--	--	--	--	--	--	--	0	93	4	.0	.2	--	270	270	51
LITTLE SCHUYLKILL RIVER AT SOUTH TAMAQUA																						
Apr. 13, 1948	304	---	1	3.90	505	---	---	---	---	---	---	---	---	0	203	---	---	---	---	126	---	81
Apr. 20	286	54	2	3.70	533	10	10	0.16	2.7	32	22	7.3	---	0	240	5	0.0	1.0	362	241	241	115
May 4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
July 13	63.6	69	1	4.00	1,020	---	---	---	---	---	---	---	---	0	536	---	.1	---	---	343	343	193
July 20	67.3	66	1	3.25	1,720	14	47	1.4	10	154	97	10	---	0	1,070	4	.2	.2	1,610	110	110	352
July 27	82.2	71	4	3.40	1,170	17	---	---	---	---	---	---	---	0	553	7	.1	---	---	460	460	--
Sept. 14	54.7	64	1	2.60	1,460	18	---	---	---	---	---	---	---	0	775	6	.0	.5	---	468	468	398
Sept. 21	59.8	63	1	3.60	1,490	16	39	.32	8.0	138	79	8.0	---	0	885	4	.0	.5	1,410	914	914	300
Sept. 28	49.5	61	6	3.45	1,210	14	---	---	---	---	---	---	---	0	758	4	.0	.7	---	570	570	425

## LITTLE SCHUYLKILL RIVER AT PORT CLINTON

Apr. 12, 1948	725	56	1	4.25	289	--	--	--	--	--	--	--	--	--	--	76	76	39
Apr. 20	420	56	2	4.00	309	8.0	0.7	0.14	1.5	20	12	14	--	--	2.1	200	111	49
May 4	200	57	1	4.35	443	--	--	--	--	--	--	--	--	--	0.1	141	141	70
July 13	95.5	77	1	3.60	923	--	--	--	--	--	--	--	--	--	0	509	509	212
July 20	70.0	74	1	3.45	958	11	24	.50	5.2	66	47	2.3	--	--	0	733	521	184
July 27	90.2	76	2	3.60	886	20	--	--	--	--	--	--	--	--	0	343	343	--
Sept. 14	58.0	69	3	2.90	1,140	17	--	--	--	--	--	--	--	--	0	437	437	271
Sept. 21	69.8	65	2	3.60	1,190	16	37	.72	8.0	92	59	10	--	--	0	707	707	244
Sept. 28	47.7	55	3	3.70	988	13	--	--	--	--	--	--	--	--	0	476	476	329

## PANTHER CREEK AT TAMAQUA

Apr. 13, 1948	73.2	48	1	3.60	1,430	--	--	--	--	--	--	--	--	--	--	660	660	322
Apr. 20	59.3	58	2	3.30	1,430	17	37	0.57	7.2	117	74	13	--	--	0	844	844	308
May 4	54.2	52	1	3.70	1,690	--	--	--	--	--	--	--	--	--	0	900	900	384
July 13	25.1	66	1	3.30	1,670	--	--	--	--	--	--	--	--	--	0	716	716	536
July 20	29.2	67	1	3.25	1,340	13	37	1.2	7.2	100	67	3.0	--	--	0	779	779	312
July 27	41.7	67	4	3.20	1,870	15	--	--	--	--	--	--	--	--	0	1,010	1,010	--
Sept. 14	32.4	62	2	2.60	1,930	21	--	--	--	--	--	--	--	--	0	587	587	690
Sept. 21	43.6	62	1	3.50	1,470	14	34	.85	5.7	144	86	6.6	--	--	0	931	931	248
Sept. 28	30.4	60	7	3.30	1,590	14	--	--	--	--	--	--	--	--	0	650	650	496

## MAIDEN CREEK NEAR TEMPLE

Apr. 13, 1948	675	50	1	9.0	212	6.0	--	--	--	--	--	--	--	--	1/78	31	40	--
Apr. 20	480	55	12	7.3	166	7.4	0.10	5.9	19	19	5.9	3.8	--	--	60	10	72	22
May 4	333	58	1	7.3	188	7.0	--	--	--	--	--	--	--	--	75	18	82	--
July 13	122	74	1	8.0	238	4.0	--	--	--	--	--	--	--	--	114	18	81	--
July 20	118	72	4	7.6	243	5.0	.08	10	30	10	4.0	4.0	--	--	116	18	116	21
July 27	128	71	3	7.1	253	7.0	--	--	--	--	--	--	--	--	158	33	189	--
Sept. 14	135	69	3	7.9	237	6.8	--	--	--	--	--	--	--	--	189	14	232	--
Sept. 21	108	63	5	6.8	260	5.9	.20	0.10	31	10	4.0	4.0	--	--	110	16	118	27
Sept. 28	69.0	62	6	7.5	262	4.2	--	--	--	--	--	--	--	--	113	16	183	--

1/ Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

DELAWARE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Instantaneous discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> ) (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		
																			Total	Non-carbonate	
TULPEHOCKEN CREEK AT WEST BRIDGEPORT																					
Apr. 13, 1948	926	50	1	7.6	254	8.0	--	--	--	35	8.1	--	--	108	27	--	--	--	93	--	
Apr. 20	550	58	6	7.3	265	8.0	0.06	--	--	--	--	6.8	--	117	23	5.0	0.0	11	158	121	
May 4	1,410	77	1	7.8	290	7.0	--	--	--	--	--	--	--	129	22	--	--	--	132	25	
July 13	178	77	1	7.7	335	4.0	--	--	--	--	--	--	--	156	27	0.3	--	--	219	--	
July 20	139	72	12	7.6	342	6.0	--	.07	--	44	13	4.4	--	158	28	5.0	1	8.1	207	163	
July 27	103	75	5	7.4	354	5.0	--	--	--	--	--	--	--	162	38	7.0	.1	--	148	34	
Sept. 14	107	71	5	7.6	331	5.4	--	--	--	--	--	--	--	155	29	6.0	0	8.8	183	148	
Sept. 21	108	68	5	7.5	343	5.0	--	.41	0.05	50	14	3.0	--	154	29	8.0	0	9.7	239	182	
Sept. 28	104	60	5	7.5	287	2.2	--	--	--	--	--	--	--	175	27	6.0	0	12	--	163	
WYOMISSING CREEK AT WEST READING																					
Apr. 13, 1948	39.3	--	1	7.4	415	--	--	--	--	--	--	--	--	136	31	--	--	--	126	--	
Apr. 20	34.5	62	15	7.1	--	11	--	0.06	--	36	12	17	--	147	30	17	0.0	0.2	198	139	
May 4	224	60	1	7.4	371	17	--	--	--	--	--	--	--	154	29	--	--	--	135	19	
July 13	19.4	--	1	7.5	451	6.0	--	--	--	--	--	--	--	100	37	--	2	--	170	--	
July 20	16.8	--	15	7.2	501	11	--	.08	--	46	16	34	--	212	40	28	.1	.2	288	181	
July 27	13.7	72	10	7.4	507	17	--	--	--	--	--	--	--	182	30	38	.1	--	155	7	
Sept. 14	8.41	71	35	7.0	556	16	--	--	--	--	--	--	--	214	25	52	0	.7	196	--	
Sept. 21	8.43	69	30	6.8	593	13	--	.20	0.03	53	17	46	--	220	37	60	0	.9	202	--	
Sept. 28	6.87	67	120	7.0	691	9.8	--	--	--	--	--	--	--	218	42	58	0	2.8	207	22	
ANGELICA CREEK AT READING																					
Apr. 13, 1948	18.2	--	1	7.3	192	--	--	--	--	--	--	--	--	60	19	--	--	--	66	--	
Apr. 21	16.6	58	15	6.5	185	13	--	0.30	--	17	6.3	11	--	70	20	9.0	0.0	0.1	112	68	
May 5	102	53	1	7.2	163	16	--	--	--	--	--	--	--	53	17	--	1	--	62	11	
July 14	7.59	74	1	6.4	300	14	--	--	--	--	--	--	--	140	18	12	--	.2	93	--	
July 20	6.52	76	28	6.6	577	21	--	.09	--	26	10	72	--	134	36	81	1	.2	333	106	
July 27	7.37	78	70	6.5	732	12	--	--	--	--	--	--	--	86	30	11	1	--	148	0	
Sept. 14	3.39	75	120	6.6	796	22	--	--	--	--	--	--	--	409	4.9	26	0	.9	219	--	
Sept. 21	3.47	72	40	6.9	552	23	--	1.1	0.10	33	8.3	53	--	278	23	20	0	2.3	346	--	
Sept. 28	3.79	68	140	6.8	786	22	--	--	--	--	--	--	--	440	12	18	0	2.5	116	0	
																			134	--	



ANTIETAM CREEK NEAR LORANE

[illegible]

## MANATANNY CREEK AT POTTSTOWN

569	Apr. 14, 1948	---	194	14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---</
-----	---------------	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-------

## DELAWARE RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	Total acidity as H <sub>2</sub> SO <sub>4</sub>
NORTHWEST BRANCH PERKIONEN CREEK NEAR GREENLANE																					
July 13, 1948 ---		83	4	7.4	171			0.04		19	7.0	5.0		75	17	4		2.8		76	15
PERKIONEN CREEK AT RAINS																					
Oct. 20, 1947---		68	6	7.5	262			0.06		28	9.6	11		110	27	10		--		109	19
Nov. 23-----		43	26	7.3	181			.15		18	6.7	4.9		39	36	5		8.2		72	40
Dec. 30-----		33	5	7.8	231			.03		24	11	3.1		66	37	9.0		8.2		105	31
Feb. 2, 1948---		32	4	7.4	225			.06		24	10	7.5		75	36	8		8.6		101	40
Mar. 10-----		41	8	7.1	161			.12		16	6.5	2.9		34	29	6		8.0		67	39
Apr. 19-----		48	--	7.6	137			.12		--	--	--		29	29	2		3.2		50	26
PERKIONEN CREEK AT OAKS																					
Apr. 14, 1948---	2,620	46	1	7.1	169	12		--		--	6.1	6.5		39	33	--	--	--	--	52	--
Apr. 21-----	388	--	8	7.2	168	9.4		0.11		16	--	--		42	31	6.0	0.0	5.4	105	93	31
May 5-----	2,770	54	1	6.7	120	8.0		--		--	--	--		32	51	--	0	--	--	96	--
July 14-----	238	79	15	6.8	207	11		--		--	--	--		75	32	5.0	2	3.8	--	90	--
July 21-----	93.3	80	15	7.6	211	12		.04		20	7.5	11		76	28	7.5	2	2.0	132	81	18
July 28-----	115	--	6	7.5	196	12		--		--	--	--		54	29	9.0	0	--	--	98	--
Sept. 15-----	79.4	69	10	7.4	217	10		--		--	--	--		74	29	10	0	1.4	--	134	--
Sept. 22-----	50.3	76	10	7.4	241	8.0		.20	0.0	26	11	6.2		92	30	12	0	0.6	174	111	34
Sept. 28-----	43.6	65	20	6.3	203	3.0		--		--	--	--		100	22	12	0	0.6	--	134	--
MACOBY CREEK AT GREENLANE																					
July 13, 1948---		81	8	7.1	208									86	27	4		1.5			
UNAMI CREEK NEAR SUMMERTOWN																					
July 13, 1948----		81	6	7.1	193			0.04		22	8.1	4.6		87	18	5		1.5		88	17
WEST SWAMP CREEK AT LAYFIELD																					
July 13, 1948----		78	4	6.9	232	16								80	19	8		6.1		84	18

## WEST SWAMP CREEK NEAR DELHI

July 13, 1948----	82	7	7.3	222	14		0.03		22	7.4	9.5	80	28	6.6	0.1	2.3	142	85	20
-------------------	----	---	-----	-----	----	--	------	--	----	-----	-----	----	----	-----	-----	-----	-----	----	----

## NORTHEAST BRANCH PERKIOMEN CREEK NEAR BERGEY

July 12, 1948----	82	5	6.8	264			0.06		24	10	12	77	47	10		1.5		101	38
-------------------	----	---	-----	-----	--	--	------	--	----	----	----	----	----	----	--	-----	--	-----	----

## NORTHEAST BRANCH PERKIOMEN CREEK NEAR SCHWENKVILLE

July 13, 1948----	76	5	7.7	255	3.8		0.03		23	9.3	14	81	43	9.6	0.0	1.0	152	96	29
-------------------	----	---	-----	-----	-----	--	------	--	----	-----	----	----	----	-----	-----	-----	-----	----	----

## SKIPACK CREEK AT MAINLAND

July 12, 1948----	85	4	7.1	343			0.08		27	11	22	94	46	23		5.1		113	36
-------------------	----	---	-----	-----	--	--	------	--	----	----	----	----	----	----	--	-----	--	-----	----

## VALLEY CREEK AT VALLEY FORGE

July 21, 1948----	66	2	7.7	349								188	9.5	5		1.6		178	24
-------------------	----	---	-----	-----	--	--	--	--	--	--	--	-----	-----	---	--	-----	--	-----	----

## TROUT CREEK NEAR PORT KENNEDY

July 21, 1948----	68	4	7.4	305			0.12		34	17		160	13	4		7.7		155	24
-------------------	----	---	-----	-----	--	--	------	--	----	----	--	-----	----	---	--	-----	--	-----	----

## ABRAM RUN NEAR BRIDGEPORT

July 21, 1948----	72	3	7.0	118			0.04		11	5.0		43	9.7			5.6		48	13
-------------------	----	---	-----	-----	--	--	------	--	----	-----	--	----	-----	--	--	-----	--	----	----

## STONY CREEK AT NORRISTOWN

July 13, 1948----	86	3	7.2	295								84	34	15		1.8		100	31
-------------------	----	---	-----	-----	--	--	--	--	--	--	--	----	----	----	--	-----	--	-----	----

DELAWARE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN DELAWARE RIVER BASIN IN PENNSYLVANIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
PLYMOUTH CREEK AT CONSHOCKEN																						
July 13, 1948 ----		92	2	7.6	513	10								210	68	8			2.8			
GULPH CREEK NEAR WEST CONSHOCKEN																						
July 21, 1948 ----		72	26	6.5	357			0.08		50	7.0	3.2		69	34	48			1.0		154	47
MILL CREEK NEAR GLADWYNE																						
July 21, 1948 ----		66	3	6.9	188			0.05		16	8.4	6.0		47	30	10			4.6		74	36
WISSAHICKON CREEK AT WHITEMARSH																						
July 13, 1948 ----		73	3	7.3	328	12								132	23	10					131	23
WISSAHICKON CREEK NEAR FORT WASHINGTON																						
July 13, 1948 ----		73	5	7.0	342			0.05		28	15	19		118	47	12			13		132	35
WISSAHICKON CREEK AT PHILADELPHIA																						
Apr. 15, 1948 ----	216	48	1	7.1	256	9.0		--		--	--	--	--	77	37	--	--	--	--	--	88	--
Apr. 22 -----	89.1	55	7	7.2	279	6.6		0.11		24	13	12		93	39	12	0.0	7.2	169	113	37	--
May 6 -----	203	53	1	6.9	177	11		--		--	--	--	--	46	31	--	--	--	--	--	68	--
July 15 -----	1,100	70	1	6.4	134	8.0		--		--	--	--	--	42	26	4.0	--	1.6	--	--	58	--
July 21 -----	72.1	71	13	7.5	310	11		.06		27	14	14		113	37	12	.1	8.2	184	125	32	--
July 28 -----	100	75	30	7.2	187	12		--		--	--	--	--	56	39	8.0	--	--	--	122	--	--
Sept. 15 -----	36.6	66	6	7.4	314	8.0		--		--	--	--	--	127	35	12	.0	4.8	--	207	--	--
Sept. 22 -----	33.3	64	5	7.6	366	6.1		.33	0.15	40	22	4.9		160	43	14	--	7.6	244	191	60	--
Sept. 29 -----	30.1	62	6	6.8	328	4.9		--		--	--	--	--	148	33	16	--	7.7	--	219	--	--

## DABBY CREEK NEAR CLIFTON HEIGHTS (U. S. HIGHWAY 1)

Apr. 2, 1948 ----		56	10	7.0	177		0.22		14	6.9	6.6	35	32	7	7.3	63	35
-------------------	--	----	----	-----	-----	--	------	--	----	-----	-----	----	----	---	-----	----	----

## DABBY CREEK AT DABBY

Apr. 2, 1948 ----		54	13	7.5	209		0.27		15	7.5	10	38	31	16	5.9	68	37
-------------------	--	----	----	-----	-----	--	------	--	----	-----	----	----	----	----	-----	----	----

## CORBBS CREEK NEAR LANSLOWNE (U. S. HIGHWAY 1)

Apr. 2, 1948 ----		56	18	7.5	285		0.74		30	11	5.6	64	54	11	10	120	68
-------------------	--	----	----	-----	-----	--	------	--	----	----	-----	----	----	----	----	-----	----

## CRUM CREEK NEAR MEDIA (U. S. HIGHWAY 1)

Apr. 2, 1948 ----		51	7	7.4	105		0.21		8.0	5.9	2.9	27	18	5	3.3	44	22
-------------------	--	----	---	-----	-----	--	------	--	-----	-----	-----	----	----	---	-----	----	----

## RIDLEY CREEK NEAR MEDIA (U. S. HIGHWAY 1)

Apr. 2, 1948 ----		54	28	7.5	112		0.58		8.4	6.3	1.3	24	19	5	4.0	47	27
-------------------	--	----	----	-----	-----	--	------	--	-----	-----	-----	----	----	---	-----	----	----

## CHESTER CREEK AT WAWA (U. S. HIGHWAY 1)

Apr. 2, 1948 ----		55	12	7.6	147		0.27		13	6.2	3.6	30	25	7	6.5	58	33
-------------------	--	----	----	-----	-----	--	------	--	----	-----	-----	----	----	---	-----	----	----

## CHESTER CREEK AT CHESTER (U. S. HIGHWAY 13)

Apr. 2, 1948 ----		54	28	7.5	135		0.49		12	6.1	1.6	25	24	6	5.6	55	35
-------------------	--	----	----	-----	-----	--	------	--	----	-----	-----	----	----	---	-----	----	----

SUSQUEHANNA RIVER BASIN  
SUSQUEHANNA RIVER AT FALLS, PA.

LOCATION. --At bridge on State Highway 92, 400 feet upstream from Buttermilk Creek, Wyoming County, approximately 17 miles upstream from gaging station at Wilkes-Barre, Luzerne County.

DRAINAGE AREA. --9,440 square miles.

RECORDS AVAILABLE. --Chemical analyses: October 1944 to September 1948.

Water temperatures: October 1944 to September 1948.

EXTREMES 1947-48. --Specific conductance: Maximum, 282 Oct. 21-31; minimum, 108 Apr. 11-20.

Water temperatures: Maximum, 83° F. Aug. 27; minimum, freezing point on many days in December, January, and February.

EXTREMES 1944-48. --Dissolved solids (1944-47): Maximum, 143 parts per million Sept. 21-30, 1947; minimum, 58 parts per million May 21-31, 1946.

Total hardness (1944-47): Maximum, 105 parts per million Sept. 11-20, 1946; minimum, 36 parts per million May 21-31, 1946.

Specific conductance: Maximum, 282 Oct. 21-31, 1947; minimum, 89.0 Mar. 1-10, 1945.

Water temperatures: Maximum, 83° F. Aug. 27, 1948; minimum, freezing point on many days in winter months.

REMARKS. --Records of discharge for water year October 1948 to September 1949 based on records for Susquehanna River at Wilkes-Barre, Pa., which are given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947 ----	1,931	58	4	7.8	243	0.2	0.03	32	6.0	7.5	100	23	104	23	136	1.0	104	23	23
Oct. 11-20 -----	1,609	62	5	8.2	265	---	---	---	---	---	109	24	---	---	---	---	---	---	---
Oct. 21-31 -----	1,535	59	5	8.2	282	---	---	---	---	---	113	26	---	---	---	---	---	---	---
Nov. 1-10 -----	3,882	54	6	8.1	251	---	---	---	---	---	100	23	---	---	---	---	---	---	---
Nov. 11-20 -----	10,084	42	7	7.1	141	---	---	---	---	---	47	17	---	---	---	---	---	---	---
Nov. 21-30 -----	5,628	38	6	7.4	166	---	---	---	---	---	56	19	---	---	---	---	---	---	---
Dec. 1-10 -----	5,132	35	3	7.3	175	---	---	---	---	---	64	24	---	---	---	---	---	---	---
Dec. 11-20 -----	7,308	33	3	7.6	159	---	---	---	---	---	58	19	---	---	---	---	---	---	---
Dec. 21-31 -----	4,580	32	5	7.1	168	---	---	---	---	---	61	19	---	---	---	---	---	---	---
Jan. 1-10, 1948 ----	4,550	---	2	7.2	184	4.4	.03	24	4.1	6.0	72	19	77	6.0	3.1	106	77	18	18
Jan. 11-20 -----	3,012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Jan. 21-31 -----	2,505	---	7	7.4	221	---	---	---	---	---	---	22	---	---	---	---	---	---	---
Feb. 1-10 -----	2,574	---	3	7.3	227	---	---	---	---	---	---	22	---	---	---	4.6	---	---	---
Feb. 11-20 -----	10,615	---	10	7.1	137	---	---	---	---	---	---	19	---	---	---	5.7	---	---	---
Feb. 21-29 -----	25,439	32	8	7.0	119	---	---	---	---	---	---	15	---	---	---	---	---	---	---
Mar. 1-10 -----	13,946	32	12	7.1	139	---	---	---	---	---	---	15	---	---	---	---	---	---	---
Mar. 11-20 -----	41,012	32	15	7.1	124	---	---	---	---	---	---	17	---	---	---	3.7	---	---	---
Mar. 21-31 -----	84,688	---	15	7.3	109	---	---	---	---	---	---	16	---	---	---	2.3	---	---	---

Apr. 1-10	30,808	47	4	7.2	122	5.0	08	16	2.9	2.9	17	2.8	.1	3.2	77	52	18
Apr. 11-20	41,772	47	5	7.1	108	---	---	---	---	---	16	---	---	2.1	---	---	---
Apr. 21-30	20,568	52	5	7.2	125	---	---	---	---	---	17	---	---	2.3	---	---	---
May 1-10	11,866	55	4	7.1	150	---	---	---	---	---	15	---	---	1.6	---	---	---
May 11-20	22,886	57	5	6.9	126	---	---	---	---	---	14	---	---	1.5	---	---	---
May 21-31	27,852	73	4	6.9	118	---	---	---	---	---	13	---	---	1.6	---	---	---
June 1-10	10,298	---	5	7.0	158	---	---	---	---	---	68	---	---	1.4	---	---	---
June 11-20	8,423	---	4	7.2	167	---	---	---	---	---	71	---	---	1.5	---	---	---
June 21-30	9,673	74	6	7.0	170	---	---	---	---	---	69	---	---	2.1	---	---	---
July 1-10	6,467	78	4	7.1	165	---	---	---	---	---	71	---	---	1.1	---	---	---
July 11-20	4,690	79	5	7.2	191	---	---	---	---	---	84	---	---	1.0	---	---	---
July 21-31	5,615	77	4	7.2	171	---	---	---	---	---	71	---	---	1.1	---	---	---
Aug. 1-10	4,151	73	4	7.5	201	---	---	---	---	---	84	---	---	.9	---	---	---
Aug. 11-20	5,080	74	4	7.2	177	---	---	---	---	---	77	---	---	1.0	---	---	---
Aug. 21-31	3,086	78	3	7.2	204	---	---	---	---	---	87	---	---	.8	---	---	---
Sept. 1-10	1,736	73	7	7.5	232	---	---	---	---	---	101	---	---	1.2	---	---	---
Sept. 11-20	1,364	66	3	7.4	253	---	---	---	---	---	108	---	---	.8	---	---	---
Sept. 21-30	1,215	58	4	7.4	277	1.6	.03	33	6.4	11	108	13	.2	1.4	153	136	20
Average	12,514	55	6	---	178	---	---	---	---	---	69	---	---	---	---	---	---

SUSQUEHANNA RIVER BASIN--Continued  
 SUSQUEHANNA RIVER AT FALLS, PA.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	49	54	36	32	--	33	44	56	78	77	78	76
2	55	58	37	32	31	33	47	54	80	77	80	75
3	56	55	34	31	--	33	48	56	78	78	77	72
4	56	54	34	31	--	--	46	56	80	78	77	74
5	59	56	33	32	--	--	45	56	80	78	68	73
6	--	56	34	32	--	--	46	56	77	78	68	74
7	60	49	34	--	--	32	49	53	--	78	68	76
8	61	56	36	--	--	32	46	50	--	--	69	72
9	61	48	36	--	--	33	46	54	--	78	69	70
10	61	56	36	--	--	33	46	54	--	78	70	69
11	--	45	34	--	--	--	46	59	--	80	74	70
12	60	43	34	--	--	33	46	59	--	80	73	71
13	62	46	--	--	--	--	46	59	--	78	73	69
14	60	41	32	--	--	31	46	54	71	77	74	69
15	61	40	32	--	--	31	48	55	71	79	74	61
16	--	40	32	--	--	--	48	54	70	79	74	62
17	64	40	33	--	32	32	44	61	70	79	74	65
18	64	40	32	--	33	32	47	54	71	77	74	62
19	64	40	--	--	32	34	46	56	71	79	73	63
20	64	39	31	--	31	36	49	59	72	78	74	69
21	--	--	32	31	--	--	49	63	72	79	74	60
22	61	39	32	31	--	--	50	62	69	79	74	59
23	61	40	32	--	31	--	51	67	68	77	78	56
24	57	40	31	31	--	--	51	66	72	75	78	55
25	57	40	32	--	31	43	54	66	74	80	80	57
26	--	--	31	31	--	--	53	75	75	74	82	59
27	56	40	32	--	33	46	53	75	73	77	83	58
28	59	31	32	--	33	44	54	80	78	77	81	57
29	60	38	32	--	33	42	51	82	76	79	82	57
30	56	33	32	--	46	53	53	82	76	80	75	60
31	55	--	33	--	--	44	--	78	--	76	76	--
Average	60	45	33	--	--	--	46	62	--	78	75	66



## SUSQUEHANNA RIVER BASIN--Continued

## SUSQUEHANNA RIVER AT DANVILLE, PA.

LOCATION.--At gaging station at bridge on State Highway 54 at Danville, Montour County, three-quarters of a mile upstream from Mahoning Creek. DRAINAGE AREA.--11,220 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 528 Sept. 21-30; minimum, 111 Mar. 21-31.

Water temperatures: Maximum, 83° F. Aug. 29; minimum, freezing point on several days in December, January, and February.

EXTREMES, 1945-48.--Dissolved solids (1945-47): Maximum, 334 parts per million Sept. 11-20, 1946; minimum, 68 parts per million May 21-31, 1946.

Total hardness (1945-47): Maximum, 223 parts per million Sept. 11-20, 1946; minimum, 46 parts per million May 21-31, 1946, Apr. 1-10, 1947.

Specific conductance: Maximum, 528 Sept. 21-30, 1948; minimum, 111 Mar. 21-31, 1948.

Water temperatures: Maximum, 83° F. Aug. 29, 1948; minimum, freezing point on many days in winter months.

REMARKS.--Samples collected daily at midstream 1906-07 and at point 465 feet from north end of bridge, 1945-47. Due to cross-sectional differences in

concentration of dissolved solids, water samples also collected three times a month at points 120, 660, 880, and 1180 feet from north end of bridge 1945-48. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples, October 1945 to September 1948, available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (" F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947	2,233	60	3	7.1	449	1.6	0.05	46	19	13		31	173	10	0.1	2.5	302	193	167
Oct. 11-20	1,850	60	6	7.6	495	--	--	--	--	--	--	24	205	--	--	--	--	--	--
Oct. 21-31	1,758	59	5	7.2	514	--	--	--	--	--	--	24	208	--	--	--	--	--	--
Nov. 1-10	5,186	51	6	7.7	412	--	--	--	--	--	--	33	151	--	--	--	--	--	--
Nov. 11-20	13,565	43	4	6.9	195	--	--	--	--	--	--	38	48	--	--	--	--	--	--
Nov. 21-30	7,277	39	3	7.0	243	--	--	--	--	--	--	33	72	--	--	--	--	--	--
Dec. 1-10	5,950	39	2	7.0	262	--	--	--	--	--	--	41	77	--	--	--	--	--	--
Dec. 11-20	8,383	36	3	7.0	234	--	--	--	--	--	--	42	62	--	--	--	--	--	--
Dec. 21-31	5,666	33	2	6.8	254	--	--	--	--	--	--	35	75	--	--	--	--	--	--
Jan. 1-10, 1948	5,675	34	2	6.9	275	6.0	.04	30	9.4	7.6		40	80	6.6	.0	5.7	202	114	81
Jan. 11-20	3,901	34	2	6.8	299	--	--	--	--	--	--	40	92	--	--	--	--	--	--
Jan. 21-31	2,909	35	3	6.8	328	--	--	--	--	--	--	44	102	--	--	--	--	--	--
Feb. 1-10	3,150	34	3	6.7	348	--	--	--	--	--	--	50	105	--	--	--	--	--	--
Feb. 11-20	10,485	35	3	6.7	302	--	--	--	--	--	--	45	85	--	--	--	--	--	--
Feb. 21-29	31,144	40	5	6.6	141	--	--	--	--	--	--	26	34	--	--	4.2	--	--	--
Mar. 1-10	17,240	38	6	6.9	174	--	--	--	--	--	--	32	42	--	--	3.7	--	--	--
Mar. 11-20	45,610	39	10	7.3	159	--	--	--	--	--	--	32	38	--	--	3.5	--	--	--
Mar. 21-31	95,991	42	20	6.9	111	--	--	--	--	--	--	24	24	--	--	3.7	--	--	--

SUSQUEHANNA RIVER BASIN--Continued  
SUSQUEHANNA RIVER AT DANVILLE, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Apr. 1-10, 1948	35,120	46	3	6.8	149	4.8	0.06	17	4.5	4.4		36	33	3.1	0.0	2.7	105	61	31
Apr. 11-20	53,140	50	6	7.1	128	--	--	--	--	--	--	26	31	--	--	2.4	--	--	--
Apr. 21-30	24,010	57	3	6.7	167	--	--	--	--	--	--	34	38	--	--	2.7	--	--	--
May 1-10	14,610	58	2	6.7	207	--	--	--	--	--	--	40	50	--	--	2.8	--	--	--
May 11-20	27,840	61	3	6.9	166	--	--	--	--	--	--	36	37	--	--	3.1	--	--	--
May 21-31	31,773	66	3	6.9	146	--	--	--	--	--	--	33	33	--	--	3.0	--	--	--
June 1-10	11,750	70	3	7.0	227	--	--	--	--	--	--	42	61	--	--	2.9	--	--	--
June 11-20	9,815	70	3	6.9	237	--	--	--	--	--	--	50	60	--	--	2.1	--	--	--
June 21-30	10,372	75	3	6.9	246	--	--	--	--	--	--	46	69	--	--	1.7	--	--	--
July 1-10	7,555	73	3	6.8	259	--	--	--	--	--	--	38	68	--	--	1.8	--	--	--
July 11-20	6,140	77	2	6.8	283	--	--	--	--	--	--	32	75	--	--	1.9	--	--	--
July 21-31	6,821	79	2	6.5	290	--	--	--	--	--	--	34	94	--	--	2.1	--	--	--
Aug. 1-10	4,325	75	2	6.8	341	--	--	--	--	--	--	29	122	--	--	1.9	--	--	--
Aug. 11-20	5,584	73	2	6.8	298	--	--	--	--	--	--	57	80	--	--	1.5	--	--	--
Aug. 21-31	3,444	77	2	6.8	332	--	--	--	--	--	--	41	109	--	--	1.7	--	--	--
Sept. 1-10	1,938	75	4	7.0	436	--	--	--	--	--	--	30	168	8.0	--	2.0	--	--	--
Sept. 11-20	1,565	73	3	6.7	504	--	--	--	--	--	--	23	203	--	--	1.0	--	--	--
Sept. 21-30	1,366	72	2	6.5	528	8.0	.06	48	23	23		26	219	9.5	.2	2.6	370	214	193
Average	14,670	55	4	--	282	--	--	--	--	--	--	36	90	--	--	--	--	--	--

## SUSQUEHANNA RIVER BASIN--Continued

## SUSQUEHANNA RIVER AT DANVILLE, PA.--Continued

Chemical analyses of cross-section samples, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second- feet)	Station	Time	Tem- pera- ture (° F.)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )
Oct. 4, 1947 -----	2,260	1180	3:30 p. m.	60	6.5	399	10	166
		880		60	6.2	437	14	183
		650		60	6.7	449	20	183
		465		60	--	447	--	--
		120		60	6.9	390	44	135
Oct. 14 -----	1,850	1180	4:00 p. m.	63	6.2	458	10	196
		880		63	6.3	464	9	202
		650		63	6.6	489	12	213
		465	11:00 a. m.	62	--	--	--	--
		120	4:00 p. m.	63	6.6	430	36	161
Oct. 24 -----	1,670	1080	4:00 p. m.	60	6.4	456	16	188
		880		60	6.4	476	12	200
		650	12:00 m.	63	6.6	486	22	204
		465	4:00 p. m.	60	--	499	--	--
		120	12:00 m.	58	6.8	453	40	171
Nov. 5 -----	4,040	1180	4:00 p. m.	52	5.9	171	7	51
		880		52	6.2	306	10	113
		650		52	6.4	400	20	153
		465		53	--	438	--	--
		120		52	6.3	235	26	65
Nov. 14 -----	19,500	1180	4:00 p. m.	43	5.9	171	10	60
		880		43	6.2	176	22	52
		650		43	6.4	171	34	44
		465		42	--	172	--	--
		120		43	6.5	146	30	31
Nov. 24 -----	5,620	1180	12:00 m.	42	6.2	238	2	95
		880		42	6.3	259	8	102
		650		42	7.3	279	38	88
		465		40	--	248	--	--
		120		42	6.7	196	32	55
Dec. 4 -----	5,150	1180	4:00 p. m.	42	5.5	237	3	91
		880		42	6.3	268	4	102
		650		40	6.7	275	27	95
		465		40	--	270	--	--
		120		42	6.7	211	28	62
Dec. 14 -----	7,330	1180	3:00 p. m.	36	6.6	235	26	77
		880		36	6.6	239	33	72
		650		36	6.9	230	40	65
		465		36	--	233	--	--
		120		36	7.0	201	40	51
Dec. 24 -----	6,980	1180	2:00 p. m.	35	6.4	225	14	81
		880		33	6.5	230	21	78
		650		34	6.8	225	30	68
		465		33	--	225	--	--
		120		33	6.7	192	42	53
Jan. 4, 1948 -----	5,400	1180	2:00 p. m.	--	--	--	--	--
		880		32	6.1	241	20	81
		650		32	6.3	260	33	80
		465	4:00 p. m.	32	--	261	--	--
		120	2:00 p. m.	32	6.3	164	27	44
Jan. 14 -----	5,190	1180	5:00 p. m.	32	6.0	262	14	99
		880		32	6.3	292	25	102
		650		32	6.4	298	39	95
		465	4:00 p. m.	32	--	299	--	--
		120	5:00 p. m.	32	6.4	225	32	65
Jan. 25 -----	6,480	1180	3:00 p. m.	35	6.0	317	27	109
		880		35	6.2	340	34	113
		650		35	6.2	346	38	118
		465		34	--	341	--	--
		300		35	6.3	325	45	102
Feb. 4 -----	7,730	1200	4:00 p. m.	32	6.1	318	26	110
		850		32	6.4	340	37	111
		465		34	--	335	--	--

## SUSQUEHANNA RIVER BASIN--Continued

## SUSQUEHANNA RIVER AT DANVILLE, PA.--Continued

Chemical analyses of cross-section samples, in parts per million,  
water year October 1947 to September 1948--Continued

Date of collection	Discharge (second- feet)	Station	Time	Tem- pera- ture (° F.)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )
Feb. 24, 1948-----	26,300	1180	4:00 p. m.	40	6.0	137	14	40
		880		40	6.2	135	19	35
		650		40	6.3	132	21	32
		465		40	--	130	--	--
		120		42	6.4	120	22	26
Mar. 4 -----	18,100 18,000	1180	3:00 p. m.	36	6.2	158	13	58
		880	4:00 p. m.	36	7.3	159	21	53
		650		36	6.8	155	26	49
		465		38	--	153	--	--
		120		36	6.6	134	25	41
Mar. 14 -----	10,100	1180	2:30 p. m.	38	6.3	203	21	63
		880		38	6.4	210	26	58
		650		38	6.6	207	32	54
		465		38	--	202	--	--
		120		38	6.6	177	34	42
Mar. 24 -----	178,000	1180	12:00 m.	46	6.4	91.8	20	17
		880		46	6.2	88.0	18	14
		650		46	6.2	87.5	18	20
		465		46	--	85.8	--	--
		120		46	6.2	87.3	20	16
Apr. 4 -----	53,200	1180	1:00 p. m.	47	6.7	126	20	26
		880		47	6.7	126	27	16
		650		47	6.7	124	28	16
		465		47	--	122	--	--
		120		47	6.7	112	27	12
Apr. 14 -----	51,000	1180	4:30 p. m.	50	6.5	135	19	26
		880		50	7.0	157	36	31
		650		50	6.7	149	34	22
		465		50	--	141	--	--
		120		50	6.7	106	26	14
Apr. 24 -----	26,400	1180	4:00 p. m.	56	6.5	174	22	45
		880		56	6.5	172	30	42
		650		56	6.6	168	31	35
		465		57	--	165	--	--
		120		56	6.6	145	30	33
May 4 -----	13,200	1180	4:00 p. m.	56	6.6	209	19	65
		880		56	6.6	221	31	63
		650		58	6.8	219	41	55
		465		--	--	208	--	--
		120		60	6.7	195	38	49
May 14 -----	18,800	1180	4:30 p. m.	60	6.4	156	13	49
		880		60	6.6	189	29	53
		650		58	6.8	195	38	53
		465	3:00 p. m.	67	--	190	--	--
		120	4:30 p. m.	60	6.7	131	28	28
May 24 -----	23,700	1180	4:00 p. m.	64	6.5	165	18	50
		880		64	6.6	164	28	42
		650		64	6.6	159	33	38
		465		64	--	156	--	--
		120		64	6.7	139	34	30
June 4 -----	10,400	1180	2:00 p. m.	70	6.3	213	19	71
		880		70	6.4	223	29	68
		650		71	6.5	218	36	61
		465		70	--	213	--	--
		120		70	6.6	199	36	53
June 14 -----	9,990	1180	12:00 m.	70	6.7	455	22	133
		880		70	6.7	232	36	70
		650		70	6.8	225	46	57
		465		70	--	226	--	--
		120		70	6.7	211	43	55
June 24 -----	6,790	1180	4:00 p. m.	76	6.8	319	79	74
		880		75	6.6	283	28	94
		650		76	6.8	294	38	93
		465		75	--	295	--	--
		120		75	6.9	257	43	74

## SUSQUEHANNA RIVER BASIN--Continued

## SUSQUEHANNA RIVER AT DANVILLE, PA.--Continued

Chemical analyses of cross-section samples, in parts per million,  
water year October 1947 to September 1948--Continued

Date of collection	Discharge (second- feet)	Station	Time	Tem- pera- ture (° F.)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )
July 14, 1948 -----	10,300	1180	1:00 p. m.	75	4.8	189	--	65
				75	5.3	195	6	66
				75	6.1	216	20	63
				76	--	238	--	--
				75	6.5	210	34	52
July 24 -----	7,210	1180	1:00 p. m.	78	6.1	229	10	--
				78	6.4	291	15	--
				78	6.5	302	19	114
				78	--	318	--	--
				78	6.9	291	35	97
Sept. 4 -----	1,940	1180	3:00 p. m.	75	6.0	375	18	153
				75	6.1	398	19	165
				75	6.1	411	20	170
				75	--	422	--	--
				75	6.8	372	47	133
Sept. 14 -----	1,620	1180	4:30 p. m.	74	6.1	450	12	196
				74	5.9	468	13	210
				74	5.9	480	10	214
				74	--	520	--	--
				74	6.2	454	36	181
Sept. 25 -----	1,400	1180	2:00 p. m.	71	6.4	422	38	161
				71	6.2	476	18	204
				71	6.1	498	16	218
				71	--	526	--	--
				71	6.1	470	43	184

SUSQUEHANNA RIVER BASIN--Continued  
SUSQUEHANNA RIVER AT DANVILLE, PA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	55	55	38	32	32	38	40	60	68	72	80	77
2	56	--	45	34	32	38	45	60	71	74	80	78
3	57	53	38	38	34	38	45	60	71	70	80	--
4	60	52	40	32	34	38	47	--	70	75	68	75
5	60	53	38	32	35	35	49	56	70	75	78	76
6	64	53	38	35	34	38	50	58	71	75	75	76
7	56	53	38	35	35	38	50	58	70	72	72	74
8	63	49	38	32	--	38	42	56	70	70	--	75
9	64	46	38	35	34	38	40	60	70	74	74	72
10	62	42	38	35	34	38	48	58	69	74	72	73
11	--	46	38	32	--	35	--	66	69	78	72	73
12	60	45	37	32	34	38	50	--	70	77	74	74
13	--	45	--	--	--	38	50	60	69	--	73	78
14	62	42	36	32	35	38	50	87	70	76	73	74
15	62	42	35	32	36	38	50	58	70	75	72	74
16	62	42	35	38	36	38	50	58	70	76	74	71
17	60	42	34	37	35	38	48	60	--	74	73	71
18	58	44	35	35	34	38	50	60	71	78	74	72
19	59	42	35	36	36	40	--	60	71	--	74	72
20	58	41	--	--	36	45	52	58	70	78	73	74
21	58	42	35	33	38	38	54	--	74	80	73	74
22	60	43	34	--	38	38	55	64	70	82	73	72
23	58	--	34	35	38	44	55	65	70	78	74	71
24	60	40	33	35	40	46	57	64	75	78	74	--
25	58	38	--	34	38	45	56	65	77	76	80	71
26	58	38	34	35	40	40	57	64	77	78	74	72
27	62	36	34	38	45	40	58	68	77	80	--	72
28	58	38	33	35	40	--	58	68	78	78	80	--
29	63	39	--	--	40	40	58	65	75	80	83	71
30	60	38	32	34	--	45	60	66	75	82	78	71
31	50	--	32	--	--	40	--	66	--	--	78	--
Average	59	44	36	34	36	39	51	62	72	76	75	73

SUSQUEHANNA RIVER BASIN--Continued  
SUSQUEHANNA RIVER AT HARRISBURG, PA.

LOCATION.--At Walnut Street Bridge in Harrisburg, Dauphin County.

DRAINAGE AREA.--24,100 square miles.

RECORDS AVAILABLE.--Chemical analyses: Composites of daily samples collected from east channel station 1180, October 1944 to September 1946. Cross-section samples, one to three times monthly, October 1944 to September 1948.

Water temperatures: East channel station 1180, October 1944 to September 1946. Cross-section, October 1944 to September 1948.

EXTREMES, 1944-48.--Dissolved solids (1944-46): Maximum, 241 parts per million Feb. 1-10, 1946; minimum, 54 parts per million Mar. 11-20, 1946.

Total hardness (1944-46): Maximum, 156 parts per million Feb. 1-10, 1946; minimum, 35 parts per million Jan. 11-20, Mar. 11-20, 1946.

REMARKS.--Records of discharge for water year 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses of cross-section samples, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second- feet)	Sampling point		Temperature (° F.)	Color	pH	Specific conductance (micromhos at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Total hardness as CaCO <sub>3</sub>
		Channel	Station									
Oct. 6, 1947 -----	4, 860	East	120	60	0	4.5	618	4	291	7	2.0	252
			600	60	1	6.6	425	36	169	9	2.1	185
		West	1180	60	1	6.7	255	36	79	8	1.6	108
			600	60	1	7.0	264	60	65	9	1.5	102
			1100	60	1	7.3	322	104	56	11	1.0	138
Oct. 15 -----	4, 000	East	1300	61	0	7.3	304	156	20	7	10	135
		West	120	60	0	4.5	665	4	312	11	2.6	261
			600	59	1	6.2	480	22	188	9	2.9	189
			1180	59	1	6.9	295	44	88	7	2.1	108
Oct. 24 -----	3, 950	West	600	60	1	7.2	311	74	76	11	1.8	126
			1100	60	1	7.5	362	112	65	13	1.4	144
			1300	60	2	7.6	330	154	23	9	8.6	150
		East	120	56	0	4.7	669	4	316	9	2.2	279
			600	54	3	6.3	511	18	216	11	2.9	213
Nov. 6 -----	10, 300	West	1180	55	2	7.0	328	56	94	10	2.2	129
			600	54	2	7.2	336	86	76	12	2.1	126
			1100	55	3	7.5	349	120	58	13	1.2	135
		East	1300	55	2	7.6	339	154	30	8	5.6	150
		East	120	52	1	4.40	543	4	248	6	3.6	240
			600	52	3	6.4	433	22	169	11	3.6	183
		West	1180	51	3	6.7	263	46	72	8	4.3	120
			600	52	5	7.0	261	92	42	8	4.6	123
			1100	52	12	6.9	167	53	26	5	8.6	74
			1320	51	12	7.2	264	124	25	12	135	

SUSQUEHANNA RIVER BASIN--Continued  
SUSQUEHANNA RIVER AT HARRISBURG, PA.--Continued

Chemical analyses of cross-section samples, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Discharge (second- feet)	Sampling point		Temperature (° F.)	Color	pH	Specific conductance (micromhos at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Total hardness as CaCO <sub>3</sub>
		Channel	Station									
Nov. 14, 1947 -----	38,000	East	120	41	2	4.5	255	4	99	7	5.2	111
			600	41	1	6.5	209	36	53	7	4.7	93
			1180	40	1	6.3	171	14	51	5	5.8	69
		West	600	41	2	6.1	173	14	52	7	6.0	69
			1100	41	4	6.7	185	46	38	5	8.0	76
Nov. 25 -----	17,800	East	1320	41	3	6.8	170	49	21	6	12	70
			120	39	2	4.6	319	4	129	3	4.1	129
			600	38	2	6.4	243	26	76	3	3.9	102
		West	1180	38	1	6.5	161	21	44	3	3.2	63
			600	39	2	7.1	238	70	45	5	3.9	102
Dec. 4 -----	14,400	East	1100	40	7	7.5	241	108	20	5	8.8	111
			1320	41	3	7.1	252	110	19	3	10	117
			120	37	1	4.7	362	6	149	6	4.2	153
		West	600	36	2	6.5	247	32	71	7	4.0	108
			1180	36	1	6.6	135	14	39	4	3.0	56
Feb. 27, 1948 -----	52,000	East	600	36	1	6.8	146	26	33	3	3.4	45
			1100	36	2	7.1	228	70	42	7	2.9	60
			1320	36	1	7.6	291	134	17	3	13	96
		West	120	36	1	5.6	194	6	75	4	2.8	76
			600	35	3	6.1	144	22	45	5	2.8	63
Mar. 9 -----	35,000	East	1180	35	3	6.1	111	10	38	3	3.4	45
			600	35	6	6.0	104	13	34	3	2.9	42
			1100	37	7	6.4	139	40	26	4	4.8	57
		West	1320	34	6	6.5	142	50	35	4	6.1	62
			120	36	1	5.9	219	10	75	3	4.1	84
Mar. 18 -----	165,000	East	600	35	2	6.4	180	26	55	6	5.0	72
			1180	35	2	6.4	116	8	41	4	1.9	46
			600	36	3	6.7	121	20	34	4	2.8	52
		West	1100	38	4	6.7	151	48	33	4	5.8	64
			1320	38	4	7.3	229	126	28	2	10	106
		East	120	41	4	6.2	170	9	57	4	1.5	66
			600	40	1	6.5	192	44	48	5	1.5	86
			1180	40	2	6.3	150	28	44	4	1.4	57
		West	600	40	4	6.1	108	16	32	2	2.3	42
			1100	41	8	6.6	142	38	35	4	4.6	63
			1320	42	8	6.7	167	52	31	4	6.9	74



Mar. 30-----	73,300	East	120	44	3	6.6	188	25	67	5	3.2	81
			600	44	3	6.6	150	32	39	4	3.8	60
			1180	44	4	6.9	133	30	36	4	2.5	56
			West	600	46	3	6.5	167	41	4	2.6	50
Apr. 9-----	56,700	East	1100	46	6	6.9	138	43	33	4	4.4	66
			1320	47	6	7.1	191	78	33	4	7.2	90
			120	47	3	6.5	205	14	79	6	3.1	87
			600	47	5	6.5	171	27	56	4	2.4	69
Apr. 20-----	89,100	West	1180	47	3	6.4	120	20	34	4	2.4	50
			600	48	5	6.6	103	19	33	3	2.6	45
			1100	49	5	7.1	142	48	31	3	3.9	64
			1320	50	4	6.7	149	45	31	6	3.6	69
Apr. 30-----	53,600	East	120	50	3	6.5	176	12	64	7	3.1	78
			600	50	4	6.5	143	17	47	2	3.3	64
			1180	49	5	6.2	111	10	42	4	2.8	51
			West	600	51	4	6.3	106	8	3	2.6	50
May 10-----	67,600	East	1100	52	3	7.0	135	42	28	4	4.0	68
			1320	53	3	7.2	167	64	26	4	5.4	84
			120	52	4	6.3	257	10	90	15	2.2	108
			600	52	4	6.8	187	28	58	3	2.4	78
May 20-----	78,700	West	1180	52	3	6.3	118	10	58	5	2.0	63
			600	50	3	6.8	131	30	38	4	2.5	66
			1100	50	3	7.2	163	50	30	4	3.8	57
			1320	49	3	7.4	210	98	29	12	6.8	93
May 30-----	89,100	East	120	55	3	6.4	199	12	78	3	2.8	93
			600	55	6	6.4	133	20	44	4	2.2	60
			1180	55	8	6.2	93.9	10	38	3	2.6	44
			West	600	55	8	6.7	104	26	2	2.0	51
May 40-----	99,100	East	1100	55	7	7.0	127	44	38	2	3.3	64
			1320	56	4	7.1	189	82	33	4	6.8	92
			120	55	2	6.6	179	9	68	4	2.5	74
			600	55	3	6.5	148	26	44	4	2.3	69
May 50-----	109,100	West	1180	55	6	6.6	107	24	32	3	1.7	51
			600	56	4	6.4	96.8	14	36	2	1.8	43
			1100	56	4	6.8	129	40	30	4	3.8	66
			1320	56	2	7.1	181	84	25	4	5.4	98

SUSQUEHANNA RIVER BASIN--Continued  
SUSQUEHANNA RIVER AT HARRISBURG, PA.--Continued

Chemical analyses of cross-section samples, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Discharge (second- feet)	Sampling point		Temperature (° F.)	Color	pH	Specific conductance (microhmios at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Total hardness as CaCO <sub>3</sub>
		Channel	Station									
June 1, 1948-----	39,300	East	120	65	3	5.9	233	12	100	6	2.4	116
			600	65	4	6.7	183	30	58	4	2.7	87
		West	1180	66	4	6.7	134	28	42	4	4.0	69
			600	66	8	6.9	124	31	40	4	1.6	58
June 10 -----	21,300	East	1100	66	4	7.0	163	60	53	4	2.6	90
			1320	66	6	7.1	200	96	48	4	5.2	120
		West	120	65	1	4.9	353	2	200	3	2.1	136
			600	65	2	6.6	259	38	89	5	2.2	117
June 21 -----	30,500	East	1180	68	1	6.5	183	32	59	4	2.4	84
			600	65	2	6.8	161	36	44	3	2.2	78
		West	1100	66	2	7.1	201	78	38	5	2.2	90
			1320	66	2	7.4	303	146	22	5	6.4	141
July 1-----	26,000	East	120	71	1	6.1	316	14	132	4	2.2	129
			600	73	1	6.6	219	36	67	4	2.1	102
		West	1180	78	4	6.7	177	64	31	4	3.7	87
			600	68	5	6.7	166	56	30	3	2.3	72
July 1-----	26,000	East	1100	66	6	6.6	141	49	25	2	3.3	66
			1320	65	6	6.8	183	82	21	2	5.0	87
		West	120	75	1	6.2	238	24	84	4	2.8	105
			600	75	1	6.5	172	40	44	4	3.5	78
July 9 -----	12,800	East	1180	75	1	6.5	155	38	39	4	3.3	72
			600	75	2	6.5	141	26	49	2	2.0	60
		West	1100	75	3	6.9	184	60	39	3	3.7	75
			1320	75	2	7.0	257	118	21	3	5.8	123
July 9 -----	12,800	East	120	72	1	6.0	358	10	165	4	4.0	156
			600	74	1	6.5	270	38	99	5	2.2	108
		West	1180	73	1	6.4	187	26	69	4	2.0	84
			600	73	1	6.4	194	44	55	5	2.3	97
July 9 -----	12,800	West	1100	73	1	7.2	238	80	40	5	2.8	99
			1320	72	1	7.2	288	140	28	4	7.0	132

July 19-----	11,600	East	120	76	3	4.6	374	0	143	4.0	2.0	162
			600	76	4	6.5	250	16	82	5.0	2.0	102
			1180	76	4	7.5	194	26	60	4.5	1.5	78
			600	76	2	7.5	195	10	55	4.5	2.0	81
		West	1100	77	4	7.3	261	90	42	6.8	1.5	104
			1320	76	4	7.2	321	158	22	7.0	8.0	162
Aug. 2-----	9,370	East	120	75	3	5.6	420	2	173	7.8	1.2	188
			600	76	4	6.5	297	30	98	7.0	1.2	126
			1180	76	4	7.6	163	19	49	3.8	1.8	63
			600	76	4	6.3	154	20	44	3.8	1.6	63
		West	1100	77	4	7.1	277	84	56	7.2	1.0	114
			1320	75	4	7.2	334	160	21	8.5	7.0	154
Aug. 20-----	10,300	East	120	70	10	6.2	350	12	142	--	2.0	175
			600	71	10	6.8	276	50	81	7	1.5	141
			1180	71	15	6.6	235	46	64	5	1.6	125
			600	71	12	6.7	218	36	60	8	1.5	94
		West	1100	72	10	7.1	285	86	58	8	1.0	135
			1320	71	10	7.1	292	138	19	7	7.0	148
Sept. 1-----	5,100	East	120	66	10	6.0	491	7	214	7	1.2	240
			600	66	10	6.6	374	34	139	6	1.0	183
			1180	65	10	6.8	270	40	87	8	1.6	128
			600	65	10	6.9	261	42	72	7	1.2	127
			1100	64	10	7.1	314	90	68	9	1.6	146
			1380	63	10	7.2	278	124	23	10	5.0	162

SUSQUEHANNA RIVER BASIN--Continued  
WEST BRANCH SUSQUEHANNA RIVER AT LOCK HAVEN, PA.

LOCATION.--In north channel at bridge on northeast side of Great Island, and 2 miles downstream from Lock Haven, Clinton County.  
DRAINAGE AREA.--3 337 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 562 Sept. 21-30; minimum, 109 Mar. 21-31.

Water temperatures: Maximum, 76° F. July 15, 17, 31, Aug. 26, 29; minimum, freezing point Dec. 1, 4, Jan. 15.

EXTREMES, 1945-48.--Dissolved solids (1945-47): Maximum, 262 parts per million Sept. 21-30, 1946; minimum, 51 parts per million Mar. 1-10, 1946.

Total hardness (1945-47): Maximum, 177 parts per million Sept. 21-30, 1946; minimum, 29 parts per million Mar. 1-10, 1946.

Specific conductance: Maximum, 562 Sept. 21-30, 1948; minimum, 109 Mar. 21-31, 1948.

Water temperatures: Maximum, 78° F. July 12, 1946; minimum, freezing point on many days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 based on records for West Branch Susquehanna River at Renovo, Pa., which are given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Tem- per-a- ture (° F.)	Color	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Alum- inum (Al)	Iron (Fe)	Man- ga- nese (Mn)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dis- solved solids	Hardness as CaCO <sub>3</sub>		Total acid- ity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non- carbon- ate	
Oct. 1-10, 1947 -	537	55	1	3.60	407	6.0	3.2	0.10	0.60	28	10	8.8		0	147	6.4	0.0	1.0	219	144		47
Oct. 11-20 -	435	59	2	3.60	514	7.4	5.6	.34	1.0	36	14	5.4		0	188	7.2	.2	.1	296	195		64
Oct. 21-31 -	470	55	3	3.50	537									0	200	6.9		1.0				72
Nov. 1-10 -	1,293	49	5	3.45	553									0	197	8						64
Nov. 11-20 -	2,692	41	2	3.95	227									0	80	6						24
Nov. 21-30 -	4,873	39	5	3.95	198									0	67	2						19
Dec. 1-10 -	4,150	34	0	4.00	168									0	56	4						18
Dec. 11-20 -	4,984	34	1	4.10	147									0	49	2						13
Dec. 21-31 -	2,630	33	2	3.89	183									0	61	2						19
Jan. 1-10, 1948 -	5,312	33	3	3.83	197	5.7	1.5	.02	.34	13	4.9	3.2	1.4	0	65	2.5	.1	1.0	104	70		20
Jan. 11-20 -	3,191	32	4	3.83	212									0	72	2						22
Jan. 21-31 -	1,928	32	1	3.65	268									0	89	3						30
Feb. 1-10 -	1,294	32	1	3.65	317									0	107	4						35
Feb. 11-16 -	5,940	--	1	3.70	329									0	113	4						40
Feb. 17-20 -	1,605	--	1	4.35	138									0	46	1						14
Feb. 21-29 -	13,341	33	1	4.10	133									0	41	1						16
Mar. 1-10 -	9,601	36	1	4.05	135									0	43	2		1.2	--	--		15
Mar. 11-20 -	11,677	38	1	4.20	137									0	45	2		1.3	--	--		15
Mar. 21-31 -	15,711	48	0	4.10	109									0	35	1.5		1.3	--	--		10

Apr. 1-10	9,196	49	0	4.00	122	4.6	.8	.02	.21	8.2	3.3	1.0	0	40	1.6	.1	2.8	67	44	14
Apr. 11-20	36,668	48	1	4.10	138	---	---	---	---	---	---	---	0	42	1.6	---	1.2	---	---	14
Apr. 21-30	11,100	51	0	3.95	167	---	---	---	---	---	---	---	0	53	1	---	.7	---	---	14
May 1-10	12,926	52	0	4.10	123	---	---	---	---	---	---	---	0	43	2	---	.9	---	---	17
May 11-20	10,432	58	0	4.10	121	---	---	---	---	---	---	---	0	40	1	---	.7	---	---	13
May 21-31	6,777	61	5	4.25	112	---	---	---	---	---	---	---	0	38	2	---	.6	---	---	12
June 1-10	2,834	64	0	4.15	187	---	---	---	---	---	---	---	0	67	2	---	.6	---	---	12
June 11-20	2,927	67	2	4.00	242	---	---	---	---	---	---	---	0	90	2	---	.8	---	---	20
June 21-30	5,743	70	1	4.05	183	---	---	---	---	---	---	---	0	62	2	---	1.2	---	---	29
July 1-10	2,233	72	2	3.95	225	---	---	---	---	---	---	---	0	80	1	---	1.2	---	---	22
July 11-20	1,891	75	1	3.90	279	---	---	---	---	---	---	---	0	102	4	---	1.5	---	---	28
July 21-31	4,057	71	1	4.40	163	---	---	---	---	---	---	---	0	59	2	---	1.2	---	---	35
Aug. 1-10	1,994	70	1	4.10	237	---	---	---	---	---	---	---	0	88	2	---	1.1	---	---	20
Aug. 11-20	1,595	70	1	3.95	288	---	---	---	---	---	---	---	0	109	4	---	.6	---	---	29
Aug. 21-31	9,940	74	5	4.10	315	---	---	---	---	---	---	---	0	116	6	---	.5	---	---	36
Sept. 1-10	528	69	5	3.90	395	8.0	6.5	.07	1.4	30	12	.9	0	157	4.8	.1	1.5	249	170	59
Sept. 11-20	462	66	5	3.80	494	---	---	---	---	---	---	---	0	192	10	---	.5	---	---	48
Sept. 21-30	332	60	5	3.75	562	---	---	---	---	---	---	---	0	226	9	---	.5	---	---	92
Average	5,795	51	2	---	243	---	---	---	---	---	---	---	0	89	3.4	---	1.0	---	---	94

## NORTH ATLANTIC SLOPE BASINS

SUSQUEHANNA RIVER BASIN--Continued  
 WEST BRANCH SUSQUEHANNA RIVER AT LOCK HAVEN, PA.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	52	54	31	33	32	34	48	51	62	72	73	70
2	52	50	32	33	32	36	50	51	64	70	73	67
3	51	47	33	33	32	36	48	52	65	69	73	66
4	52	50	31	33	32	35	48	53	67	70	70	69
5	53	48	32	33	32	36	46	53	58	72	70	71
6	58	50	32	33	32	34	50	54	65	74	69	70
7	59	46	33	33	32	38	52	--	64	73	68	71
8	58	48	39	32	32	37	52	49	64	73	68	70
9	57	45	37	33	32	39	51	50	63	74	67	69
10	56	47	36	33	32	37	49	51	62	--	67	70
11	55	45	36	33	32	37	49	55	65	74	69	68
12	55	46	34	33	32	33	49	60	67	74	68	65
13	57	40	33	34	32	33	47	60	68	75	70	66
14	58	40	33	32	32	35	46	59	67	74	71	67
15	56	43	32	31	33	37	44	62	67	76	72	65
16	56	42	35	32	33	36	47	59	68	75	71	63
17	63	39	36	32	33	38	49	56	68	76	70	66
18	65	38	33	32	34	40	49	57	67	75	69	64
19	67	39	34	32	33	42	48	54	67	74	70	67
20	61	40	34	32	34	46	50	53	67	73	71	67
21	57	39	33	33	34	47	49	57	68	73	69	66
22	60	39	33	32	33	48	51	59	65	73	71	64
23	56	40	33	32	33	48	51	56	65	72	73	59
24	54	40	33	32	33	48	51	56	68	70	74	60
25	53	41	33	32	33	51	51	68	69	70	75	59
26	50	41	32	32	33	53	52	60	70	68	76	56
27	54	40	33	32	34	51	54	62	72	69	74	55
28	56	39	34	32	33	46	54	64	72	68	75	56
29	55	37	32	32	--	48	49	63	72	70	76	68
30	56	33	33	32	--	46	49	60	74	73	75	60
31	54	--	33	32	--	47	--	62	--	76	75	--
Average	56	43	33	32	33	41	49	57	67	73	71	65

## SUSQUEHANNA RIVER BASIN--Continued

## WEST BRANCH SUSQUEHANNA RIVER AT LEWISBURG, PA.

LOCATION.--At gaging station at Market Street Bridge at Market Street Bridge at Lewisburg, Union County, 560 feet from east bank of river.

DRAINAGE AREA.--6,847 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1944 to September 1948.

Water temperatures: October 1944 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 308 Sept. 21-30; minimum, 80.2 Mar. 21-31.

Water temperatures: Maximum, 83° F. Aug. 26; minimum, freezing point on many days in December, January, and February.

EXTREMES, 1944-48.--Dissolved solids (1944-47): Maximum, 219 parts per million Oct. 1-10, 1944; minimum, 46 parts per million May 1-10, 1945.

Total hardness (1944-47): Maximum, 133 parts per million Oct. 1-10, 1944; minimum, 26 parts per million May 21-31, 1946.

Specific conductance: Maximum, 318 Oct. 1-10, 1944; minimum, 72.0 May 21-31, 1946.

Water temperatures: Maximum, 83° F. Aug. 26, 1948; minimum, freezing point on many days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Oct. 1-10, 1947 -	1,425	60	5	7.1	211	2.5	0.00	0.00	22	6.3	7.4		23	65	7.0	0.1	0.6	132	81	62
Oct. 11-20 -	1,147	64	5	6.7	245	1.3	.01	.00	25	7.5	8.2		27	76	8.5		1.6	152	93	75
Oct. 21-31 -	1,179	61	7	6.8	281								26	91	11					
Nov. 1-10 -	2,815	51	8	6.7	249								18	81	8					
Nov. 11-20 -	6,829	42	1	6.1	157								6	55	6					
Nov. 21-30 -	6,859	37	1	6.4	145								10	47	4					
Dec. 1-10 -	5,603	34	5	6.3	120								7	39	2					
Dec. 11-20 -	7,339	32	4	5.9	125								7	43	2					
Dec. 21-31 -	4,395	32	4	6.4	126								8	42	2					
Jan. 1-10, 1948 -	7,893	32	3	6.0	132	4.3	.02	.00	12	4.1	4.8		4	46	3	1.1	1.6	83	47	44
Jan. 11-20 -	4,884	31	1	5.8	139								6	48	2					
Jan. 21-31 -	3,229	--	1	6.3	162								10	53	4					
Feb. 1-10 -	2,410	--	6	6.3	189								12	64	5					
Feb. 11-17 -	8,957	--	5	6.2	196								8	71	4					
Feb. 18-20 -	30,000	--	3	6.3	106								8	36	1					
Feb. 21-29 -	24,100	--	1	5.3	94.6								2	32	1					
Mar. 1-10 -	17,230	--	2	5.8	97.3								4	33	1	1.5				
Mar. 11-20 -	24,673	44	10	6.0	104								6	34	2					
Mar. 21-31 -	36,545	48	1	5.7	80.2								6	25	1.9					

SUSQUEHANNA RIVER BASIN--Continued  
WEST BRANCH SUSQUEHANNA RIVER AT LEWISBURG, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Apr. 1-10, 1948 -	22,770	49	5	6.1	90.1	4.5	0.02	0.06	8.7	3.1	1.4		5	28	1.8	0.1	1.7	56	34	30
Apr. 11-20 -	60,570	47	2	5.3	91.2	--	--	--	--	--	--	--	4	30	1.6	--	1.8	--	--	--
Apr. 21-30 -	18,760	53	2	5.4	114	--	--	--	--	--	--	--	7	40	1	--	1.4	--	--	--
May 1-10 -	22,560	53	5	5.7	101	--	--	--	--	--	--	--	2	35	2	--	1.2	--	--	--
May 11-20 -	21,120	58	0	6.2	97.4	--	--	--	--	--	--	--	6	30	2	--	1.4	--	--	--
May 21-31 -	14,614	61	0	6.4	92.8	--	--	--	--	--	--	--	9	27	2	--	1.1	--	--	--
June 1-10 -	5,811	69	2	6.4	132	--	--	--	--	--	--	--	9	41	2	--	1.8	--	--	--
June 11-20 -	4,514	71	2	6.3	168	--	--	--	--	--	--	--	10	57	4	--	1.5	--	--	--
June 21-30 -	7,145	74	1	6.2	145	--	--	--	--	--	--	--	8	48	3	--	1.6	--	--	--
July 1-10 -	3,608	78	2	6.4	161	--	--	--	--	--	--	--	9	54	3	--	1.1	--	--	--
July 11-20 -	3,469	79	3	6.4	178	--	--	--	--	--	--	--	10	60	4	--	1.8	--	--	--
July 21-31 -	7,366	77	1	6.4	147	--	--	--	--	--	--	--	8	49	3	--	1.4	--	--	--
Aug. 1-10 -	3,326	75	1	7.0	156	--	--	--	--	--	--	--	15	48	4	--	1.3	--	--	--
Aug. 11-20 -	2,655	74	1	6.8	190	--	--	--	--	--	--	--	10	66	5	--	1.2	--	--	--
Aug. 21-31 -	1,955	80	1	6.8	213	--	--	--	--	--	--	--	13	72	7	--	1.5	--	--	--
Sept. 1-10 -	1,143	76	13	6.9	237	4.8	.01	.00	24	7.8	7.5		22	74	7.9	.2	1.7	145	92	74
Sept. 11-20 -	1,103	74	5	7.4	281	--	--	--	--	--	--	--	31	86	10	--	1.7	--	--	--
Sept. 21-30 -	8,959	66	2	7.3	308	--	--	--	--	--	--	--	25	102	10	--	1.4	--	--	--
Average	10,410	54	3	--	158	--	--	--	--	--	--	--	11	52	4.0	--	1.5	--	--	--



## SUSQUEHANNA RIVER BASIN

115

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	55	55	33	32	31	41	51	53	68	79	79	75
2	57	53	33	32	31	43	47	55	74	77	79	75
3	57	53	36	32	31	42	47	53	--	78	78	75
4	60	50	35	32	31	46	47	55	71	81	70	77
5	60	50	34	31	--	46	49	54	70	81	75	78
6	62	53	34	32	--	46	49	55	68	78	72	77
7	62	52	34	31	31	--	50	53	69	75	74	76
8	62	50	34	31	31	--	47	50	69	77	73	80
9	60	45	34	31	31	--	51	52	67	78	73	76
10	60	45	34	32	--	42	48	53	69	79	72	72
11	61	45	33	31	31	--	46	60	69	80	71	71
12	61	45	34	32	31	45	48	60	70	81	71	75
13	63	43	32	32	31	45	46	61	70	79	75	77
14	63	43	33	31	--	44	--	59	72	79	75	75
15	64	40	32	31	31	41	45	--	72	80	76	71
16	65	40	33	31	--	44	46	57	70	79	77	--
17	65	40	32	31	37	44	47	58	70	77	76	72
18	66	40	32	31	38	45	48	57	72	80	69	73
19	65	41	32	31	37	45	49	56	72	79	73	74
20	65	40	31	31	34	47	52	54	72	79	72	75
21	65	39	32	31	--	49	--	55	72	79	80	69
22	65	38	32	31	--	48	54	56	70	80	76	67
23	65	40	32	31	--	48	52	57	--	78	77	65
24	59	40	32	--	43	52	58	58	73	78	79	62
25	57	38	32	31	41	50	55	60	74	73	81	63
26	60	36	31	31	39	--	52	62	74	72	83	67
27	61	36	32	31	40	50	56	63	66	75	83	67
28	60	35	31	31	40	47	53	64	76	76	80	67
29	61	33	31	31	40	47	52	65	80	77	79	66
30	59	34	31	--	--	48	51	66	79	79	82	66
31	55	--	32	--	--	48	--	66	--	80	78	--
Average	63	43	32	31	--	--	50	58	71	78	76	72

SUSQUEHANNA RIVER BASIN--Continued  
FRANKSTOWN BRANCH JUNIATA RIVER AT HUNTINGDON, PA.

LOCATION.--At gaging station at Fourth Street Bridge at Huntingdon, Huntingdon County.

DRAINAGE AREA.--816 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 241 parts per million Oct. 21-31; minimum, 109 parts per million May 1-10.

Total hardness: Maximum, 175 parts per million Oct. 21-31; minimum, 79 parts per million Feb. 21-29.

Water temperatures: Maximum, 78° F. Aug. 1-5, 28-30; minimum, 32° F. Jan 23-Feb. 2.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Oct. 1-10, 1947	224	57	12	7.4	387	3.1	0.02	0.00	44	13	14	2.7	152	34	24	0.1	4.2	221	163	39
Oct. 11-20	184	62	15	7.5	410	4.5	0.02	0.00	45	14	16	3.0	162	34	26	.2	3.5	231	170	37
Oct. 21-31	282	60	15	7.5	424	6.0	0.02	0.00	47	14	16	3.3	163	35	29	.1	3.5	231	170	41
Nov. 1-10	384	35	20	7.3	366	6.3	0.03	0.00	44	12	14	3.3	139	40	24	.2	4.9	222	155	45
Nov. 11-20	850	41	24	7.3	307	8.7	0.04	0.00	36	8.3	10	3.3	104	38	16	.1	4.2	179	128	43
Nov. 21-30	1,088	40	23	7.4	274	6.6	0.06	0.00	32	8.2	8.7	2.6	91	36	13	.1	4.5	162	114	39
Dec. 1-10	700	39	17	7.2	266	5.6	0.04	0.00	32	8.7	9.4	2.3	96	34	12	0	4.5	162	116	37
Dec. 11-20	655	36	13	6.9	263	6.0	0.03	0.00	29	8.5	9.8	2.0	87	34	14	.1	4.5	155	107	36
Dec. 21-31	440	37	14	7.1	303	5.8	0.02	0.00	34	10	11	2.1	109	34	15	.1	5.4	116	126	37
Jan. 1-10, 1948	1,223	39	22	7.0	241	5.6	0.03	0.00	27	7.7	9.1	2.1	77	33	11	.2	5.2	142	126	36
Jan. 11-20	685	34	22	7.1	270	5.9	0.06	0.00	30	9.0	10	1.9	94	33	15	.2	5.6	157	112	35
Jan. 21-31	337	33	22	7.2	317	6.2	0.06	0.00	36	11	113	2.0	113	36	17	.1	5.7	186	135	42
Feb. 1-10	290	34	30	7.3	332	5.7	0.06	0.00	38	11	12	2.0	124	34	19	.1	4.8	193	140	38
Feb. 11-20	1,748	37	15	6.9	260	6.6	0.02	0.00	30	7.9	8.2	2.2	90	31	12	.1	5.7	155	107	34
Feb. 21-30	1,728	36	17	7.1	181	7.1	0.02	0.00	22	5.8	4.8	1.4	62	26	5.8	.1	4.4	113	79	26
Mar. 1-10	1,566	40	6	7.1	205	6.7	0.05	0.00	24	6.4	5.2	1.2	68	29	7.6	.1	4.4	120	86	30
Mar. 11-20	2,182	41	12	7.1	219	6.2	0.09	0.00	26	6.7	5.7	1.3	80	28	7.1	.1	4.2	130	92	27
Mar. 21-31	2,125	49	5	7.2	204	9.9	0.07	0.00	24	6.3	5.2	1.2	74	28	5.2	.1	4.0	125	86	25
Apr. 1-10	1,978	52	16	7.3	201	6.5	0.10	0.00	25	6.4	4.4	1.2	76	27	5.5	.1	3.7	119	89	26
Apr. 11-20	2,562	51	10	7.0	192	6.9	0.07	0.00	24	6.4	4.1	1.7	75	28	4.2	.2	4.6	117	86	30
Apr. 21-30	2,986	56	10	7.1	219	6.5	0.03	0.00	27	7.7	5.2	1.7	82	27	5.4	.2	5.0	130	99	32
May 1-10	3,234	54	10	7.0	181	5.5	0.04	0.00	22	6.0	4.7	1.4	60	27	5.1	.2	4.0	109	80	30
May 11-20	2,666	58	10	7.1	195	5.8	0.04	0.00	25	6.9	4.4	1.5	71	27	4.4	.2	4.1	117	91	33
May 21-31	1,007	62	10	7.2	250	3.7	0.02	0.00	31	9.0	6.6	1.4	98	28	7.9	.2	4.3	145	114	34

June 1-10, 1948-----	596	67	20	7.3	288	4.4	0.03	--	32	10	11	2.6	122	28	-12	0.1	5.0	162	121	21
June 11-20-----	1,152	69	30	7.3	296	5.8	.03	--	34	10	12	2.1	117	37	12	.1	5.0	171	126	30
June 21-30-----	1,379	70	25	7.2	236	8.4	.03	--	30	7.6	6.7	1.8	95	30	7.8	.1	4.6	144	106	28
July 1-10-----	497	73	25	7.2	298	5.0	.00	--	34	11	11	1.9	123	31	10	.0	5.5	170	130	29
July 11-20-----	332	74	25	7.4	327	4.8	.02	--	41	11	10	1.5	133	31	16	.1	4.6	188	145	36
July 21-31-----	384	76	10	7.2	339	3.3	.01	0.00	39	11	11	2.6	134	33	18	.1	3.9	193	143	33
Aug. 1-10-----	319	75	15	7.3	370	5.3	.00	.00	39	13	14	3.1	152	33	22	.1	4.0	209	151	26
Aug. 11-20-----	320	72	15	7.4	375	2.4	.01	.00	42	14	14	2.9	154	34	24	.1	4.1	213	162	36
Aug. 21-31-----	343	75	15	7.3	361	4.1	.02	.00	41	12	14	3.7	136	46	22	.1	5.4	209	152	40
Sept. 1-10-----	302	75	15	7.4	394	2.2	.02	.00	44	14	13	2.7	160	33	24	.1	4.1	221	168	36
Sept. 11-20-----	260	73	15	6.7	384	5.0	.05	.00	43	14	13	3.2	154	35	22	.1	4.4	215	165	39
Sept. 21-30-----	256	65	10	7.0	384	5.6	.02	.00	42	15	16	2.5	162	33	26	.1	4.2	232	164	34
Average -----	1,103	55	16	--	293	5.7	0.04	0.00	34	9.8	9.9	2.2	111	32	14	0.1	4.6	170	125	34

SUSQUEHANNA RIVER BASIN--Continued  
FRANKTOWN BRANCH JUNIATA RIVER AT HUNTINGDON, PA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	50	58	32	38	32	44	54	54	66	72	78	78
2	45	58	38	38	32	44	50	54	68	72	78	78
3	58	56	40	40	34	44	48	54	66	72	78	78
4	60	54	40	38	34	42	48	54	68	74	78	74
5	60	56	40	40	34	38	50	56	68	74	78	74
6	62	56	--	40	34	38	54	56	68	74	74	76
7	56	52	42	38	34	38	54	54	68	74	74	74
8	62	52	42	40	34	38	56	50	66	74	70	74
9	60	52	40	36	34	38	50	54	66	72	70	76
10	60	50	36	34	34	40	52	58	68	74	70	74
11	60	48	38	36	34	38	50	60	68	72	74	72
12	62	46	38	36	36	36	50	60	68	74	72	72
13	60	40	36	38	36	36	50	60	68	74	70	74
14	62	40	36	36	36	38	48	58	70	74	72	72
15	62	40	36	32	34	40	50	58	70	74	74	72
16	62	40	38	32	47	44	50	58	70	74	70	74
17	63	40	40	32	36	46	52	58	70	74	70	72
18	60	40	40	32	38	46	50	57	70	76	72	72
19	62	40	38	32	38	--	52	58	70	76	72	74
20	64	40	36	--	36	48	56	58	68	76	72	72
21	64	40	40	36	36	50	56	58	70	76	72	70
22	62	40	36	40	34	50	58	58	--	74	72	68
23	62	42	40	32	36	50	54	70	70	76	74	68
24	60	42	38	32	36	50	56	--	70	76	74	68
25	58	42	36	32	--	50	--	60	70	76	74	--
26	60	40	36	32	38	50	58	60	70	76	76	62
27	62	40	36	32	38	50	58	62	70	76	78	64
28	60	40	36	32	42	46	56	64	70	76	78	64
29	60	38	32	32	40	46	52	64	72	76	78	62
30	58	36	32	32	--	48	52	66	72	78	78	62
31	58	--	36	32	--	48	--	66	--	78	76	--
Average	60	45	38	35	36	44	53	58	69	75	74	71

## SUSQUEHANNA RIVER BASIN--Continued

## JUNIATA RIVER AT NEWPORT, PA.

LOCATION.--At gaging station at bridge on State Highway 34, at Newport, Perry County, 230 feet from west bank of river.  
DRAINAGE AREA.--334 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1944 to September 1948.

Water temperatures: October 1944 to September 1948: 45 Sept. 21-30; minimum, 120 May 1-10.

EXTREMES, 1947-48.--Specific conductance: Maximum, 32 F. Aug. 1-3, 26-30; minimum, 32 F. Jan. 23-Feb. 2.

Water temperatures: Maximum, 86 F. Aug. 29, 1948; minimum, freezing point on many days in winter months.

EXTREMES, 1944-48.--Dissolved solids (1944-47): Maximum, 282 parts per million Oct. 1-10, 1944; minimum, 78 parts per million Mar. 1-10, 1945, May 21-31, 1946.

Total hardness (1944-47): Maximum, 167 parts per million Oct. 1-10, 1944; minimum, 50 parts per million May 21-31, 1946.

Specific conductance: Maximum, 44 Oct. 1-10, 1944; minimum, 120 May 1-10, 1948.

Water temperatures: Maximum, 86 F. Aug. 29, 1948; minimum, freezing point on many days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Oct. 1-10, 1947-----	659	58	5	7.7	363	1.4	0.01	0.00	39	11	18		112	66	15	0.0	1.3	213	143	51
Oct. 11-20-----	621	63	7	7.4	375	--	--	--	--	--	--	--	117	69	15	--	--	--	--	--
Oct. 21-31-----	707	61	5	7.5	375	--	--	--	--	--	--	--	122	65	16	--	--	--	--	--
Nov. 1-10-----	1,854	51	12	7.4	283	--	--	--	--	--	--	--	90	46	12	--	--	--	--	--
Nov. 11-20-----	3,303	42	30	6.7	199	--	--	--	--	--	--	--	57	30	8	--	--	--	--	--
Nov. 21-30-----	3,361	39	8	7.1	229	--	--	--	--	--	--	--	71	40	6	--	--	--	--	--
Dec. 1-10-----	2,026	36	12	7.2	229	--	--	--	--	--	--	--	74	38	6	--	--	--	--	--
Dec. 11-20-----	1,819	34	10	7.2	231	--	--	--	--	--	--	--	71	40	6	--	--	--	--	--
Dec. 21-31-----	1,246	32	8	7.3	264	--	--	--	--	--	--	--	84	45	9	--	--	--	--	--
Jan. 1-10, 1948-----	4,008	33	18	6.9	187	5.4	.09	.00	20	5.4	8.0		52	35	5.0	.1	4.0	113	72	30
Jan. 11-20-----	2,000	31	28	7.8	210	--	--	--	--	--	--	--	61	38	4	--	--	--	--	--
Jan. 24, 31-----	1,275	--	9	7.2	250	--	--	--	--	--	--	--	78	48	6	--	--	--	--	--
Feb. 8, 10-----	1,050	--	11	7.3	286	--	--	--	--	--	--	--	88	54	8	--	--	--	--	--
Feb. 12-19-----	4,433	31	15	7.0	249	--	--	--	--	--	--	--	76	43	7	--	--	--	--	--
Feb. 21-29-----	7,579	32	20	7.1	140	--	--	--	--	--	--	--	41	23	1	--	--	--	--	--
Mar. 1-10-----	6,421	32	16	7.2	150	--	--	--	--	--	--	--	48	25	2	--	--	--	--	--
Mar. 11-20-----	6,789	33	25	7.0	139	--	--	--	--	--	--	--	42	22	1	--	4.0	--	--	--
Mar. 21-31-----	8,726	49	23	7.1	141	--	--	--	--	--	--	--	44	22	2	--	3.3	--	--	--

SUSQUEHANNA RIVER BASIN--Continued  
JUNIATA RIVER AT NEWPORT, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Apr. 11-10, 1948	8,225	51	9	6.7	137	6.8	0.09	0.00	16	4.3	2.8		42	21	2.9	0.1	3.7	84	58	23
Apr. 11-20	21,636	50	10	6.7	131	--	--	--	--	--	--	--	42	20	2	--	4.3	--	--	--
Apr. 21-30	7,179	54	6	7.0	162	--	--	--	--	--	--	--	57	23	1	--	2.7	--	--	--
May 1-10	11,912	53	12	6.9	120	--	--	--	--	--	--	--	41	19	1	--	3.0	--	--	--
May 11-20	11,323	59	15	6.8	123	--	--	--	--	--	--	--	38	18	2	--	3.3	--	--	--
May 21-31	5,136	63	5	7.0	170	--	--	--	--	--	--	--	58	26	3	--	3.2	--	--	--
June 1-10	3,399	67	7	7.2	183	--	--	--	--	--	--	--	63	28	4	--	2.9	--	--	--
June 11-20	3,041	70	5	7.3	216	--	--	--	--	--	--	--	76	33	5	--	2.3	--	--	--
June 21-30	6,154	72	10	6.9	171	--	--	--	--	--	--	--	54	28	3	--	4.2	--	--	--
July 1-10	2,708	75	6	7.1	209	--	--	--	--	--	--	--	69	34	4	--	3.6	--	--	--
July 11-20	1,465	78	5	7.3	258	--	--	--	--	--	--	--	86	44	7	--	1.8	--	--	--
July 21-31	1,398	79	6	7.3	284	--	--	--	--	--	--	--	92	50	8	--	1.9	--	--	--
Aug. 1-10	1,087	76	6	7.3	316	--	--	--	--	--	--	--	99	57	11	--	1.8	--	--	--
Aug. 11-20	1,944	75	4	7.6	327	--	--	--	--	--	--	--	103	60	10	--	1.6	--	--	--
Aug. 21-31	1,047	79	5	7.6	327	--	--	--	--	--	--	--	100	61	10	--	1.8	--	--	--
Sept. 1-10	611	76	12	7.6	376	2.1	.02	.00	36	12	21		104	77	13	.2	.8	228	139	54
Sept. 11-20	632	73	5	7.8	385	--	--	--	--	--	--	--	112	77	14	--	.8	--	--	--
Sept. 21-30	544	64	6	7.7	415	--	--	--	--	--	--	--	112	90	15	--	.9	--	--	--
Average	4,046	54	11	--	239	--	--	--	--	--	--	--	74	42	3.8	--	2.6	--	--	--

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	54	36	36	31	31	51	54	67	76	79	71
2	55	51	36	36	32	31	48	52	61	77	77	72
3	55	51	36	33	32	31	48	54	69	73	79	72
4	58	51	36	32	31	32	50	53	68	77	80	72
5	58	52	37	33	32	32	51	54	68	78	78	79
6	60	52	35	33	32	32	53	54	69	78	68	77
7	60	52	38	32	32	33	52	52	68	75	70	79
8	60	51	38	32	--	33	52	52	68	73	76	78
9	61	48	36	32	31	33	50	53	68	70	73	79
10	61	43	36	31	--	33	47	53	68	74	74	79
11	58	46	34	32	31	34	51	61	70	77	73	70
12	60	42	37	32	31	--	51	63	68	80	74	78
13	62	45	36	32	31	32	50	58	68	80	73	74
14	63	43	32	32	32	34	51	58	70	79	73	76
15	62	40	32	--	31	33	47	58	70	77	78	71
16	62	40	34	31	32	34	49	59	70	79	79	71
17	62	41	32	32	31	33	50	59	70	77	75	68
18	67	39	35	31	31	34	50	59	70	78	74	75
19	67	41	33	33	31	34	50	58	70	78	74	73
20	64	40	32	--	31	33	53	57	69	77	75	73
21	63	38	32	32	32	47	51	56	68	79	74	72
22	65	39	32	32	32	47	56	57	68	80	73	65
23	63	39	32	31	32	50	53	62	69	79	79	63
24	58	42	32	31	32	47	54	61	71	77	77	63
25	--	37	31	31	33	47	61	68	70	76	78	61
26	62	41	32	32	--	52	52	62	74	76	80	66
27	61	38	32	--	31	53	58	65	73	78	82	64
28	61	39	32	32	31	48	51	67	77	79	82	63
29	62	37	32	31	31	48	51	66	77	78	86	61
30	59	36	31	31	--	50	53	64	77	80	81	64
31	57	--	32	31	--	50	--	65	--	82	77	--
Average	61	43	34	32	31	39	52	59	70	77	77	71

## SUSQUEHANNA RIVER BASIN--Continued

## RAYSTOWN BRANCH JUNIATA RIVER NEAR HUNTINGDON, PA.

LOCATION.--At gaging station at Hawn Bridge, a quarter of a mile below Pennsylvania Electric Co. power dam, 6 miles south of Huntingdon, Huntingdon County.

DRAINAGE AREA.--957 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948.

Water temperatures: October 1946 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 289 Sept. 21-30; minimum, 81.3 Apr. 21-30.

Water temperatures: Maximum, 82° F. July 31; minimum, freezing point on many days in December, January, February, and March.

EXTREMES, 1946-48.--Dissolved solids: (1946-47): Maximum, 168 parts per million Aug. 11-20, 1947; minimum, 64 parts per million Apr. 11-20, 1947.

Total hardness (1946-47): Maximum, 125 parts per million Aug. 11-20, 1947; minimum, 41 parts per million Apr. 11-20, 1947.

Specific conductance: Maximum, 289 Sept. 21-30, 1948; minimum, 81.3 Apr. 21-30, 1948.

Water temperatures: Maximum, 82° F. July 31, 1948; minimum, freezing point on many days in winter months.

REMARKS.--Flow is regulated by dam a quarter of a mile upstream from gaging station. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Oct. 1-10, 1947	104	63	3	7.2	263	4.4	0.12	0.00	32	12	0.9	1.5	82	56	2.9	0.1	1.6	160	139	62
Oct. 11-20	106	62	5	7.3	264	2.8	.02	.00	32	11	1.5	1.5	80	55	2.5	.2	1.8	159	125	60
Oct. 21-31	115	61	7	7.2	265	--	--	--	--	--	--	--	84	57	--	--	--	--	--	--
Nov. 1-10	202	56	8	7.4	265	--	--	--	--	--	--	--	94	61	--	--	--	--	--	--
Nov. 11-20	311	46	9	7.4	226	--	--	--	--	--	--	--	70	46	--	--	--	--	--	--
Nov. 21-30	564	41	16	7.2	150	--	--	--	--	--	--	--	40	29	--	--	--	--	--	--
Dec. 1-10	310	34	11	6.7	101	--	--	--	--	--	--	--	23	22	--	--	--	--	--	--
Dec. 11-20	295	32	3	6.9	130	--	--	--	--	--	--	--	52	27	--	--	--	--	--	--
Dec. 21-31	186	32	3	7.2	194	--	--	--	--	--	--	--	55	39	--	--	--	--	--	--
Jan. 1-10, 1948	1,236	32	12	6.9	126	5.8	.09	.00	14	4.3	2.9	2.9	30	26	2.0	.1	5.2	79	53	28
Jan. 11-20	512	32	7	6.6	136	--	--	--	--	--	--	--	35	26	--	--	--	--	--	--
Jan. 21-31	275	32	8	7.0	153	--	--	--	--	--	--	--	40	30	--	--	--	--	--	--
Feb. 1-10	212	32	4	7.2	190	--	--	--	--	--	--	--	52	38	--	--	--	--	--	--
Feb. 11-20	1,500	33	20	6.6	104	--	--	--	--	--	--	--	23	20	--	--	--	--	--	--
Feb. 21-29	1,993	32	8	6.9	100	--	--	--	--	--	--	--	22	20	--	--	5.2	--	--	--
Mar. 1-10	1,685	33	9	7.0	121	--	--	--	--	--	--	--	28	24	--	--	4.8	--	--	--
Mar. 11-20	1,420	40	12	7.1	112	--	--	--	--	--	--	--	26	22	--	--	4.6	--	--	--
Mar. 21-31	2,210	47	--	7.0	110	--	--	--	--	--	--	--	28	22	--	--	3.1	--	--	--



Apr. 1-10	2,146	48	10	6.5	104	6.8	.16	.00	11	3.7	2.3	27	19	2.1	.1	3.2	67	43	21
Apr. 11-20	5,556	50	17	6.8	106	--	--	--	--	--	--	28	21	2.2	--	4.1	--	--	--
Apr. 21-30	1,936	53	22	6.6	81.3	--	--	--	--	--	--	22	17	1.4	--	2.4	--	--	--
May 1-10	3,308	55	10	6.6	98.5	--	--	--	--	--	--	22	19	--	--	2.9	--	--	--
May 11-20	2,543	62	12	6.8	115	--	--	--	--	--	--	29	24	--	--	2.8	--	--	--
May 21-31	1,215	65	10	7.0	151	--	--	--	--	--	--	42	31	--	--	2.7	--	--	--
June 1-10	773	69	10	6.8	136	--	--	--	--	--	--	39	25	--	--	3.2	--	--	--
June 11-20	847	71	5	6.9	161	--	--	--	--	--	--	52	31	1	--	2.8	--	--	--
June 21-30	1,769	70	17	6.6	122	--	--	--	--	--	--	36	23	1	--	3.5	--	--	--
July 1-10	915	75	14	6.7	135	--	--	--	--	--	--	55	27	1	--	3.5	--	--	--
July 11-20	317	78	4	6.9	191	--	--	--	--	--	--	67	33	1	--	3.6	--	--	--
July 21-31	2,452	79	3	7.0	218	--	--	--	--	--	--	76	41	2	--	2.7	--	--	--
Aug. 1-10	262	77	2	7.4	251	--	--	--	--	--	--	79	51	2	--	2.6	--	--	--
Aug. 11-20	248	73	3	7.5	263	--	--	--	--	--	--	86	53	2	--	2.7	--	--	--
Aug. 21-31	252	77	2	7.5	263	--	--	--	--	--	--	85	50	4	--	2.8	--	--	--
Sept. 1-10	128	76	10	7.3	258	4.4	.02	.00	31	11	1.8	76	56	2.6	.1	2.4	158	123	60
Sept. 11-20	137	74	5	7.4	272	--	--	--	--	--	--	80	59	3	--	2.3	--	--	--
Sept. 21-30	146	67	6	7.6	289	--	--	--	--	--	--	93	62	2	--	2.2	--	--	--
Average	990	54	8.7	--	174	--	--	--	--	--	--	51	35	2.0	--	--	--	--	--

SUSQUEHANNA RIVER BASIN--Continued  
 RAYSTOWN BRANCH JUNIATA RIVER NEAR HUNTINGDON, PA.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	70	58	40	32	32	33	47	53	66	74	80	76
2	67	58	41	32	32	33	47	55	68	75	80	75
3	63	57	32	32	32	33	48	53	69	75	79	75
4	63	56	32	32	32	33	48	55	70	78	78	78
5	63	57	32	32	32	33	48	60	70	75	75	77
6	61	56	32	32	32	32	48	55	70	75	76	75
7	61	55	32	32	32	33	48	53	70	75	75	77
8	61	55	32	32	32	33	48	54	70	75	75	77
9	61	53	32	32	32	33	48	55	69	75	73	76
10	61	51	32	32	32	33	48	58	70	78	74	75
11	59	50	31	32	32	35	50	64	71	78	72	75
12	61	50	31	34	33	36	52	66	69	78	75	75
13	64	50	31	31	33	38	48	65	70	78	74	76
14	62	49	31	32	33	38	47	63	72	78	70	75
15	62	47	31	32	33	38	43	61	72	78	75	75
16	62	45	31	31	33	38	47	60	72	78	74	72
17	63	45	31	32	33	42	50	60	72	78	75	73
18	64	43	33	32	33	42	53	59	74	78	74	75
19	63	41	32	32	35	45	52	59	65	75	75	71
20	62	41	33	32	34	45	55	59	68	78	70	74
21	63	41	32	33	32	45	51	61	67	78	75	71
22	67	41	32	32	32	45	51	60	68	78	72	71
23	60	41	32	32	32	45	51	63	70	80	76	70
24	63	41	32	32	32	48	53	64	70	77	76	68
25	61	41	32	32	32	47	52	63	70	80	78	68
26	62	41	32	32	32	48	53	65	70	78	78	67
27	63	41	32	32	32	54	55	68	70	80	78	67
28	61	41	32	32	32	48	53	68	70	80	81	67
29	60	41	32	32	32	46	54	68	70	80	79	65
30	41	32	32	32	--	--	55	70	--	80	80	60
31	56	--	32	32	--	47	--	66	--	82	--	--
Average	62	48	32	32	32	40	50	61	70	78	76	72

SUSQUEHANNA RIVER BASIN--Continued  
CONESTOGA CREEK AT LANCASTER, PA.

LOCATION.--At raw water intake for Lancaster, Lancaster County.

DRAINAGE AREA.--322 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 276 parts per million July 11-20; minimum, 156 parts per million Apr. 11-20.

Total hardness: Maximum, 193 parts per million Sept. 1-10, 21-30; minimum, 115 parts per million Nov. 1-10.

Water temperatures: Maximum, 77° F. Aug. 29-30; minimum, freezing point on many days in January and February.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947 -----	76	57	2	7.9	380	4.6	0.04	51	14	4.2		180	23	7.2	0.1	15	218	185	50
Oct. 11-20 -----	68	61	3	7.9	390	4.6	.05	52	15	7.8		198	24	7.2	.1	13	222	191	31
Oct. 21-31 -----	1,161	59	5	7.8	364	4.8	.04	46	13	11		181	25	7.8	.1	15	210	173	31
Nov. 1-10 -----	575	52	17	7.6	259	6.4	.10	32	8.6	6.5		103	26	7.6	.1	14	161	115	31
Nov. 11-20 -----	485	44	7	7.8	284	10	.11	38	9.6	5.4		122	24	6.0	.2	15	176	134	41
Nov. 21-30 -----	435	41	5	7.6	299	6.4	.05	42	10	5.8		130	26	7.2	.1	18	182	146	39
Dec. 1-10 -----	270	38	3	7.8	386	7.6	.03	46	12	6.9		154	24	7.5	.1	21	199	164	41
Dec. 11-20 -----	243	36	3	7.9	326	7.2	.05	45	13	5.9		148	25	7.8	.0	20	191	162	47
Dec. 21-31 -----	177	33	5	7.9	343	5.6	.09	46	13	5.9		164	24	7.8	.0	19	205	173	49
Jan. 1-10, 1948 -----	512	36	7	7.5	291	8.6	.02	40	11	3.2		128	24	5.5	.2	17	175	145	40
Jan. 11-20 -----	263	33	5	7.7	342	8.6	.03	46	13	3.1		138	24	6.5	.1	20	203	173	44
Jan. 21-31 -----	196	33	3	7.5	360	10	.07	46	14	4.3		166	25	6.0	.0	20	214	177	41
Feb. 1-10 -----	167	32	4	7.5	363	9.4	.07	46	14	4.6		169	23	6.1	.0	20	216	177	39
Feb. 11-20 -----	861	33	10	7.4	271	13	.10	35	10	3.8		117	21	5.0	.0	15	166	126	33
Feb. 21-29 -----	874	38	20	7.5	259	13	.19	33	9.3	6.5		109	23	4.8	.0	18	165	121	31
Mar. 1-10 -----	778	36	3	7.5	277	9.0	.05	35	10	7.8		121	22	4.6	.0	21	170	128	29
Mar. 11-20 -----	663	44	3	7.6	290	8.4	.04	37	11	4.7		127	23	4.9	.0	16	177	138	34
Mar. 21-31 -----	717	50	5	7.6	272	9.1	.05	35	9.8	4.2		118	21	4.9	.0	14	166	128	30
Apr. 1-10 -----	697	52	5	7.7	274	8.1	.05	36	10	5.2		121	20	4.9	.0	19	163	131	32
Apr. 11-20 -----	862	50	4	7.7	283	11	.05	33	9.4	3.8		113	20	4.4	.0	12	156	121	26
Apr. 21-30 -----	537	54	3	7.8	293	5.7	.04	38	11	7.1		138	19	4.6	.0	20	173	140	27
May 1-10 -----	979	55	4	7.3	255	9.8	.03	32	8.7	5.5		113	18	4.6	.0	12	180	116	23
May 11-20 -----	993	59	3	7.4	255	22	.04	32	8.7	5.3		113	18	4.4	.0	12	202	116	23
May 21-31 -----	703	60	4	7.5	264	8.4	.05	35	9.8	6.2		128	18	5.0	.0	13	197	128	23

SUSQUEHANNA RIVER BASIN--Continued  
CONESTOGA CREEK AT LANCASTER, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
June 1-10, 1948-----	466	65	2	7.3	318	11	0.14	42	12	4.2		148	20	4.8	0.0	18	224	154	33
June 11-20 -----	572	65	3	7.3	301	9.6	.16	38	10	9.8		140	19	4.5	.1	20	208	136	21
June 21-30 -----	484	69	2	7.2	304	11	.16	37	11	8.9		140	20	4.2	.1	19	213	138	23
July 1-10-----	293	70	2	7.3	354	16	.15	46	13	6.2		168	20	4.5	.0	21	218	168	31
July 11-20 -----	222	71	2	7.4	369	15	.06	48	15	2.5		172	20	5.8	.0	21	276	181	41
July 21-31 -----	291	73	9	7.2	328	11	.06	43	12	2.4		150	19	5.5	.1	14	214	157	34
Aug. 1-10 -----	373	68	6	7.3	325	8.4	.08	42	13	6.3		152	23	6.2	.1	18	200	158	34
Aug. 11-20 -----	269	68	4	7.5	352	6.4	.08	45	14	5.3		167	21	6.8	.1	16	214	170	33
Aug. 21-31 -----	232	72	6	7.6	356	9.2	.08	45	14	8.5		176	21	6.5	.1	16	221	170	26
Sept. 1-10 -----	169	70	6	7.8	389	4.8	.06	51	16	6.2		192	23	7.2	.2	18	253	193	36
Sept. 11-20 -----	146	68	5	7.6	367	5.2	.08	47	15	5.9		178	21	6.6	.1	18	226	179	33
Sept. 21-30 -----	115	64	4	7.9	394	4.0	.06	51	16	8.6		198	23	7.4	.2	18	254	193	31
Average-----	439	53	5	--	319	9.0	0.07	42	12	5.9		147	22	5.9	0.1	17	200	154	34

Temperature (" F. ) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1 -	56	54	36	36	32	38	54	55	64	--	74	70
2 -	54	52	34	34	32	38	54	56	65	70	72	68
3 -	54	56	36	--	32	39	50	56	64	69	72	67
4 -	54	52	38	34	32	39	47	54	65	69	70	--
5 -	56	52	39	36	32	36	50	56	64	72	60	67
6 -	58	52	40	36	31	35	54	54	64	74	66	--
7 -	59	53	40	36	31	38	53	54	64	70	66	70
8 -	60	53	42	35	32	40	53	56	66	67	64	70
9 -	60	49	41	36	32	40	52	52	66	68	66	74
10 -	60	45	38	37	32	42	48	58	65	68	66	70
11 -	60	45	38	34	31	42	48	62	66	60	67	67
12 -	59	48	37	33	31	38	50	66	66	72	62	68
13 -	58	46	36	34	32	37	51	64	66	74	70	70
14 -	62	44	35	35	32	39	48	58	66	74	68	72
15 -	60	42	34	32	31	42	46	56	68	72	70	68
16 -	58	43	36	32	31	48	50	56	65	72	70	66
17 -	62	44	36	32	33	50	52	58	65	72	68	66
18 -	63	42	36	32	34	48	51	58	63	70	69	67
19 -	64	42	36	31	37	48	52	58	64	72	68	68
20 -	65	41	36	32	37	48	55	58	64	71	66	70
21 -	64	40	34	33	36	42	57	58	66	71	66	68
22 -	62	40	34	33	36	42	56	56	65	74	66	65
23 -	62	42	34	32	36	54	55	58	62	74	68	63
24 -	58	42	--	32	35	51	54	60	64	73	70	62
25 -	56	44	34	37	39	50	55	60	70	70	72	63
26 -	56	42	33	31	42	50	57	60	70	70	74	60
27 -	56	40	33	33	40	53	53	60	71	72	74	60
28 -	58	39	34	32	42	52	52	62	73	73	76	62
29 -	60	39	33	32	39	46	50	64	74	74	77	68
30 -	60	38	32	32	--	48	52	62	75	77	77	70
31 -	58	--	32	32	--	52	--	53	--	73	76	--
Average	59	45	36	34	34	44	52	58	66	71	69	67

SUSQUEHANNA RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN SUSQUEHANNA RIVER BASIN IN PENNSYLVANIA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (microhmhos at 25° C.)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dis-solved solids	Hardness as CaCO <sub>3</sub>	Total acidity as H <sub>2</sub> SO <sub>4</sub>
																			Total	Non-carbonate
SUSQUEHANNA RIVER AT SHICKSHINNY																				
Feb. 28, 1948 -----	17,200	36	10	6.9	151	--	0.30		16	5.2	5.2		30	38	4		3.6		61	37
Nov. 4 -----	1,580																			
Left side -----		56		6.8	462	2.8							54	167	14		2.8		178	134
Left center -----		56		6.8	460	3.6							55	165	14		3.0		169	124
Center -----		56		6.8	459	3.3							53	163	14		2.7		154	111
Right center -----		56		6.9	457	3.5							51	163	14		2.8		147	105
Right side -----		56		6.7	342	3.6							41	115	11		2.7		119	85
SUSQUEHANNA RIVER AT MARIETTA																				
May 29, 1948 -----	54,300												26	52			3.2		72	
Station 300 -----		66	10	6.8	168								22	44			2.2		66	
Station 1100 -----		65	15	6.8	143								23	35			1.9		58	
Station 2100 -----		66	20	6.9	120								22	28			1.8		48	
Station 3100 -----		66	15	6.8	110								31	30			1.7		57	
Station 4100 -----		67	15	7.0	122								58	30			3.1		70	
Station 5100 -----		68	22	7.1	170															
LACKAWANNA RIVER AT FOREST CITY																				
Feb. 27, 1948 -----		36	8	6.5	64.2		0.08		11	1.9	1.2		18	18	2		1.8		35	20
LACKAWANNA RIVER AT CARBONDALE																				
Feb. 27, 1948 -----		40	6	4.7	187		0.06		20	9.2	2.4		4	80	4		0.9		88	84
LACKAWANNA RIVER AT ARCHBALD																				
Feb. 27, 1948 -----	190	42	4	3.90	286		0.08		22	13	8.8			117	8		0.6		114	114
TOBY CREEK AT LUZERNE																				
Feb. 28, 1948 -----	104	37	8	6.7	89.1		0.11		14	2.1	1.0		16	22	4		5.1		44	31
HARVEY CREEK AT WEST NANTICOKE																				
Feb. 28, 1948 -----		36	8	6.7	63.7								12	14	1		3.2		24	14

HUNLOCK CREEK AT HUNLOCK														
Feb. 23, 1948-----		36	9	6.8	53.5					9	14	1	2.3	21 14
SHICKSHINNY CREEK AT SHICKSHINNY														
Feb. 23, 1948-----		35	10	6.5	52.5					7	14	2	2.3	24 18
MAHONING CREEK AT DANVILLE														
Feb. 23, 1948-----		39	35	6.7	90.8	0.35	12	3.7	5.4	20	27	5	6.5	45 29
BRIAR CREEK AT BRIAR														
Feb. 26, 1948-----		38	25	7.0	79.9	0.44	9.5	3.9		17	16	1	6.1	40 26
MIDDLE CREEK NEAR SELINGROVE														
Feb. 23, 1948-----		38	30	7.2	92.9	0.45	12	3.6		28	15	2	5.0	45 22
WEST MAHANTANGO CREEK NEAR MCKEES HALF FALLS														
Feb. 28, 1948-----		40	40	6.9	78.6	0.31	12	2.0	4.1	20	19	4	6.4	38 22
FRANKSTOWN BRANCH JUNIATA RIVER NEAR WILLIAMSBURG														
Aug. 11, 1948-----	97.0	69	10	8.1	395	4.0	42	13		--	34		--	159
Aug. 17-----	90.8	68	10	7.9	406	2.8	49	15	18	162	57	18	0.0	184 51
Sept. 1-----	93.1	65	15	7.4	391	--	--	--		188	44		5.1	177
FRANKSTOWN BRANCH JUNIATA RIVER BELOW WILLIAMSBURG														
Aug. 11, 1948-----	98.4	71	40	7.9	469	5.0	50	17		--	42		--	185
Aug. 17-----	92.5	78	60	7.5	488	2.4	52	16	24	186	48	30	0.0	196 43
Sept. 1-----	94.7	75	60	7.4	456	--	--	--		180	50		1.9	207
FRANKSTOWN BRANCH JUNIATA RIVER AT ALEXANDRIA														
Aug. 11, 1948-----	125	70	20	8.2	404	5.0	46	17		--	36		0.0	185
Aug. 17-----	116	75	20	7.8	421	3.6	48	16	25	184	48	25	5.4	186 35
Sept. 1-----	93.6	72	35	6.1	412	--	--	--		184	40		2.9	189

SUSQUEHANNA RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN SUSQUEHANNA RIVER BASIN IN PENNSYLVANIA--Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (°F.)	Color	pH	Specific conductance (micromhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	Total acidity as H <sub>2</sub> SO <sub>4</sub>
FRANKTOWN BRANCH JUNIATA RIVER AT HUNTINGTON																				
Aug. 12, 1948	69.0	67	15	7.6	366	6.0			38	16			--	24		0.0	--		152	
Aug. 16	73.8	67	15	7.3	372	3.2	0.10		42	13			154	31	20	0	3.4	228	158	32
Sept. 2	103	67	25	7.8	386	--			--	--			156	34		0	0		183	
FRANKTOWN BRANCH JUNIATA RIVER BELOW HUNTINGTON																				
Aug. 12, 1946	210	70	10	7.8	253	4.0			31	10		7.7	--	19		0.0	--		118	
Aug. 16	83.3	67	10	7.6	275	2.6	0.10		33	10			121	25	10	0	1.0	168	123	24
Sept. 2	151	65	15	7.6	304	--			--	--			136	34		0	0.7		177	
JUNIATA RIVER AT MILL CREEK																				
Aug. 12, 1948	452	71	10	7.9	320	4.0			36	13			--	34		0.0	--		143	
Aug. 16	391	70	10	7.3	338	2.2	0.08		38	13	10		132	38	15	0	2.6	204	148	40
Sept. 2	308	69	20	7.7	347	--			--	--			132	40		0	1.7		177	
JUNIATA RIVER AT MOUNT UNION																				
Aug. 12, 1948	444	73	12	7.8	306	4.0			35	13			--	40		0.0	--		141	
Aug. 16	382	72	10	7.4	334	1.2	0.08		38	11	12		130	38	14	0	2.5	200	140	34
Sept. 2	334	70	20	7.6	337	--			--	--			140	41		0	1.0		177	
JUNIATA RIVER AT LEWISTOWN																				
Aug. 12, 1948	733	76	10	8.0	261	2.0			34	11		8.4	--	36		0.0	--		130	
Aug. 16	617	74	10	7.8	298	1.2	0.04		35	11			114	40	10	0	0.4	186	132	39
Sept. 2	645	75	15	8.2	321	--			--	--			120	41		0	0.7		189	
JUNIATA RIVER NEAR LEWISTOWN																				
Aug. 12, 1948	762	76	10	7.8	323	2.0			34	12		18	108	59		0.0	1.0	207	134	44
Aug. 16	641	74	10	7.5	338	1.6	0.10		35	11				53	12	0			133	
JUNIATA RIVER AT MIFFLINTOWN																				
Aug. 12, 1948	1,110	80	9	7.8	342	2.0			35	10		24	--	66		0.0	--		--	
Aug. 16	916	77	10	7.6	374	0.8	0.10		36	11			111	73	13	0	1.3	230	135	44
Sept. 2	655	75	15	7.8	407	--			--	--			108	52		0	0.3		177	



## JUNIATA RIVER AT NEWPORT

Aug. 12, 1946	876	79	8	7.9	323	2.0	33	10	--	51	0.0	--	206	--	44
Aug. 16	762	75	5	7.8	345	2.0	35	11	18	108	.0	0.9	--	133	--
Sept. 2	662	74	15	8.2	363	--	--	--	--	104	.0	--	--	139	--

## LITTLE JUNIATA RIVER AT PINECROFT

Aug. 11, 1946	13.2	65	40	7.2	1,330	15	39	11	--	100	91	0.1	--	143	--
Aug. 17	13.3	67	30	6.8	457	9.6	41	9.7	40	116	102	0.4	282	142	47
Sept. 1	13.9	64	50	6.9	499	--	--	--	--	96	123	.0	.6	139	--

## LITTLE JUNIATA RIVER ABOVE TYRONE

Aug. 11, 1946	17.8	67	15	7.6	201	15	37	11	--	104	60	0.2	--	138	--
Aug. 17	13.0	67	10	7.0	375	5.6	40	9.1	23	100	67	.0	13	137	--
Sept. 1	14.7	62	25	7.4	467	--	--	--	--	112	85	.1	8.2	189	--

## LITTLE JUNIATA RIVER BELOW TYRONE

Aug. 11, 1946	55.7	71	75	7.8	593	10	60	8.5	--	152	46	0.1	--	185	--
Aug. 17	54.3	72	100	7.3	538	4.0	70	7.0	29	145	46	.0	1.4	203	--
Sept. 1	48.9	72	100	7.4	589	--	--	--	--	148	63	.1	1.1	207	--

## LITTLE JUNIATA RIVER ABOVE SPRUCE CREEK

Aug. 11, 1946	101	69	25	7.8	437	7.0	45	7.7	--	144	21	0.0	--	144	--
Aug. 16	110	66	25	7.3	447	3.6	43	10	37	139	33	.0	3.4	148	--
Sept. 1	99.0	64	30	7.7	486	--	--	--	--	144	35	.0	1.7	196	--

## LITTLE JUNIATA RIVER AT BARRE

Aug. 11, 1946	164	64	25	8.0	361	5.0	--	13	--	160	20	0.0	--	--	--
Aug. 16	195	67	20	7.7	369	2.4	40	3.0	36	152	23	.0	3.6	243	0
Sept. 1	141	64	30	8.0	395	--	--	--	--	148	28	.0	1.9	183	--

## SOUTH BALD EAGLE CREEK NEAR TYRONE

Aug. 11, 1946	18.4	66	7	7.5	400	6.0	12	4.3	--	36	14	0.0	--	46	--
Aug. 17	22.6	67	7	7.3	67.7	3.4	9.7	2.3	7.2	37	15	.0	0.8	53	3
Sept. 1	17.7	67	15	7.2	106	--	--	--	--	40	19	.0	.3	82	--

SUSQUEHANNA RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN SUSQUEHANNA RIVER BASIN IN PENNSYLVANIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (microhmhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	Total acidity as H <sub>2</sub> SO <sub>4</sub>
SOUTH BALD EAGLE CREEK AT TYRONE																				
Aug. 11, 1948-----	19.8	75	75	8.3	447	10			66	6.6			116	36		0.0	--	502	187	
Aug. 17-----	24.3	76	140	7.1	690	6.8	0.16		54	8.0	97		177	39	185		2.2	168	22	
Sept. 1-----	18.9	74	100	9.1	563		--	--	--	--			116	52		.1	1.9	141		
CLOVER CREEK AT LARKE																				
Aug. 17, 1948-----	12.8		5	7.9	310	3.0	0.06		37	17			175	10	2.2	0.0	9.0	181	162	19
STANDING STONE CREEK AT HUNTINGTON																				
Aug. 17, 1948-----	15.2		8	7.6	169	2.5	0.05		29	7.6			96	20	2.2	0.0	1.0	128	104	24
RAYSTOWN BRANCH JUNIATA RIVER AT EVERETT																				
Aug. 16, 1948-----	85.0		7	7.8	264	4.4	0.06		36	11	2.5		126	25	4.2	0.0	4.5	179	133	30
RAYSTOWN BRANCH JUNIATA RIVER AT SAXTON																				
Aug. 16, 1948-----	188	78	8	8.0	268	2.4	0.05		35	11			166	38	3.0	0.0	2.7	166	134	44
RAYSTOWN BRANCH JUNIATA RIVER NEAR HUNTINGTON																				
Aug. 12, 1948-----	1,250	73	7	7.8	271	3.0			38	14			--	39		0.0	--		152	
Aug. 17-----	23.1	--	5	7.5	260	2.0	0.05		31	10	5.7		88	51	2.5	.0	2.6	168	118	46
Sept. 2-----	282	75	10	7.3	268	--	--	--	--	--			84	53		.0	1.3		159	
DUNNING CREEK AT BELDON																				
Aug. 16, 1948-----	18.8		10	7.6	281	3.1	0.05		40	9.7			110	45	1.8	0.0	2.4	189	140	50
GREAT TROUGH CREEK AT MARKLESBURG																				
Aug. 16, 1948-----	8.8	73	7	4.25	231	7.8	0.08		22	9.1			0	87	3.0	0.0	0.8	164	98	28
AUGWICK CREEK NEAR THREE SPRINGS																				
Aug. 17, 1948-----	25.8		8	7.3	138	2.2	0.05		20	4.3			56	19	2.2	0.0	0.6	89	68	17

## KISHACOQUILLAS CREEK AT REEDSVILLE

Aug. 18, 1948-----	51.2	7	7.2	293	4.0	0.06	40	7.1		154	15	3.2	0.0	7.2	185	150	23
--------------------	------	---	-----	-----	-----	------	----	-----	--	-----	----	-----	-----	-----	-----	-----	----

## TUSCARORA CREEK AT PORT ROYAL

Aug. 18, 1948-----	17.0	8	7.7	205	1.8	0.08	38	6.7		126	16	2.2	0.0	1.0	127	122	19
--------------------	------	---	-----	-----	-----	------	----	-----	--	-----	----	-----	-----	-----	-----	-----	----

## COCOLANUS CREEK NEAR MILLERSTOWN

Aug. 18, 1948-----	4.0	8	7.6	172	2.5	0.06	26	5.2		87	11	3.0	0.0	1.9	103	86	15
--------------------	-----	---	-----	-----	-----	------	----	-----	--	----	----	-----	-----	-----	-----	----	----

## BUFFALO CREEK AT NEWPORT

Aug. 18, 1948-----	5.6	5	7.5	164	1.4	0.04	25	4.9	1.6	86	11	2.2	0.0	1.2	95	83	12
--------------------	-----	---	-----	-----	-----	------	----	-----	-----	----	----	-----	-----	-----	----	----	----

## SWATARA CREEK NEAR HUMMELSTOWN

Feb. 28, 1948-----		41	35	141		0.36	20	4.4	3.8	39	33	3		7.0		68	36
--------------------	--	----	----	-----	--	------	----	-----	-----	----	----	---	--	-----	--	----	----

## POTOMAC RIVER BASIN

## CACAPON RIVER AT GREAT CACAPON, W. VA.

LOCATION --At Potomac Edison power plant, 4 miles downstream from gaging station, and 2½ miles upstream from mouth. DRAINAGE AREA --661 square miles above power plant (677 square miles above gaging station).

RECORDS AVAILABLE --water temperatures: October 1946 to September 1948. --water temperatures: Maximum, 80° F. July 6; minimum, freezing point on several days in December, January, and February.

EXTREMES, 1946-48 --water temperatures: Maximum, 80° F. July 6, 1948; minimum, freezing point on many days in winter months.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	56	33	33	32	36	52	60	68	--	78	75
2	57	56	33	34	32	37	52	58	67	--	77	74
3	57	56	33	34	33	41	51	56	65	--	78	73
4	57	56	34	33	33	42	50	59	68	--	78	73
5	57	56	36	33	33	36	50	57	66	--	77	73
6	57	53	38	34	33	35	48	55	67	80	76	73
7	57	52	38	34	33	36	48	58	68	79	75	73
8	58	52	38	34	33	35	46	56	68	78	75	74
9	60	52	37	37	33	36	46	57	70	78	75	73
10	62	53	35	35	33	36	48	59	70	77	76	73
11	61	47	34	34	33	39	49	60	71	77	75	70
12	62	47	34	34	33	38	49	60	72	78	75	70
13	62	43	33	35	35	36	48	61	72	78	74	71
14	64	43	33	33	36	38	48	61	72	79	73	71
15	63	42	33	33	34	42	48	61	73	78	72	71
16	64	42	36	34	35	44	49	61	72	76	72	69
17	64	43	35	33	34	44	49	62	70	76	72	70
18	66	44	35	33	34	46	49	63	70	77	72	72
19	66	42	34	33	34	48	50	60	72	78	72	72
20	64	40	34	33	35	48	55	60	70	77	72	74
21	63	38	33	33	35	49	56	63	72	78	72	71
22	62	39	33	33	35	50	55	63	75	78	72	63
23	61	35	33	32	35	52	55	62	77	79	73	66
24	60	43	33	32	34	53	56	63	78	77	72	64
25	58	46	33	32	35	57	57	65	78	77	74	62
26	60	44	34	32	40	56	60	64	77	77	76	59
27	45	45	33	32	39	58	60	66	78	77	--	59
28	40	40	32	32	40	54	59	66	78	77	--	62
29	61	39	32	32	38	50	60	70	79	78	74	62
30	36	36	33	32	--	48	60	70	78	78	74	61
31	58	--	33	32	--	50	60	68	--	--	75	--
Average	61	47	34	33	35	45	52	61	72	78	74	69

## POTOMAC RIVER BASIN--Continued

SOUTH BRANCH POTOMAC RIVER NEAR PETERSBURG, W. VA.

LOCATION.--At Potomac Edison Power Plant, 1,000 feet upstream from gaging station, and 2½ miles west of Petersburg, Grant County.

DRAINAGE AREA.--642 square miles.

RECORDS AVAILABLE.--Water temperatures: January 1947 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 80° F. July 5, 12, 30, Aug. 29-30; minimum, freezing point on many days in January and February. EXTREMES, January 1947-September 1948.--Water temperatures: Maximum, 82° F. Aug. 14-15, 1947; minimum, freezing point on many days in winter months.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	54	33	35	32	43	54	55	65	73	73	71
2	58	53	34	37	32	42	55	55	64	71	74	73
3	59	53	36	36	32	43	52	55	63	75	75	72
4	60	53	36	37	32	44	53	54	65	76	74	71
5	61	54	40	37	32	40	54	55	65	76	70	70
6	63	54	40	36	32	39	55	55	65	79	69	71
7	63	52	39	33	32	40	55	55	65	76	70	72
8	65	50	41	33	32	42	54	52	65	75	73	73
9	63	49	38	36	32	41	54	56	66	74	70	72
10	63	47	35	37	32	43	51	60	66	76	70	75
11	63	47	35	34	32	44	53	64	68	77	73	69
12	64	46	36	34	32	43	56	65	70	80	74	69
13	66	46	35	35	32	39	53	63	70	79	73	70
14	68	44	34	33	34	41	50	64	69	75	73	70
15	68	42	34	33	36	44	51	65	73	70	72	69
16	67	42	35	33	38	50	53	64	73	74	73	68
17	66	43	33	33	41	52	54	62	76	78	72	69
18	66	41	36	32	48	51	52	62	76	76	71	70
19	67	41	35	32	48	52	53	61	75	74	71	69
20	65	41	35	33	45	55	55	60	75	74	70	68
21	64	40	35	33	40	55	56	62	73	75	70	69
22	65	41	35	33	37	57	54	62	75	76	70	65
23	62	44	34	32	36	54	53	63	76	73	71	60
24	60	46	33	32	36	51	59	63	76	73	72	60
25	61	42	33	32	41	49	63	65	76	76	74	59
26	61	40	33	32	45	51	65	62	76	76	76	59
27	61	36	33	32	43	55	62	64	77	75	78	61
28	62	37	33	32	46	53	62	66	77	78	79	59
29	58	37	33	32	45	51	55	65	76	76	80	61
30	56	35	33	32	--	46	55	63	76	80	80	64
31	53	32	32	32	--	50	55	63	--	76	76	67
Average	63	43	35	34	37	47	55	61	71	76	73	67

POTOMAC RIVER BASIN--Continued  
CONOCHEAGUE CREEK AT FAIRVIEW, MD.

LOCATION.--At bridge on highway in Fairview, Washington County, 6½ miles northwest of Hagerstown, Washington County, and 1.3 miles upstream from Rockdale Run.

DRAINAGE AREA.--494 square miles.

RECORDS AVAILABLE.--Chemical analyses: April to September 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Suspended sediment	Dissolved oxygen	Biochemical oxygen demand (five days at 20° C.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>	
Apr. 14, 1948	2,558	47	--	--	--	1	7.4	180	--	--	--	--	--	--	77	--	--	--	--	6.5	--	82
May 5	1,388	54	--	9.7	1.8	20	7.7	206	--	--	--	--	--	--	93	--	--	--	--	8.0	--	92
May 11	998	66	--	8.6	.7	5	7.6	236	--	--	--	--	--	--	111	--	--	--	--	--	102	
May 19	1,022	58	--	9.8	1.1	6	7.8	248	--	--	--	--	--	--	120	--	--	--	--	--	106	
May 26	409	65	--	10.2	1.1	4	8.3	285	--	--	--	--	--	--	144	--	--	--	--	--	129	
June 2	432	68	--	10.2	1.0	5	7.4	252	6.2	0.07	36	7.7	3.4	--	129	14	2.5	0.0	6.4	163	121	
June 9	320	66	--	14.2	2.2	10	7.7	262	--	--	--	--	--	--	148	--	--	--	--	--	129	
June 16	226	68	--	8.6	1.2	10	7.7	260	--	--	--	--	--	--	124	--	--	--	--	--	158	
June 23	413	69	--	8.4	.8	10	7.9	254	--	--	--	--	--	--	82	--	--	--	--	--	169	
June 30	1,564	72	--	7.2	1.3	15	7.6	194	--	--	--	--	--	--	176	--	--	--	--	--	110	
July 7	238	72	--	8.9	1.1	5	7.7	310	7.0	.03	46	9.4	3.3	--	160	16	3.9	.0	8.6	202	152	
July 14	169	75	--	8.8	.2	10	8.0	227	--	--	--	--	--	--	180	--	--	--	--	--	179	
July 21	167	76	--	11.3	.6	10	8.1	301	--	--	--	--	--	--	146	--	--	--	--	--	179	
July 28	130	78	--	13.2	1.1	5	8.1	293	--	--	--	--	--	--	174	--	--	--	--	--	211	
Aug. 4	112	70	1	11.3	2.8	5	8.4	331	--	--	--	--	--	--	176	--	--	--	--	--	207	
Aug. 11	112	72	6	17.2	4.4	6	8.3	318	2.4	.06	48	11	3.7	--	176	17	4.2	.0	6.4	206	165	
Aug. 18	108	73	8	17.1	4.5	10	8.4	327	--	--	--	--	--	--	178	--	--	.0	5.8	--	189	
Aug. 25	425	79	8	12.0	2.8	10	8.4	321	--	--	--	--	--	--	172	--	--	.0	8.4	--	202	
Sept. 1	97	73	4	11.8	.4	5	7.0	342	--	--	--	--	--	--	194	--	--	--	4.5	--	237	
Sept. 8	91	78	4	10.6	.7	5	7.3	336	--	--	--	--	--	--	195	--	--	--	7.2	--	219	
Sept. 15	82	72	2	12.7	1.0	5	8.1	282	1.2	.10	45	12	4.5	--	170	19	7.0	.0	3.0	160	162	
Sept. 22	86	66	3	12.6	1.8	5	8.2	339	--	--	--	--	--	--	196	--	--	--	4.2	--	232	
Sept. 29	74	61	2	14.2	2.2	5	8.5	315	--	--	--	--	--	--	181	--	--	--	4.5	--	183	

<sup>1</sup>/Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

<sup>2</sup>/Includes equivalent of 20 parts per million of carbonate (CO<sub>3</sub>).

<sup>3</sup>/Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

## POTOMAC RIVER BASIN--Continued

## ANTIETAM CREEK NEAR WAYNESBORO, PA.

LOCATION --At county highway bridge at Rock Forge, Md., 0.5 mile downstream from Maryland-Pennsylvania State line.

DRAINAGE AREA --53.5 square miles.

RECORDS AVAILABLE --Chemical analyses: April 1948 to September 1948.

REMARKS --Records of discharge for gaging station near Waynesboro, Pa., available in Surface Water district office at College Park, Md. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second- feet)	Tem- pera- ture (° F.)	Sus- pended sediment	Dis- solved oxygen	Bio- chemical oxygen demand (five days at 20° C.)	Color	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sod- ium (Na)	Pot- as- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dis- solved solids as CaCO <sub>3</sub>	Total hardness as CaCO <sub>3</sub>
Apr. 14, 1948	---	46	--	--	--	1	7.8	172	--	--	--	--	--	--	78	--	--	--	4.0	--	81
May 5	---	53	--	10.1	2.1	10	7.6	205	--	--	--	--	--	--	101	--	--	--	9.0	--	88
May 11	376	60	--	9.8	.9	4	7.5	235	--	--	--	--	--	--	113	--	--	--	--	--	114
May 19	143	54	--	10.8	1.3	5	7.8	253	--	--	--	--	--	--	122	--	--	--	--	--	114
May 26	114	52	--	10.2	1.3	5	7.8	274	--	--	--	--	--	--	141	--	--	--	--	--	129
June 2	---	50	--	10.1	1.0	4	7.6	265	7.0	0.04	34	11	3.8	--	138	13	3.5	0.0	8.4	160	130
June 9	---	90	--	10.2	1.2	5	7.6	285	--	--	--	--	--	--	136	--	--	--	--	--	199
June 16	---	236	--	8.6	1.3	5	7.6	290	--	--	--	--	--	--	152	--	--	--	--	--	234
June 23	---	242	--	9.0	1.3	10	8.0	303	--	--	--	--	--	--	156	--	--	--	--	--	135
June 30	---	149	--	8.0	1.1	15	7.6	208	--	--	--	--	--	--	100	--	--	--	--	--	135
July 7	---	67	--	9.1	1.2	5	8.0	289	7.6	.04	38	13	1.6	--	152	14	3.5	.0	9.6	181	148
July 14	---	87	--	8.1	.3	5	7.5	247	--	--	--	--	--	--	122	--	--	--	--	--	148
July 21	---	66	--	10.1	.2	5	7.7	227	--	--	--	--	--	--	162	--	--	--	--	--	197
July 28	---	60	--	10.4	1.6	5	8.0	317	--	--	--	--	--	--	166	--	--	--	--	--	197
Aug. 4	---	64	12	8.6	2.6	5	7.6	284	--	--	--	--	--	--	146	--	--	--	--	--	182
Aug. 11	---	50	66	12	13.9	7	7.9	343	6.8	.06	45	15	3.4	--	184	16	3.6	.0	11	212	174
Aug. 18	---	46	65	12	10.0	4.4	8.0	346	--	--	--	--	--	--	184	--	--	.0	6.8	--	183
Aug. 25	---	56	68	12	10.0	2.2	15	8.0	361	--	--	--	--	--	193	--	--	.0	9.2	--	189
Sept. 1	---	47	61	4	10.6	1.1	2	7.4	361	--	--	--	--	--	201	--	--	.0	10	--	207
Sept. 8	---	48	68	6	9.5	.9	3	8.0	359	--	--	--	--	--	203	--	--	--	9.8	--	219
Sept. 15	---	40	61	5	10.4	.0	3	7.9	337	.10	53	17	--	--	199	20	5.0	.1	8.8	207	202
Sept. 22	---	45	59	12	10.0	1.2	5	7.7	359	--	--	--	--	--	202	--	--	--	9.2	--	257
Sept. 28	---	48	57	10	10.6	1.4	5	8.1	352	--	--	--	--	--	197	--	--	--	9.0	--	219

POTOMAC RIVER BASIN--Continued  
MONOCACY RIVER AT BRIDGEPORT, MD.

LOCATION.--At gaging station sixty feet downstream from bridge on State Highway 32, at Bridgeport, Carroll County.

DRAINAGE AREA.--173 square miles.

RECORDS AVAILABLE.--Chemical analyses: April to September 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1111. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended sediment	Dissolved oxygen	Biochemical oxygen demand (five days at 20° C.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>	
Apr. 14, 1948	1,260	45	--	--	--	1	6.8	128	--	--	--	--	--	--	36	--	--	--	--	3.5	--	54
May 5	425	56	--	9.5	1.5	30	7.2	137	--	--	--	--	--	--	45	--	--	--	--	2.5	--	54
May 11	162	69	--	8.2	1.1	7	7.0	132	--	--	--	--	--	--	39	--	--	--	--	--	--	48
May 19	120	60	--	8.6	1.0	23	7.2	151	--	--	--	--	--	--	55	--	--	--	--	--	--	60
May 26	74	68	--	7.0	1.2	9	7.6	173	--	--	--	--	--	--	63	--	--	--	--	--	--	66
June 2	67	69	--	7.3	1.1	19	6.9	136	9.6	0.03	14	4.7	3.3	43	19	2.5	0.0	--	3.6	92	54	
June 9	35	70	--	7.5	1.2	15	7.0	135	--	--	--	--	--	--	54	--	--	--	--	--	--	73
June 16	63	72	--	6.2	2.0	15	7.0	140	--	--	--	--	--	--	42	--	--	--	--	--	--	80
June 23	71	71	--	6.9	1.4	25	7.4	155	--	--	--	--	--	--	48	--	--	--	--	--	--	110
June 30	52	80	--	5.6	1.0	20	7.4	140	--	--	--	--	--	--	42	--	--	--	--	--	--	92
July 7	48	75	--	6.0	1.4	30	7.4	145	9.8	.35	16	4.8	3.7	46	18	3.5	.0	--	7.8	104	60	
July 14	21	78	--	5.3	.3	20	7.2	150	--	--	--	--	--	--	48	--	--	--	--	--	--	98
July 21	17	76	--	6.2	.2	20	7.1	140	--	--	--	--	--	--	58	--	--	--	--	--	--	98
July 28	28	77	--	5.4	2.4	20	7.1	162	--	--	--	--	--	--	62	--	--	--	--	--	--	89
Aug. 4	167	74	165	6.5	2.2	30	7.1	158	--	--	--	--	--	--	58	--	--	--	--	--	--	104
Aug. 11	17	78	38	8.2	2.0	23	6.9	156	11	.11	16	5.1	5.4	51	21	3.8	.0	4.5	108	61	108	
Aug. 18	12	72	28	8.8	2.6	15	7.5	162	--	--	--	--	--	--	68	--	--	.0	.6	--	--	116
Aug. 25	44	74	84	6.4	3.0	90	6.9	150	--	--	--	--	--	--	52	--	--	.0	4.4	--	--	170
Sept. 1	10	70	22	6.9	.7	10	6.9	176	--	--	--	--	--	--	71	--	--	--	2.4	--	--	183
Sept. 8	8.2	72	22	6.6	.6	10	7.4	195	--	--	--	--	--	--	82	--	--	--	.8	--	--	146
Sept. 15	7.1	68	19	7.0	1.0	7	7.2	190	.8	.11	27	8.1	4.4	84	32	5.5	.0	.5	119	101	101	
Sept. 22	5.4	66	26	6.6	1.4	5	7.5	201	--	--	--	--	--	--	92	--	--	--	.6	--	--	146
Sept. 29	5.2	61	18	8.3	1.6	5	7.7	215	--	--	--	--	--	--	94	--	--	--	.6	--	--	146



## PART 2. SOUTH ATLANTIC SLOPE AND EASTERN GULF OF MEXICO BASINS

## JAMES RIVER BASIN

## JACKSON RIVER AT FALLING SPRING, VA.

LOCATION.--At gaging station at Smith Bridge, 1 mile south of town of Falling Spring, Alleghany County, and 1½ miles downstream from Falling Springs Creek.

DRAINAGE AREA.--409 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1929 to March 1930, October 1947 to September 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 7, 1947	74		5	--		6.4	0.03	41	7.8	2.0		112	42	2.0	0.1	0.1	164	134
Nov. 5	1,410		--	--		--	--	--	--	--		55	--	--	--	--	--	57
Dec. 9	219		3	7.5		4.5	.04	29	4.2	1.8		86	20	1.5	.0	.2	102	90
Jan. 6, 1948	257		4	7.5		4.0	.03	24	3.4	2.3		70	17	2.2	.2	.3	88	74
Feb. 3	160		1	7.5		5.0	.04	31	5.3	1.7		91	25	1.5	.0	.2	118	99
Mar. 9	1,830		5	7.3		5.4	.03	14	2.0	2.1		44	8.6	1.2	.1	.9	56	43
Apr. 7	1,340		7	7.4		5.0	.04	15	2.9	2.0		48	11	1.5	.2	.4	62	49
May 18	414		4	7.5		6.2	.04	25	3.1	2.1		79	12	1.5	.1	.1	90	75
June 15	214		6	7.8		5.7	.02	29	4.2	2.3		90	18	1.2	.1	.3	109	90
July 20	170		5	7.9		7.2	.04	30	5.1	5.5		98	24	1.2	.1	.5	127	96
Aug. 13	428		8	7.9		5.6	.01	22	3.3	1.8		71	11	1.5	.1	.4	83	63
Sept. 7	153		5	7.3		6.8	.02	37	5.8	3.1		107	31	1.8	.1	.2	144	116

## JAMES RIVER BASIN--Continued

## JAMES RIVER AT LICK RUN, VA.

LOCATION.--At gaging station at old highway bridge at Lick Run, Botetourt County, 1,000 feet downstream from bridge on U. S. Highway 220, three-quarters of a mile downstream from confluence of Cowpasture and Jackson Rivers.

DRAINAGE AREA.--1,369 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948																		
Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948										Total hardness as CaCO <sub>3</sub>		
						Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)		Nitrate (NO <sub>3</sub> )	Dissolved solids
Oct. 9, 1947	312		85	7.1		7.0	0.04	47	5.4	57		128	101	37	0.1	0.3	338	139
Nov. 6	3,060		10	7.1		6.6	.02	24	3.2	6.5		61	21	10	.0	1.5	100	73
Dec. 10	650		40	7.7		4.2	.03	40	4.5	26		98	60	22	.0	.2	212	118
Jan. 7, 1948	716		55	7.3		4.0	.02	35	4.3	23		100	48	17	.0	.2	190	105
Feb. 5	905		--	7.3		5.0	.05	37	4.8	30		107	58	21	.0	.2	225	112
Mar. 10	4,560		5	7.1		5.4	.06	12	2.1	3.8		39	9.8	2.8	.1	.6	60	39
Apr. 7	3,400		25	7.5		4.6	.06	26	3.8	7.7		74	24	7.5	.3	.1	116	80
May 21	1,010		40	7.1		7.6	.03	33	3.7	16		89	33	17	.1	.2	162	98
June 16	709		42	7.3		6.4	.04	39	4.3	26		108	44	26	.0	.1	210	115
July 22	521		35	7.2		6.8	.06	44	4.5	24		106	55	25	.0	.1	222	128
Aug. 10	814		15	7.8		6.6	.04	32	4.1	14		93	33	11	.1	.2	153	97
Sept. 9	468		18	7.1		5.0	.01	41	4.4	18		118	43	12	.0	1.6	190	120

## JAMES RIVER BASIN--Continued

## JAMES RIVER AT BUCHANAN, VA.

LOCATION--At gaging station at Chesapeake & Ohio Railway station at Buchanan, Botetourt County, 300 feet upstream from bridge on U. S. Highway 11, 1,000 feet upstream from Purgatory Creek, and 1½ miles downstream from Looney Creek.

DRAINAGE AREA.--2,084 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1929 to March 1930, October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 217 parts per million Oct. 1-10; minimum, 77 parts per million Mar. 21-31.

Total hardness: Maximum, 141 parts per million Sept. 21-30; minimum, 58 parts per million Mar. 21-31.

Water temperatures: Maximum, 84° F. June 28, July 5-6; minimum, 34° F. Dec. 29-30.

EXTREMES, 1929-30, 1947-48.--Dissolved solids: Maximum, 289 parts per million Sept. 21-30, 1929; minimum, 77 parts per million Mar. 21-31, 1948.

Total hardness: Maximum, 163 parts per million Sept. 21-30, 1929; minimum, 56 parts per million May 1-10, 1929.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
Oct. 1-10, 1947	674	61	12	7.6	5.4	32	7.4	0.03	39	7.6	25	2.7	126	53	18	0.0	0.4	217	129
Oct. 11-20	2,026	63	54	6.8	4.2	15	7.1	0.02	28	6.0	9.1	9.1	95	25	6.8	.1	.7	132	94
Oct. 21-31	1,685	60	44	8.0	4.4	14	7.2	0.07	32	6.6	9.4	1.5	101	30	9.2	.0	.6	148	107
Nov. 1-10	7,180	54	168	10	3.6	18	7.4	0.02	25	4.6	2.9	7.1	80	17	3.8	.1	.7	104	81
Nov. 11-20	2,770	48	18	4.8	3.6	6	7.3	0.03	24	5.2	7.1	7.0	82	20	5.5	.1	.8	110	81
Nov. 21-30	2,039	46	12	4.4	3.2	7	7.3	0.03	26	5.2			86	21	6.0	.1	.6	118	86
Dec. 1-10	1,188	42	2	2.0	.6	8	7.4	0.02	30	6.5	11		98	30	9.5	.2	.4	143	102
Dec. 11-20	1,661	40	3	2.2	2.0	15	7.3	0.04	28	5.7	11	8.4	89	29	9.2	.0	.2	137	93
Dec. 21-31	1,312	37	1	1.4	1.4	8	7.3	0.02	27	5.6	12	10.4	92	25	5.8	.0	.3	126	92
Jan. 1-10, 1948	1,024	40	1	2.4	2.9	10	7.5	0.03	33	6.6			104	33	11	.0	.1	154	110
Jan. 11-20	1,303	39	--	6.0	4.3	3	7.2	0.03	29	6.3	10	5.4	96	28	9.0	.0	.1	141	98
Jan. 21-31	996	39	6	4.7	3.7	12	7.5	0.03	32	5.9	14		102	32	12	.0	.1	157	104
Feb. 1-10	1,612	39	11	9.1	4.7	18	7.7	0.03	29	5.2	9.9	2.0	92	29	10	.1	.1	142	94
Feb. 11-20	12,810	46	68	2.8	2.7	6	7.4	0.04	20	4.4	1.6		62	14	4.0	.0	.7	86	68
Feb. 21-29	3,942	51	1	1.6	1.4	5	7.5	0.02	22	4.7	4.0		73	15	4.5	.2	.8	96	74
Mar. 1-10	5,091	51	16	2.3	1.0	10	7.5	0.02	20	4.2	3.8		66	14	4.0	.2	.6	88	67
Mar. 11-20	3,650	53	--	--	--	10	7.4	0.02	20	4.6	4.9		70	15	4.2	.1	.5	93	69
Mar. 21-31	9,608	58	14	2.7	2.9	10	7.5	0.02	17	3.7	2.5	1.4	60	11	3.8	.1	.5	77	58
Apr. 1-10	8,015	61	131	5.3	1.3	5	7.1	0.03	23	4.6	2.7		80	12	2.6	.1	.4	95	76
Apr. 11-20	8,082	62	29	2.2	1.7	8	7.4	0.01	18	4.0	3.6		65	11	3.0	.0	.2	81	61
Apr. 21-30	2,444	57	5	2.6	2.2	10	7.4	0.02	25	5.3	7.0		90	18	4.8	.0	.3	113	84
May 1-10	7,023	63	9	2.1	1.5	8	7.3	0.01	19	3.7	4.6		62	14	4.2	.1	.4	87	63
May 11-20	3,432	67	34	2.4	1.4	10	7.9	0.03	21	4.4	6.6		78	14	4.2	.1	.3	96	70
May 21-31	1,645	72	21	3.4	3.2	19	7.3	0.03	32	6.7	7.9		107	24	8.2	.1	.1	147	107

JAMES RIVER BASIN--Continued  
JAMES RIVER AT BUCHANAN, VA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered															
Aug. 1-10, 1948 ---	3,723	71	80	4.4	2.5	20	7.4	7.5	0.03	24	5.4		6.1	86	15	4.5	0.2	0.8	112	82
Aug. 11-20 -----	1,105	76	15	2.4	1.8	8	7.6	5.3	.03	34	7.5		5.9	116	26	10	.2	.6	155	116
Aug. 21-31 -----	791	78	10	3.0	2.1	9	7.6	5.4	.02	38	8.0		12.	122	33	13	.2	.5	177	128
Sept. 1-10 -----	785	77	29	3.5	2.9	20	7.6	6.0	.03	40	8.2	.4	9.3	128	35	15	.2	.4	191	134
Sept. 11-20 -----	756	73	--	--	--	12	7.4	4.5	.02	39	8.4		9.3	123	33	12	.0	.1	181	132
Sept. 21-30 -----	600	66	17	4.6	3.4	25	7.2	6.8	.03	43	8.1	16	16	134	41	16	.0	.1	206	141
Average -----	2,965	60	30	4.0	2.7	13	--	6.2	0.03	29	5.9		8.7	95	24	8.0	0.1	0.4	134	97

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	60	56	42	40	38	55	58	64	72	76	74	76
2	57	55	40	40	36	53	60	65	71	76	75	76
3	60	54	40	41	40	53	60	65	69	78	70	76
4	59	55	40	40	40	50	60	63	70	82	70	76
5	61	55	42	41	40	52	61	62	70	84	71	75
6	60	56	44	40	40	50	60	60	73	84	68	75
7	61	55	42	41	40	--	64	61	74	80	74	76
8	63	54	46	38	40	50	64	61	74	78	70	75
9	64	50	42	41	40	51	61	61	70	--	70	75
10	62	48	40	39	40	50	--	66	71	78	70	--
11	60	50	40	40	40	51	60	66	70	79	75	--
12	60	50	41	41	40	51	61	69	72	79	74	--
13	60	48	41	44	44	50	62	69	74	79	79	--
14	64	48	39	40	45	54	62	68	74	79	78	--
15	62	48	36	38	45	51	60	66	74	76	78	--
16	65	48	39	38	46	53	60	67	75	79	74	--
17	66	47	40	37	47	54	62	66	75	80	74	73
18	67	47	41	36	50	53	63	66	74	80	75	73
19	65	44	40	36	51	52	64	69	77	79	75	72
20	64	46	38	38	52	57	65	68	76	80	76	74
21	62	48	37	38	--	60	68	68	77	80	76	70
22	61	48	40	38	--	60	64	69	78	80	78	68
23	60	48	37	40	47	60	60	70	79	83	77	66
24	60	48	37	36	46	61	68	74	80	80	77	66
25	60	48	37	36	48	56	68	72	81	80	78	65
26	60	46	39	39	47	59	70	72	79	81	76	63
27	60	43	36	39	54	61	71	72	81	80	82	62
28	61	42	37	40	56	56	70	71	84	80	78	67
29	62	44	34	40	56	54	65	72	79	80	77	68
30	58	44	34	40	--	54	65	74	79	82	80	66
31	58	--	38	40	--	57	--	73	--	83	78	--
Average	61	49	39	39	45	54	63	67	75	80	75	--

JAMES RIVER BASIN--Continued  
JAMES RIVER AT HOLCOMBS ROCK, VA.

LOCATION.--At gaging station at Holcombs Rock, Bedford County, half a mile downstream from Pedlar River.  
DRAINAGE AREA.--3,250 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1930 to March 1931, October 1947 to September 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 7, 1947	740		55	7.3		6.8	0.03	33	7.9	13		125	29	7.8	0.1	0.3	166	115
Nov. 3	8,100		40	7.3		9.7	.04	23	4.9	11		94	17	5.0	.1	.3	149	76
Dec. 8	1,840		30	7.1		5.6	.05	30	5.9	8.9		103	22	7.8	.0	.2	134	99
Feb. 2, 1948	1,360		2	7.5		10	.02	58	7.2	7.5		190	22	8.5	.0	.1	213	174
Mar. 15	4,740		15	7.3		5.6	.03	22	4.2	3.8		76	12	3.8	.0	.3	93	72
Apr. 12	9,450		15	7.5		6.1	.04	18	3.7	5.1		68	9.8	2.3	.3	.6	78	60
May 14	9,670		10	7.2		6.8	.02	21	3.9	4.4		78	9.5	2.6	.1	.3	91	68
June 17	2,180		24	7.3		7.0	.02	25	4.8	8.3		90	16	6.0	.1	1.5	122	52
July 15	1,670		20	7.6		4.9	.05	30	6.6	7.8		117	17	3.4	.1	.3	132	102
Aug. 24	1,840		15	7.9		3.9	.02	33	8.3	5.1		122	16	6.5	.2	1.6	143	116
Sept. 17	1,190		40	7.3		5.0	.03	36	8.0	13		136	25	8.8	.1	.3	175	123

JAMES RIVER BASIN--Continued  
JAMES RIVER AT BENT CREEK, VA.

LOCATION --At gaging station at bridge on U. S. Highway 60 at town of Bent Creek, Appomattox County, 150 feet downstream from Bent Creek and 1 mile downstream from Gladstone, Nelson County.

DRAINAGE AREA --3,671 square miles.

RECORDS AVAILABLE --3,671 square miles.

Water temperatures: October 1947 to September 1948.

EXTREMES 1947-48: Dissolved solids: Maximum 204 parts per million Oct. 1-10; minimum 55 parts per million Mar. 21-31, Apr. 11-20.

Total hardness: Maximum 121 parts per million Oct. 1-10; minimum 33 parts per million Mar. 21-31.

Water temperatures: Maximum 86° F Aug 27-30; minimum 33° F Jan. 20, Feb. 3.

REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
Oct. 1-10, 1947 -----	1,045	64	1	8.1	7.2	40	7.3	0.01	35	8.1	20	3.8	128	40	16	0.1	0.3	204	121
Oct. 11-20 -----	3,359	65	64	5.2	5.2	25	7.1	0.3	24	5.4	12	12	86	24	8.5	0.1	0.3	133	82
Oct. 21-31 -----	2,962	64	16	5.0	5.2	20	7.2	0.7	26	5.5	9.7	9.7	93	21	7.0	0.1	0.4	131	87
Nov. 1-10 -----	6,772	55	118	5.7	4.6	20	7.3	0.7	22	3.9	5.1	1.2	76	19	6.5	0.1	0.4	111	71
Nov. 11-20 -----	4,563	48	20	3.6	3.6	20	7.3	0.1	23	4.5	5.1	5.3	76	16	4.5	0.1	0.6	104	73
Nov. 21-30 -----	3,582	46	5	5.8	4.2	15	7.3	0.4	23	5.1	5.3	5.3	76	17	5.5	0.1	0.3	108	78
Dec. 1-10 -----	2,224	42	3	7.0	6.2	20	7.5	0.3	24	5.1	8.3	8.3	86	18	6.5	0.1	0.3	116	81
Dec. 11-20 -----	2,558	40	2	8.0	6.4	25	7.5	0.4	27	5.9	11	11	96	24	8.0	0.1	0.3	133	92
Dec. 21-31 -----	2,108	37	--	5.2	4.8	4	7.1	0.5	24	4.9	9.2	9.2	86	20	6.0	0.1	0.4	116	80
Jan. 1-10, 1948 -----	1,831	38	--	3.3	2.9	7	7.1	0.5	26	5.7	10.9	10.9	96	21	6.5	0.1	0.2	128	88
Jan. 11-20 -----	3,106	35	--	4.0	2.8	10	7.1	0.3	23	4.9	10	10	84	20	7.2	0.1	0.2	118	78
Jan. 21-31 -----	2,023	36	1	6.3	2.2	20	7.5	0.3	24	4.4	10	10	86	19	7.0	0.1	0.2	121	78
Feb. 1-10 -----	2,897	34	19	6.8	6.3	25	7.5	0.6	26	3.8	9.8	2.2	94	22	7.8	0.1	0.2	133	80
Feb. 11-20 -----	17,450	41	78	4.6	2.3	14	7.1	0.7	19	3.9	2.2	2.2	60	13	3.5	0.1	0.6	93	63
Feb. 21-29 -----	7,151	44	11	3.8	2.9	15	7.5	0.5	20	3.9	4.9	4.9	66	13	6.0	0.1	0.5	91	66
Mar. 1-10 -----	7,658	46	27	3.1	1.8	10	7.3	0.2	20	5.4	1.9	1.9	68	13	4.2	0.1	0.6	89	72
Mar. 11-20 -----	6,782	50	2	2.3	2.0	15	7.3	0.5	19	3.9	4.3	4.3	87	12	3.2	0.1	0.4	86	63
Mar. 21-31 -----	13,360	56	35	3.5	2.9	10	7.4	0.1	17	3.0	2.1	1.2	58	8.9	2.8	0.1	0.3	76	55
Apr. 1-10 -----	14,800	57	138	4.1	--	10	7.4	0.5	18	3.8	4.1	4.1	86	10	3.0	0.1	0.9	82	60
Apr. 11-20 -----	11,940	58	50	3.0	2.3	10	7.3	0.5	17	3.4	3.3	3.3	80	13	2.8	0.1	0.6	76	56
Apr. 21-30 -----	4,772	65	17	3.2	3.1	10	7.2	0.1	22	4.6	5.3	5.3	80	10	4.2	0.1	0.4	100	74
May 1-10 -----	9,576	64	24	3.8	3.4	10	7.3	0.5	20	4.1	3.9	3.9	71	12	3.2	0.1	0.9	91	67
May 11-20 -----	7,122	65	32	3.2	2.6	20	7.2	0.6	18	3.7	4.5	4.5	87	9.8	2.8	0.1	0.4	85	60
May 21-31 -----	3,149	69	22	4.4	3.5	24	7.2	0.2	25	5.3	7.9	7.9	96	15	4.5	0.1	0.4	119	84

JAMES RIVER BASIN--Continued  
JAMES RIVER AT BENT CREEK, VA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (°F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
June 1-10, 1948	4,176	72	20	3.8	3.3	21	7.3	8.0	0.05	22	4.2	6.7	81	14	3.8	0.1	0.4	105	72
June 11-20	2,440	77	15	4.0	3.4	30	7.3	7.8	.08	24	4.9	8.2	93	16	4.8	.1	.2	120	80
June 21-30	2,345	82	14	4.1	3.9	31	7.4	6.8	.03	26	5.7	9.4	101	29	6.6	.1	.2	137	93
July 1-10	2,234	83	13	5.1	4.3	26	7.5	7.4	.04	27	5.5	11	103	19	5.0	.2	.4	134	90
July 11-20	1,824	82	19	4.2	3.6	27	7.4	6.3	.03	28	6.6	11	112	17	5.5	.2	.6	137	97
July 21-31	1,495	84	8	4.4	4.4	30	7.4	3.7	.02	28	5.9	12	101	22	8.5	.2	.2	141	94
Aug. 1-10	9,164	80	70	4.8	3.7	28	7.6	6.8	.01	25	4.9	6.2	94	11	4.2	.2	.7	112	83
Aug. 11-20	2,493	86	5	3.5	2.2	20	7.5	6.5	.03	27	6.0	7.2	105	14	4.5	.1	.7	126	92
Aug. 21-31	1,793	85	3	5.1	4.6	26	7.8	3.9	.04	31	7.0	11	117	21	8.0	.1	.2	150	106
Sept. 1-10	1,572	77	2	5.4	5.3	28	7.8	5.0	.02	31	7.1	12	121	23	7.1	.1	.2	160	107
Sept. 11-20	1,560	75	1	5.4	5.3	32	7.8	6.0	.02	32	7.3	14	122	23	12	.1	.2	183	110
Sept. 21-30	1,284	68	11	5.7	5.4	30	7.7	5.8	.02	32	7.2	15	126	24	9.0	.1	.2	184	109
Average	4,886	60	26	4.7	3.9	26	--	6.8	0.03	24	5.1	8.4	89	18	6.0	0.1	0.4	119	81



Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	80	59	40	37	34	48	54	69	71	84	82	76
2	60	57	39	40	34	34	56	68	70	83	80	76
3	63	41	39	39	33	46	56	64	71	85	79	70
4	54	63	42	39	34	48	56	66	72	83	79	74
5	63	42	42	37	34	46	57	62	72	84	79	76
6	85	56	44	35	35	45	59	61	72	83	80	77
7	65	42	41	35	35	46	56	61	72	82	80	77
8	67	55	44	--	34	45	60	61	73	81	80	78
9	66	52	42	--	36	44	--	65	71	79	80	79
10	63	52	41	36	36	44	--	65	71	80	79	78
11	63	52	41	37	38	45	57	64	73	80	79	77
12	61	51	41	35	39	46	58	63	74	81	81	72
13	64	50	40	34	39	47	59	64	75	83	81	74
14	64	49	40	37	39	49	57	65	76	83	79	75
15	62	47	39	34	40	49	57	66	77	83	78	76
16	65	48	40	36	41	52	57	66	79	83	79	73
17	66	47	39	36	42	53	59	67	78	83	80	75
18	68	45	38	36	42	52	60	68	79	83	80	74
19	67	45	39	--	44	51	60	65	79	83	80	75
20	68	45	39	33	48	55	60	65	79	83	--	76
21	67	45	37	35	46	60	64	65	80	84	83	76
22	67	45	39	36	44	60	64	68	80	84	83	67
23	66	47	37	36	43	55	62	70	81	84	85	67
24	64	47	36	36	41	54	65	69	82	85	85	66
25	63	46	36	36	42	58	68	70	83	83	85	67
26	64	46	36	36	44	58	69	68	83	83	85	65
27	63	45	38	35	46	56	67	68	83	85	86	67
28	65	46	38	36	48	54	65	70	84	85	86	67
29	65	46	38	36	--	54	62	73	84	85	86	68
30	59	45	36	36	--	52	62	72	--	85	86	68
31	60	--	37	36	--	52	--	70	--	85	80	--
Average	64	49	39	36	40	51	60	66	77	83	82	73

JAMES RIVER BASIN--Continued  
JAMES RIVER AT SCOTTSVILLE, VA.

LOCATION --At gaging station at bridge on State Highway 20 at Scottsville, Albemarle County, 6 miles upstream from Hardware River. DRAINAGE AREA 4,571 square miles.

RECORDS AVAILABLE: April 1930 to March 1931, October 1947 to September 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 17, 1947	3,010		30	7.3		9.5	0.11	17	3.8	11		50	29	6.8	0.1	0.3	102	58
Nov. 14	5,830		25	6.9		8.8	.27	14	3.0	5.0		40	19	3.5	.0	.7	74	47
Dec. 17	3,920		40	7.3		8.1	.44	16	3.8	9.0		44	30	5.2	.1	.2	97	56
Jan. 16, 1948	4,700		25	7.3		8.8	.18	14	2.7	5.6		42	16	4.8	.1	.3	77	46
Feb. 9	4,500		--	--		--	--	--	--	--		65	26	7.5	.1	.8	--	--
Mar. 22	5,830		8	7.2		7.5	.02	15	3.1	7.6		49	20	3.8	.1	.1	81	50
Apr. 5	11,500		10	7.1		8.0	.14	12	2.8	3.1		40	11	2.0	.2	.6	60	41
May 10	13,800		5	6.9		7.6	.04	12	2.1	3.3		38	11	2.0	.1	.2	59	39
June 14	3,010		15	7.3		8.7	.04	17	3.6	6.7		47	26	4.0	.1	.5	93	57
July 13	2,710		13	7.8		6.7	.04	22	4.9	6.3		52	37	4.8	.2	.4	115	75
Aug. 25	2,420		8	7.4		6.5	.03	20	4.9	8.2		49	38	5.2	.2	.4	112	70
Sept. 14	1,890		17	7.4		7.0	.01	25	5.8	9.9		84	26	7.9	.1	.5	131	96

## JAMES RIVER BASIN--Continued

## JAMES RIVER AT CARTERSVILLE, VA.

LOCATION.--At gaging station at bridge on State Highway 45 between Pemberton and Cartersville, Cumberland County, 2 miles downstream from Willis River.

DRAINAGE AREA.--6 242 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1929 to March 1930, October 1947 to September 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 16, 1947	3,240		30	7.3		9.2	0.06	20	5.0	11		64	27	8.8	0.1	0.5	117	70
Nov. 13	9,520		20	7.1		10	.01	8.6	2.0	4.7		29	10	3.2	.0	1.4	55	30
Dec. 18	4,830		15	7.3		9.8	.30	12	2.9	5.7		37	17	4.2	.0	.5	73	42
Jan. 15, 1948	10,700		20	7.1		9.1	.01	5.7	1.7	4.9		19	9.5	3.6	.1	.9	47	21
Feb. 9	5,980		16	7.3		10	.36	15	3.6	7.7		48	21	5.5	.0	.1	91	52
Mar. 18	8,210		23	7.1		11	.22	10	2.6	3.0		34	11	1.5	.2	.4	62	36
Apr. 15	20,000		10	7.3		9.8	.02	10	2.5	4.5		38	8.4	3.0	.2	.5	58	35
May 10	18,400		4	6.8		9.0	.04	9.9	1.9	4.4		36	8.5	2.2	.1	.5	56	32
June 17	4,020		22	7.0		11	.14	11	2.7	4.9		34	16	2.8	.1	.5	70	39
July 16	4,570		70	7.8		8.3	.07	10	2.8	4.5		30	15	3.2	.2	1.1	67	36
Aug. 26	3,300		17	7.6		10	.08	13	3.6	4.4		45	13	3.9	.2	.3	75	47
Sept. 16	2,500		14	7.7		9.1	.01	17	4.1	9.0		60	20	5.9	.1	.3	98	59

## JAMES RIVER BASIN--Continued

## JAMES RIVER AT RICHMOND, VA.

LOCATION--At filtration plant of Richmond Waterworks, half-a-mile west of city limits of Richmond, Henrico County, and 2½ miles downstream from gaging station which is 3 miles west of Richmond.

DRAINAGE AREA--6,757 square miles above gaging station.

RECORDS AVAILABLE--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48--Dissolved solids: Maximum, 129 parts per million Oct. 11-20; minimum, 58 parts per million Apr. 1-10.

Total hardness: Maximum, 76 parts per million Sept. 21-31; minimum, 35 parts per million Apr. 1-10.

Water temperatures: Maximum, 89° F. Aug. 28; minimum, 34° F. Jan. 8.

REMARKS--Records of discharge for gaging station for water year October 1947 to September 1948 given in Water-Supply Paper 1112. Records of quantities of suspended matter available in district office at Charlottesville, Va.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
Oct. 1-10, 1947	840	66	11	3.7	3.6	20	7.3	11	0.04	20	11	2.1	63	33	7.5	0.2	0.5	125	69
Oct. 11-20	3,699	66	20	4.7	3.3	20	7.3	10	0.04	21	4.7	14	66	33	8.8	0.1	0.6	129	72
Oct. 21-31	2,811	67	23	3.8	3.4	20	7.5	12	0.01	16	3.8	8.3	50	24	5.0	0.1	0.5	96	56
Nov. 1-10	11,380	61	139	5.4	3.2	15	7.3	10	0.01	18	3.5	6.4	54	20	5.2	0.1	0.8	94	59
Nov. 11-20	8,669	52	42	4.6	3.8	20	7.3	11	0.14	12	2.8	5.3	40	14	3.2	0.2	0.7	72	41
Nov. 21-30	5,997	47	11	4.2	3.6	15	7.3	10	0.30	15	3.3	5.2	48	16	4.2	0.0	0.5	83	51
Dec. 1-10	3,497	45	7	4.8	3.2	25	7.3	10	0.42	17	3.6	6.9	54	20	4.8	0.0	0.4	88	57
Dec. 11-20	3,769	43	7	4.8	3.2	25	7.3	11	0.30	15	3.8	7.4	49	21	4.8	0.0	0.4	89	53
Dec. 21-31	3,355	41	--	3.3	3.1	8	7.1	10	0.20	17	3.8	7.9	55	22	4.9	0.0	0.3	98	58
Jan. 1-10, 1948	2,913	40	--	3.4	2.5	6	7.0	10	0.08	14	3.3	7.7	44	22	4.4	0.0	0.2	85	48
Jan. 11-20	8,378	39	--	3.2	3.0	10	6.8	9.3	0.07	11	2.8	6.9	35	19	3.6	0.0	0.5	71	39
Jan. 21-31	4,005	37	9	3.8	3.4	25	7.3	11	0.16	14	2.9	6.8	41	19	5.5	0.0	0.6	83	47
Feb. 1-10	4,774	36	9	4.3	4.5	30	7.3	11	0.30	13	3.1	5.2	40	21	4.5	0.0	0.3	86	45
Feb. 11-20	26,410	40	150	--	3.1	25	7.3	7.6	0.02	14	2.9	5.3	44	15	4.2	0.0	1.0	73	47
Feb. 21-28	11,160	47	20	3.0	2.0	16	7.3	8.7	0.07	13	2.8	3.2	42	11	3.1	0.0	0.8	64	44
Mar. 1-10	11,570	50	169	2.8	2.6	15	7.3	9.7	0.11	12	2.9	2.9	40	13	4.0	0.0	0.9	69	42
Mar. 11-20	10,530	52	24	2.3	2.0	10	7.3	9.2	0.09	13	2.7	4.2	41	11	3.2	0.1	0.4	65	41
Mar. 21-31	19,400	60	74	2.4	2.6	20	7.4	8.6	0.04	12	2.8	4.1	42	12	3.8	0.1	0.4	67	44
Apr. 1-10	28,040	60	127	3.6	2.8	30	7.3	8.6	0.03	10	2.4	3.1	35	8.9	2.2	0.1	0.2	58	35
Apr. 11-20	18,530	61	61	3.3	3.1	61	7.3	8.4	0.10	12	2.6	2.4	41	12	3.0	0.1	0.6	64	41
Apr. 21-30	8,152	64	16	2.7	1.6	7	7.1	8.8	0.11	12	3.1	3.8	41	12	3.2	0.0	0.5	68	43
May 1-10	13,600	66	34	3.2	2.1	10	7.3	7.6	0.08	13	3.2	4.4	45	13	3.2	0.0	0.4	71	46
May 11-20	12,580	70	52	3.0	2.1	25	7.3	9.8	0.09	11	2.5	3.5	39	9.5	2.2	0.1	0.2	62	38
May 21-31	5,883	71	15	2.2	1.8	21	7.2	11	0.16	13	3.1	4.9	45	13	3.5	0.0	0.5	75	45

June 1-10 -----	6,493	74	30	3.0	2.1	24	7.4	12	.06	16	3.5	5.7	54	16	3.5	.1	.6	86	54
June 11-20 -----	3,748	76	13	2.4	2.0	20	7.3	12	.06	15	3.4	5.9	48	18	4.0	.1	.4	86	51
June 21-30 -----	3,547	82	12	3.1	2.5	19	7.3	11	.05	15	3.6	6.8	56	15	3.5	.1	.5	88	52
July 1-10 -----	3,100	84	12	2.8	2.6	19	7.5	11	.03	20	4.5	8.4	74	14	5.0	.2	.5	106	68
July 11-20 -----	2,865	84	18	3.0	2.6	21	7.5	10	.12	16	3.7	7.8	54	20	4.2	.2	.6	95	55
July 21-31 -----	2,267	85	16	2.8	2.2	14	7.5	9.3	.05	18	4.2	8.9	58	22	5.0	.2	.7	101	62
Aug. 1-10 -----	20,740	79	150	3.4	2.4	18	7.2	7.5	.03	13	3.1	4.8	42	15	3.5	.1	.6	75	45
Aug. 11-20 -----	4,856	74	21	2.2	2.1	15	7.5	11	.14	14	3.4	4.0	48	13	2.8	.1	.6	80	49
Aug. 21-31 -----	2,908	84	3	1.9	1.9	15	7.8	9.2	.10	16	4.1	7.2	58	18	4.0	.1	.4	90	57
Sept. 1-10 -----	1,733	80	1	2.0	2.0	10	7.8	6.6	.03	20	4.9	7.9	64	25	5.8	.1	.3	107	70
Sept. 11-20 -----	1,921	78	--	2.5	2.4	12	7.9	9.8	.04	20	5.0	9.2	68	25	5.9	.1	.2	115	70
Sept. 21-30 -----	1,283	71	1	2.8	2.5	13	7.8	9.1	.04	22	5.1	10	72	28	6.4	.1	.1	120	76
Average -----	7,879	62	41	3.3	2.7	18	--	9.8	0.10	15	3.5	6.4	50	18	4.3	0.1	0.5	86	52

## SOUTH ATLANTIC SLOPE AND EASTERN GULF OF MEXICO BASINS

JAMES RIVER BASIN--Continued  
JAMES RIVER AT RICHMOND, VA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	64	44	40	37	54	58	64	73	86	86	86
2	65	63	45	40	37	52	58	67	75	85	85	82
3	63	62	44	40	36	52	59	67	72	85	82	79
4	63	61	44	40	36	49	59	68	72	81	81	78
5	64	61	45	40	36	50	58	66	72	85	82	78
6	66	60	46	40	36	49	58	66	73	86	76	78
7	68	60	46	37	36	47	61	68	73	86	73	79
8	68	60	46	34	36	47	61	68	76	82	75	81
9	68	58	46	40	36	47	64	65	82	76	75	77
10	68	57	46	44	39	48	62	65	76	82	75	79
11	68	55	44	42	39	49	60	65	74	82	72	80
12	64	55	45	40	36	49	60	68	76	84	73	80
13	64	54	43	40	37	49	62	70	78	84	78	78
14	64	54	44	40	37	49	61	70	77	84	74	80
15	64	53	44	38	37	49	61	72	77	84	72	80
16	--	52	42	39	41	53	63	72	76	82	73	80
17	66	52	42	38	41	53	62	72	76	84	73	75
18	66	49	42	39	42	54	61	72	76	84	73	74
19	66	49	42	39	42	58	61	72	76	84	75	76
20	70	49	41	39	47	60	61	71	77	84	79	75
21	68	48	42	39	46	58	63	70	77	84	79	77
22	72	48	42	38	46	58	63	69	79	84	79	75
23	66	48	41	37	44	63	66	70	79	87	80	74
24	68	48	41	38	44	63	63	68	79	85	81	72
25	67	48	41	37	44	61	63	70	79	84	81	70
26	66	48	41	37	47	62	67	72	82	85	82	69
27	66	46	42	37	49	64	67	72	86	85	88	69
28	69	48	40	37	54	59	66	72	86	85	89	87
29	66	46	40	38	52	59	63	72	86	86	88	68
30	66	45	40	37	--	--	64	72	86	86	88	68
31	66	--	40	36	--	59	--	74	--	87	88	--
Average	66	53	43	39	41	54	62	69	77	84	79	76

## JAMES RIVER BASIN

## JAMES RIVER BASIN--Continued

## COMPASTURE RIVER NEAR CLIFTON FORGE, VA.

LOCATION.--At gaging station at bridge on U. S. Highway 60, 1½ miles upstream from confluence with Jackson River and 4 miles southeast of Clifton Forge, Alleghany County.

DRAINAGE AREA.--456 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1929 to March 1930, October 1947 to September 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948										Total hardness as CaCO <sub>3</sub>		
						Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)		Nitrate (NO <sub>3</sub> )	Dissolved solids
Oct. 8, 1947	89		5	7.8		4.4	0.02	28	3.7	1.7		96	7.5	1.5	0.0	0.1	92	85
Nov. 6	701		--	--		--	--	--	--	--		37	--	--	--	--	66	48
Dec. 11	226		2	7.3		4.1	.08	18	2.7	1.5		60	8.2	.8	.1	.3	66	56
Jan. 9, 1948	196		5	7.3		4.4	.08	17	1.7	3.1		54	9.3	1.5	.0	.1	63	49
Feb. 5	250		6	7.3		4.9	.05	18	2.6	2.3		60	8.9	1.5	.0	.2	67	56
Mar. 10	1,580		5	7.0		5.0	.03	9.7	1.7	1.4		29	7.4	1.4	.1	.6	47	31
Apr. 7	1,010		--	--		--	--	--	--	--		40	--	--	--	--	--	--
Apr. 8	1,800		10	7.3		5.2	.10	11	1.9	2.6		36	7.9	1.8	.1	.4	53	35
May 20	330		10	7.3		6.4	.05	17	2.3	1.9		57	6.6	1.5	.1	.1	63	52
June 16	178		6	7.6		5.9	.02	20	2.6	1.5		68	6.4	.9	.0	.3	73	61
July 22	185		4	7.4		5.7	.02	20	2.8	1.3		69	6.0	.8	.0	.3	74	61
Aug. 10	230		10	7.5		6.4	.02	18	2.4	2.6		63	6.8	1.1	.0	.3	69	55
Sept. 8	165		4	7.7		5.8	.01	26	2.2	3.1		88	6.4	1.2	.0	.2	88	74

JAMES RIVER BASIN--Continued  
MAURY RIVER NEAR BUENA VISTA, VA.

LOCATION.--At gaging station half a mile downstream from South River and 2½ miles northwest of Buena Vista, Rockbridge County.  
DRAINAGE AREA.--649 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.  
REMARKS.--Records of water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Date of collection	Mean discharge (second-feet)	Tem- perature (° F.)	Color	pH	Specific conduct- ance (micro- mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948											Dis- solved solids	Nitre (NO <sub>3</sub> )	Fluoride (F)	Chloride (Cl)	Sulfate (SO <sub>4</sub> )	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Mag- nesium (Mg)	Cal- cium (Ca)	Iron (Fe)	Silica (SiO <sub>2</sub> )	Total hardness as CaCO <sub>3</sub>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Oct. 6, 1947-----	99		5	7.9		4.3	0.03	39	12		3.3	170	8.4	3.0	0.0	1.8	155																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											



## JAMES RIVER BASIN--Continued

## BUFFALO RIVER NEAR NORWOOD, VA.

LOCATION.--At gaging station 1 mile downstream from Tye River, 3 miles upstream from Rucker Run, and 4½ miles upstream from mouth and Norwood, Nelson County.  
DRAINAGE AREA.--360 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to May 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second- feet)	Color	pH	Silica (SiO <sub>2</sub> )	Alum- inum (Al)	Iron (Fe)	Manga- nese (Mn)	Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dis- solved solids	Hardness as CaCO <sub>3</sub>		Free acidity as H <sub>2</sub> SO <sub>4</sub>
																		Total	Non- carbon- ate	
Oct. 6, 1947-----	121	1	2.70	13	2.3	1/	1.5	12	1.9	5.8		0	204	5.0	0.4	0.4	240	208	208	115
Nov. 7-----	546	--	3.50	10	--	.4	.25	4.9	1.3	5.9		0	39	6.0	.2	.3	67	37	37	16
Dec. 12-----	313	1	3.50	--	--	--	.30	4.6	1.5	2.4		0	74	2.0	--	.2	114	75	75	16
Jan. 9, 1948-----	245	2	2.60	--	--	2/	.62	--	--	--		0	135	--	--	--	--	--	--	147
Feb. 11-----	313	40	7.1	14	--	--	.48	7.0	2.0	149		45	45	188	--	1.0	476	26	0	--
Mar. 12-----	693	--	3.70	--	--	--	.14	3.4	1.1	4.5		0	29	2.0	.1	.1	40	24	24	10
Apr. 16-----	943	1	4.5	11	--	--	.07	.09	3.0	2.6	1.0	0	20	.5	.0	.2	47	13	13	0
May 14 3/-----	1,530	2	5.7	9.8	--	--	.10	4.1	1.6	2.7		1	19	1.0	.2	.4	48	17	16	--

1/ Total iron (Fe) 14 parts per million.

2/ Total iron (Fe) 3.0 parts per million.

3/ Sample collected 4 miles downstream from gaging station.

JAMES RIVER BASIN--Continued  
 RIVANNA RIVER AT PALMYRA, VA.

LOCATION.--At gaging station 200 feet downstream from bridge on U. S. Highway 15 at Palmyra, Fluvanna County, half a mile upstream from Cunningham Creek, and 15 miles upstream from mouth.

DRAINAGE AREA.--675 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948												
						Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 16, 1947	148		10	6.6		11	0.04	5.1	1.8	5.7		26	3.9	4.2	0.1	1.1	50	20
Nov. 14	592		5	6.7		11	.07	4.6	1.3	4.5		20	5.6	3.0			42	17
Dec. 4	257		8	6.7		12	.10	4.6	1.5	2.7		18	3.8	2.8	0	1.0	41	18
Jan. 16, 1948	750		6	6.9		11	.11	4.8	1.5	4.0		16	5.6	3.2		.2	39	16
Feb. 12	357		1	7.1		12	.04	3.6	1.5	6.1		20	6.8	3.2		.0	40	15
Mar. 18	532		8	6.9		11	.04	3.8	1.5	4.8		20	3.9	3.5		.1	39	16
Apr. 8	1,270		7	7.1		10	.02	4.2	1.6	2.6		16	4.7	2.8		.1	38	17
May 10	1,270		8	6.6		11	.04	3.6	1.3	3.6		17	4.4	2.0		.1	38	14
June 19	452		12	7.3		13	.02	4.4	1.5	4.3		23	3.0	2.6		.1	44	17
Aug. 25	436		5	7.0		12	.04	5.4	2.1	3.1		24	3.8	2.9		.2	47	22
Sept. 14	284		6	7.2		12	.01	5.3	1.9	3.4		25	2.7	2.8		.2	46	21

## JAMES RIVER BASIN--Continued

## CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA.

LOCATION.--At gaging station at bridge on U. S. Highway 60, 1.1 miles southwest of Providence Forge, New Kent County, and 1.7 miles downstream from Schminoe Creek.

DRAINAGE AREA.--249 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948																		
Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids l/	Total hardness as CaCO <sub>3</sub>
Oct. 14, 1947	84	30	6.0		13	0.04	5.4	1.6	6.3	10	14	7.5	0.1	0.3	64	20		
Nov. 12	724	75	5.7		10	.22	3.8	1.3	5.4	7.0	12	5.5	5.4	.2	.2	63	15	
Dec. 12	190	34	6.1		9.9	.12	3.4	.9	5.8	10	8.5	5.2	.1	.2	48	12		
Jan. 14, 1948	381	45	6.2		7.0	.02	3.3	1.1	5.0	8.0	8.2	6.0	.0	.2	45	13		
Mar. 17	767	35	6.4		4.0	.01	3.2	1.1	3.8	8.0	7.0	4.8	.0	.1	35	12		
Apr. 7	857	55	6.6		2.0	.02	3.3	1.3	2.6	8.0	5.8	4.5	.1	.1	41	14		
May 11	258	38	6.1		5.8	.02	3.8	1.1	4.6	17	4.0	4.0	.0	.2	45	14		
June 9	567	96	--		9.1	.02	4.2	1.0	2.6	13	3.7	3.8	.0	.5	48	14		
July 23	98	17	7.2		8.4	.08	5.2	1.3	3.9	15	6.0	4.5	.1	2.1	50	18		
Aug. 24	91	35	--		11	.34	4.8	1.3	5.0	16	6.1	5.8	.1	.4	56	17		
Sept. 15	48	45	7.5		8.9	.08	5.4	1.6	5.8	18	6.6	6.8	.2	1.3	53	20		

l/Includes a large proportion of organic matter for some of the analyses.

JAMES RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN JAMES RIVER BASIN IN VIRGINIA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dis-solved solids	Total hardness as CaCO <sub>3</sub>
DUNLAP CREEK NEAR COVINGTON																		
Oct. 8, 1947	25		5	7.9		7.4	0.09	52	15	4.8		140	76	5.5	0.1	0.2	236	191
Jan. 7, 1948	50		2	7.5		5.7	.03	40	9.3	5.7		118	47	3.2	0		172	138
Mar. 9	613		5	7.1		6.4	.03	11	2.6	2.6		35	12	1.4		.4	57	33
June 15	56		3	7.9		8.1	.02	36	8.0	3.1		104	38	2.9	.1	.4	156	123
POTTS CREEK NEAR COVINGTON																		
Oct. 8, 1947	32		5	7.9		5.0	0.04	28	4.2	2.3		96	10	1.8	0.1	0.2	97	87
Jan. 7, 1948	51		10	7.1		4.2	.07	20	2.8	1.3		64	9.2	1.5	0		71	61
Mar. 9	600		6	7.0		5.2	.01	8.2	1.5	1.8		24	6.5	1.0	.1	.4	39	27
June 16	127		4	7.5		6.3	.02	21	3.0	1.8		72	7.3	1.2	.1	.2	77	65
SMITH CREEK NEAR CLIFTON FORGE																		
Oct. 8, 1947	4.6		10	7.1		5.0	0.01	4.3	1.3	1.0		17	2.1	1.5	0.0	0.1	23	16
Jan. 7, 1948	8.4		4	6.8		4.5	.01	2.1	.7	1.2		9.0	2.3	1.5	.1	.1	15	8
Mar. 10	47		5	6.5		3.9	.02	1.8	.9			6.0	2.3	1.0	0	.1	13	8
June 17	6.1		7	6.8		5.0	.01	2.6	.6	1.4		11	2.0	.5	.0	.3	20	9
CHAIG CREEK AT PARR																		
Oct. 9, 1947	136		5	7.7		4.5	0.04	18	3.9	2.0		69	5.6	1.8	0.1	0.2	69	61
Jan. 8, 1948	137		5	7.3		5.2	.08	13	2.7	2.6		46	8.5	2.8	.2	.2	53	44
Mar. 10	1,020		9	7.1		4.9	.08	3.6	1.5	.9		18	4.6	1.6	.0	.2	30	20
June 16	192		6	7.6		6.0	.03	14	3.0	.4		49	6.3	.6	.2	.2	58	47
MEADOW CREEK AT NEWCASTLE																		
Oct. 8, 1947	5.8		10	7.4		7.4	0.04	42	6.2	0.8		147	6.2	1.8	0.1	3.0	144	130
Feb. 4, 1948	9		1	7.9		5.1	.02	39	7.9	--		148	4.6	1.8	.0	1.8	132	130
Mar. 10	40		3	7.8		5.4	.03	30	5.0	1.8		111	4.4	1.1	.1	2.4	107	95
JOHNS CREEK AT NEWCASTLE																		
Oct. 9, 1947	159		10	7.0		6.2	0.04	14	3.0	1.5		50	6.5	1.8	0.1	0.1	58	47
Jan. 8, 1948	43		6	7.1		5.2	.07	9.0	2.0	5.5		34	9.0	5.5	.2	.1	51	31
Mar. 10	344		4	6.7		5.5	.01	2.9	.9	1.2		30	4.0	.6	.1	.1	25	11
June 17	107		4	7.3		6.0	.05	9.8	2.3	1.6		38	4.4	.8	.1	.3	44	34

## CATAMBA CREEK NEAR CATAMBA

Oct. 10, 1947	400		25	7.5		7.7	0.10	36	6.4	2.5	132	9.1	1.5	0.2	1.6	130	116
Nov. 7	86		1	8.0		7.6	.04	46	11	3.6	190	7.5	1.5	.0	2.2	160	160
Jan. 8, 1948	13		5	8.0		5.2	.04	50	15	.8	213	9.3	2.0	.0	.8	186	186
Mar. 11	62		2	7.9		4.7	.04	46	10	.6	179	7.3	1.4	.1	.8	164	156
June 17	23		2	8.3		7.5	.04	45	12	2.3	188	7.6	2.1	.1	1.8	177	162

## CALFPASTURE RIVER AT GOSHEN

Oct. 7, 1947	8.7		5	7.3		4.3	0.02	14	2.9	--	52	2.1	1.8	0.0	0.0	56	47
Jan. 6, 1948	84		8	6.7		4.3	.02	5.2	1.4	2.2	16	5.8	2.8	.1	.2	28	19
Mar. 8	1,100		5	6.7		5.3	.01	3.0	1.1	1.6	11	5.0	.6	.1	.3	26	12
May 18	150		5	6.9		6.3	.05	5.2	1.7	1.7	20	5.1	1.2	.1	.2	30	20
June 15	33		3	7.2		5.7	.03	8.1	1.9	1.6	30	4.7	1.0	.1	.5	39	28

## MAURY RIVER AT ROCKBRIDGE BATHS

Oct. 6, 1947	30		5	7.8		4.0	0.04	25	3.5	1.8	83	9.5	2.0	0.0	0.1	88	77
Jan. 6, 1948	164		5	7.1		4.4	.08	11	2.5	1.2	35	8.6	1.8	.0	.2	48	33
Mar. 8	2,600		8	7.1		4.7	.01	5.3	1.1	1.1	14	7.0	1.5	.1	.4	32	19
May 18	368		5	7.1		7.5	.07	9.5	1.6	2.6	32	6.6	1.8	.1	.2	43	30

## MAURY RIVER NEAR LEXINGTON

Oct. 7, 1947	72		3	8.2		4.0	0.03	38	13	1.8	169	9.1	2.0	0.1	1.0	154	148
Jan. 5, 1948	236		3	7.4		3.7	.04	25	6.4	1.6	97	9.3	1.5	.0	1.0	96	89
Mar. 8	3,480		9	7.4		5.5	.04	16	2.6	2.1	52	8.1	2.0	.2	1.0	65	51
May 17	685		5	8.0		6.2	.02	23	5.6	1.5	92	6.0	1.0	.0	.8	93	80

## KERRS CREEK NEAR LEXINGTON

Oct. 6, 1947	11		5	8.0		5.2	0.05	42	11	--	168	8.5	2.0	0.1	1.1	151	150
Jan. 5, 1948	16		2	7.5		3.9	.04	52	8.1	2.3	131	9.2	1.0	.1	.4	170	163
Mar. 8	135		7	7.6		5.8	.03	40	3.6	2.0	129	9.0	1.5	.1	1.8	133	115
May 17	44		5	8.0		6.5	.03	49	5.6	1.7	168	7.6	1.8	.1	.8	157	145

JAMES RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN JAMES RIVER BASIN IN VIRGINIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
PEDLAR RIVER NEAR PEDLAR MILLS																		
Oct. 13, 1947	45		10	6.6		13	0.06	3.5	1.1	3.2		18	2.4	1.8	0.1	0.1	34	13
Jan. 12, 1948	26		3	--		11	.08	5.9	.9	4.4		28	2.0	1.8	.1	.1	40	18
Mar. 12	123		7	7.0		11	.10	2.6	.9	3.4		14	2.8	2.0	.1	.3	32	10
June 21	50		20	7.1		14	.04	2.6	1.0	3.4		17	1.4	1.5	.1	.3	34	11
TYE RIVER NEAR LOVINGSTON																		
Oct. 13, 1947	127		20	6.5		11	0.16	2.6	0.9	3.5		14	3.5	1.5	0.2	0.2	30	10
Jan. 12, 1948	83		6	6.9		9.1	.05	2.5	.6	3.2		12	2.2	2.0	.2	.2	26	9
Mar. 12	238		5	6.2		9.1	.02	2.4	.8	2.3		6.0	2.3	4.5	.1	.6	28	9
June 21	70		5	--		11	.03	2.6	.8	2.5		14	1.8	1.0	.1	.4	30	10
ROCKFISH RIVER NEAR GREENFIELD																		
Oct. 13, 1947	118		10	6.6		12	0.10	3.4	1.3	2.1		16	2.9	1.5	0.0	0.2	33	14
Jan. 12, 1948	81		4	6.9		9.7	.03	3.4	.7	3.5		16	2.4	2.0	.2	.1	30	11
Mar. 12	214		7	6.9		10	.04	2.6	.9	3.4		13	3.1	2.2	.1	.4	28	10
June 21	51		5	--		12	.04	3.3	.9	2.8		16	2.1	1.4	.1	.7	34	12
HARDWARE RIVER NEAR SCOTTSVILLE																		
Oct. 17, 1947	59		15	6.6		13	0.16	4.6	1.4	4.5		25	2.6	2.5	0.1	0.1	40	17
Jan. 16, 1948	141		7	7.1		11	.11	3.6	.9	4.1		17	3.3	2.2	.2	.6	34	13
Mar. 22	118		20	6.7		11	.12	4.0	1.5	2.2		17	3.0	2.9	.0	.4	37	16
May 10	190		4	6.7		11	.04	3.4	1.1	2.4		16	2.7	1.5	.0	.3	34	13
SLATE RIVER NEAR ARVONIA																		
Oct. 21, 1947	80		40	6.9		17	0.23	5.0	1.6	11		40	4.9	3.0	0.2	0.3	57	19
Mar. 30, 1948	330		5	7.1		13	.01	3.7	2.1	3.6		22	4.1	2.0	.2	.1	38	18
July 29	102		14	7.4		17	.25	4.8	2.4	3.7		30	2.4	1.8	.0	.3	51	22

## MECHUM RIVER NEAR IVY

Oct. 17, 1947	56		20	7.1		14	0.13	4.5	1.6	4.9		22	4.2	3.8	0.2	0.2	47	18
Jan. 19, 1948	50		3	7.1		12	.11	4.2	1.0	4.0		18	4.0	2.5	.2	.4	39	15
Feb. 12	71		--	7.1		--	--	--	--	--		19	4.8	2.8	.0	.5	38	--
Mar. 18	97		7	6.9		10	.01	3.4	1.2	5.2		19	4.2	2.8	.2	.3	36	13

## WILLIS RIVER AT FLANAGAN MILLS

Oct. 16, 1947	90		30	6.7		19	0.20	6.5	3.7	3.2		30	7.8	3.8	0.1	0.2	67	31
Jan. 15, 1948	1,210		40	7.0		10	.01	4.8	1.6	3.4		16	7.4	3.2	.2	.2	51	19
Mar. 18	379		10	7.1		15	.02	7.1	2.4	3.6		28	5.3	4.5	.2	.1	50	28
June 17	110		32	--		18	.08	6.7	2.8	4.5		38	3.1	2.2	.1	.3	62	28

## BEAVERDAM CREEK AT STATE FARM

Oct. 15, 1947			10	6.8		21	0.10	5.2	2.4	6.3		35	3.0	3.2	0.1	0.1	58	23
Jan. 15, 1948			25	6.9		12	.01	3.9	1.2	3.9		14	6.5	3.0	.2	.3	44	15
Feb. 11			5	7.1		17	--	--	--	--		22	4.3	3.2	.0	.2	48	--
Mar. 18			10	7.1		17	.01	4.2	2.0	4.3		21	5.6	3.2	.1	.2	47	19
June 17			14	7.2		20	.07	4.4	2.1	4.7		29	2.0	2.5	.1	.4	53	20

## FINE CREEK AT FINE CREEK MILLS

Oct. 15, 1947	55		35	6.6		20	0.32	4.4	2.3	4.9		28	3.8	2.8	0.1	0.1	57	20
Jan. 14, 1948	210		50	6.5		12	.01	2.4	1.4	3.2		6.0	6.6	4.8	.0	.2	44	12
Mar. 18	27		8	6.9		15	.01	3.7	1.2	4.0		17	4.4	2.8	.1	.1	40	14
June 17	22		35	7.3		15	.13	3.8	1.6	3.4		20	3.4	2.2	.1	.4	46	16

## FALLING CREEK NEAR DREWRY'S BLUFF

Jan. 14, 1948	446		45	6.4		9	.06	2.7	1.1	6.4		8.0	8.6	6.8	0.0	0.2	46	11
Mar. 16	117		10	6.6		11	.08	2.5	1.2	4.0		7.0	8.1	3.5	.2	.1	39	11
May 11	34		11	6.5		14	.14	3.0	1.1	4.4		13	6.0	3.0	.1	.1	46	12

## DEEP CREEK NEAR WAINBORO

Nov. 11, 1947	247		20	6.8		17	0.09	4.8	1.7	5.3		24	5.3	3.8	0.0	0.1	55	19
---------------	-----	--	----	-----	--	----	------	-----	-----	-----	--	----	-----	-----	-----	-----	----	----

JAMES RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN JAMES RIVER BASIN IN VIRGINIA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
SWIFT CREEK NEAR CHESTER																		
Oct. 15, 1947 -----	40		25	6.4		15	0.02	3.0	1.3	5.5		16	6.1	3.5	0.1	0.2	48	18
Jan. 14, 1948 -----	660		45	6.7		9.1	.01	2.7	1.4	4.6		12	7.2	3.5		.0	.2	47
Mar. 17 -----	641		20	6.8		11	.01	2.5	1.3	6.5		20	4.3	3.0	.2	.1	37	12
May 11 -----	82		26	6.5		13	.04	2.7	1.0	3.8		14	3.2	2.8	.1	.1	43	11



## PEE DEE RIVER BASIN

## YADKIN RIVER AT PATTERSON, N. C.

LOCATION.--At gaging station 200 feet upstream from bridge on State Highway 268, half a mile south of Patterson, Caldwell County, three-quarters of a mile upstream from Warrior Creek, and 2 miles downstream from Walnut Branch.

DRAINAGE AREA.--28.8 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 32 parts per million Oct. 15, Sept. 15; minimum, 24 parts per million Feb. 16.

Total hardness: Maximum, 13 parts per million July 14; minimum, 7 parts per million Mar. 16.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Tem-perature (° F.)	Oxygen consumed		Color	pH	Specific conduct-ance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	Sodium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Nitrate (NO <sub>3</sub> )	Dis-solved solids	Total hardness as CaCO <sub>3</sub>	
			Unfil-tered	Fil-tered																	
Oct. 15, 1947	33				16	6.8		11	0.02	2.2	1.3	2.5	1.3	16	2.0		1.5	0.2	0.6	32	11
Nov. 15	143				14	6.9		8.9	.06	2.0	1.1	2.4		11	2.6	1.4	.3	.3	.3	27	10
Dec. 15	44				14	6.9		11	.03	1.8	.9	4.2		15	2.5	1.6	.0	.2	.2	29	8
Jan. 15, 1948	26				24	7.0		12	.03	1.8	1.0	3.1	1.9	15	2.6	1.8	.1	.5	.5	31	9
Feb. 16	94				12	6.9		9.4	.05	1.6	.9			11	1.9	1.0	.1	.5	.5	24	8
Mar. 16	55				3	7.3		10	.06	1.4	.9	4.1		14	2.3	1.2	.1	.3	.3	27	7
Apr. 14	76				3	7.4		11	.02	2.2	.8	2.7	1.2	13	2.1	1.0	.1	.2	.2	27	9
May 14	37				3	6.6		12	.02	2.4	1.0	2.7		15	1.5	1.1	.1	.3	.3	30	10
June 15	32				3	7.1		11	.04	2.3	1.1	3.0		16	1.7	1.2	.1	.0	.0	30	10
July 14	65				3	6.6		10	.02	3.2	1.2	2.8	1.4	19	1.5	1.1	.2	.5	.5	31	13
Aug. 16	29				4	6.7		10	.03	2.9	1.1	2.9		17	2.2	1.0	.1	.3	.3	30	12
Sept. 15	38				3	7.1		11	.02	2.5	1.1	2.3	1.6	16	1.6	1.2	.1	.3	.3	32	11
Average	156.0				8	--		11	0.03	2.2	1.0	3.3		15	2.0	1.3	0.1	0.3	0.3	29	10

1/ Mean discharge for water year October 1947 to September 1948 was 56.3 second-feet.

## PEE DEE RIVER BASIN--Continued

## YADKIN RIVER AT WILKESBORO, N. C.

LOCATION.--At bridge on U. S. Highway 421 at Wilkesboro, Wilkes County, 100 feet downstream from gaging station, and 300 feet downstream from confluence with Reddies River.

DRAINAGE AREA.--493 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 37 parts per million May 1-10, July 1-10, Aug. 21-31; minimum, 27 parts per million Mar. 21-31.

Total hardness: Maximum, 14 parts per million Aug. 21-31; minimum, 6 parts per million July 11-20.

Water temperatures: Maximum, 83° F. June 24-25; minimum, 33° F. Jan. 24-25.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
Oct. 1-10, 1947-----	1,050	61	215	6.2	1.8	14	6.7	12	2.4	1.0	2.7	1.2	16	2.0	1.4	0.1	0.3	32	10
Oct. 11-20-----	1,582	64	183	5.6	2.0	12	6.8	11	2.4	1.1	2.6		13	2.5	1.8	1	3	32	11
Oct. 21-31-----	1,129	61	107	4.7	1.8	6	6.9	12	2.6	1.4		2.9	15	2.9	2.2	0	3	36	12
Nov. 1-10-----	1,691	53	84	4.2	2.0	14	7.0	10	2.2	1.0	3.0		14	2.0	1.5	1	3	29	10
Nov. 11-20-----	1,497	48	74	3.7	1.8	12	6.9	10	2.2	1.2	2.8		14	1.9	1.8	1	3	31	10
Nov. 21-30-----	1,863	46	22	2.1	1.3	8	7.0	10	2.4	1.1		2.8	14	2.6	1.4	1	3	31	10
Dec. 1-10-----	737	44	24	2.5	1.7	12	7.1	13	2.2	.9	3.1		14	2.3	1.4	0	2	31	9
Dec. 11-20-----	710	41	31	1.9	1.0	6	7.1	12	2.3	1.0	2.7		14	1.7	1.5	1	2	31	10
Dec. 21-31-----	601	40	14	1.6	1.2	4	7.0	12	1.8	.7	4.1	1.3	15	1.9	1.4	0	2	29	7
Jan. 1-10, 1948-----	616	41	27	2.4	1.8	14	7.4	12	1.9	.8	3.5		15	2.1	2.1	1	2	30	8
Jan. 11-20-----	634	38	23	2.3	1.5	10	7.0	12	2.0	.9			14	2.1	1.5	1	3	30	9
Jan. 21-31-----	639	35	23	2.4	1.3	8	7.0	12	2.0	.8	3.8		15	2.0	1.4	0	2	30	8
Feb. 1-10-----	1,126	39	77	3.6	1.5	12	6.9	12	1.9	.8	3.4		13	2.0	1.4	2	3	28	8
Feb. 11-20-----	1,590	45	71	3.2	1.8	12	6.9	10	1.8	.7	3.5		12	2.1	1.5	2	4	29	7
Feb. 21-29-----	1,908	49	28	2.2	1.7	11	7.1	11	2.3	.7	3.2		15	1.4	1.2	1	3	32	9
Mar. 1-10-----	949	50	40	2.5	1.7	4	6.9	12	1.8	.9	3.4		13	2.2	1.5	1	3	30	8
Mar. 11-20-----	974	53	137	3.3	1.6	3	6.9	11	2.0	.7	4.4		16	1.9	1.4	1	3	30	8
Mar. 21-31-----	1,965	56	337	7.5	1.8	4	7.0	9.7	1.8	.7	3.6		13	2.2	1.2	1	3	27	7
Apr. 1-10-----	1,762	58	94	4.4	2.0	2	7.1	10	2.2	.9	1.7	.8	12	2.0	1.5	1	2	28	9
Apr. 11-20-----	1,142	62	51	3.2	1.9	4	7.6	12	2.0	.8	3.6		13	1.7	1.2	1	1	29	8
Apr. 21-30-----	832	62	26	2.3	1.6	4	7.2	12	2.0	.8	3.9		16	1.6	1.2	1	1	31	8
May 1-10-----	759	63	15	2.6	1.3	7	7.6	12	2.0	.9	4.4		16	2.6	1.4	1	0	37	9
May 11-20-----	642	69	30	2.4	1.2	4	7.4	12	2.4	.9	3.4		13	2.5	1.4	1	0	36	10
May 21-31-----	973	70	124	5.5	1.3	2	6.7	11	2.4	.8	2.9		14	1.9	1.4	0	4	32	9

June 1-10 -----	845	70	107	5.2	1.5	3	6.8	12	.03	2.7	1.0	3.2	16	2.1	1.5	.0	.4	33	11
June 11-20 -----	581	73	111	4.9	1.5	3	7.5	12	.02	3.0	2.4	2.4	15	1.7	1.5	.1	.1	33	11
June 21-30 -----	604	81	168	6.6	1.8	3	7.1	12	.03	2.5	.8	3.5	16	1.6	1.5	.1	.2	33	10
July 1-10 -----	474	77	114	7.3	2.2	2	6.8	13	.03	3.1	1.0	3.2	18	1.6	1.6	.1	.5	37	12
July 11-20 -----	1,100	74	198	6.0	2.6	4	6.7	13	.04	2.4	1.2	5.3	15	2.6	1.5	.1	.2	34	16
July 21-31 -----	515	78	75	3.7	1.6	2	6.7	13	.03	2.8	1.1	1.8	13	2.5	1.2	.1	.3	34	12
Aug. 1-10 -----	1,466	70	273	7.8	2.0	3	6.6	11	.04	2.8	1.3	2.1	14	3.0	1.2	.1	.5	31	12
Aug. 11-20 -----	530	73	102	3.1	1.2	4	6.8	13	.02	2.6	1.2	2.5	16	1.6	1.2	.1	.3	33	11
Aug. 21-31 -----	529	75	42	2.8	1.5	3	6.8	14	.02	3.3	1.3	3.6	20	2.0	1.8	.1	.2	37	14
Sept. 1-10 -----	749	70	68	4.4	1.8	7	6.8	13	.02	3.1	1.0	2.1	16	1.5	1.0	.1	.2	32	12
Sept. 11-20 -----	550	70	55	3.0	1.6	7	6.7	13	.13	2.2	1.0	3.7	16	2.1	1.4	.0	.4	33	10
Sept. 21-30 -----	617	65	58	4.4	1.9	4	7.1	13	.04	2.9	1.0	1.8	16	1.5	1.0	.1	.1	30	11
Average -----	946	59	89	3.9	1.7	7	--	12	0.04	2.3	1.0	3.3	15	2.1	1.4	0.1	0.3	32	10

PEE DEE RIVER BASIN--Continued  
 YADKIN RIVER AT WILKESBORO, N. C.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	57	55	40	44	35	50	56	63	70	74	74	73
2	56	53	41	45	36	50	55	64	69	70	70	70
3	60	55	40	43	36	50	54	62	67	78	69	73
4	62	56	43	39	39	51	56	59	70	80	70	71
5	60	56	48	40	41	50	55	66	70	80	69	68
6												
7	60	56	50	39	42	50	62	62	72	81	70	70
8	63	52	47	39	41	49	60	60	69	78	70	69
9	63	53	48	38	41	47	60	62	71	74	71	71
10	63	48	44	42	40	50	62	64	70	74	70	68
11	62	49	43	39	37	50	55	66	69	71	72	68
12												
13	60	51	44	37	39	52	62	69	69	68	72	70
14	62	51	47	39	42	49	65	68	72	70	73	68
15	62	51	42	42	47	49	64	69	70	75	74	68
16	65	46	38	36	43	49	65	69	73	71	75	67
17	65	47	36	34	42	50	65	67	74	75	72	69
18												
19	69	--	41	38	42	--	62	68	73	76	71	70
20	67	50	41	37	49	53	62	72	75	74	70	72
21	65	45	38	39	47	55	69	69	72	74	72	73
22	65	45	36	39	51	54	54	68	74	78	73	68
23	65	45	42	36	49	62	58	73	75	80	74	71
24												
25	64	47	39	36	45	64	32	69	81	79	70	73
26	62	47	36	35	42	64	64	74	77	80	74	72
27	61	49	40	34	42	60	61	70	82	82	75	68
28	60	50	36	33	46	55	62	70	83	78	75	66
29	61	47	39	33	50	54	64	71	83	78	74	63
30												
31	59	--	39	34	55	56	61	69	81	77	72	59
32	62	47	39	35	54	56	59	69	81	79	78	59
33	42	42	42	37	54	46	62	68	79	75	79	60
34	61	41	39	39	51	49	61	68	80	73	76	64
35	--	--	41	36	--	53	60	69	79	77	76	69
36	58	--	43	34	--	55	--	71	--	78	74	--
Average	62	49	42	38	44	53	60	67	74	76	73	68

PEE DEE RIVER BASIN--Continued  
YADKIN RIVER AT HIGH ROCK, N. C.

LOCATION.--Just below High Rock Dam, a quarter of a mile upstream from gaging station at High Rock, Davidson County, and 2 miles upstream from Lick Creek.

DRAINAGE AREA.--3,980 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES.--Dissolved solids: Maximum, 53 parts per million Nov. 11-20; minimum, 36 parts per million Apr. 1-10.

Total hardness: Maximum, 21 parts per million July 1-10; minimum, 13 parts per million Oct. 1-10, Aug. 11-20.

Water temperatures: Maximum, 81° F. July 20, 22-24, Aug. 2; minimum, 37° F. Jan. 25, Feb. 1-7, 10, 12, 14.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Suspended matter	Oxygen consumed	Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 1-10, 1947----	3,186	63	81	5.2	3.2	22	6.6	7.2	3.2	1.3	3.8	1.4	16	4.6	3.5	0.2	1.6	39	13
Oct. 11-20-----	4,313	65	64	5.3	2.6	14	6.8	7.0	3.3	1.5	3.3	1.4	15	4.3	2.8	0	1.0	40	14
Oct. 21-31-----	5,872	66	48	5.6	3.2	23	6.9	8.3	3.2	1.4	4.5	4.5	18	4.1	2.5	2	1.6	38	14
Nov. 1-10-----	10,540	60	52	5.0	3.2	24	7.0	8.9	3.2	1.5	4.5	4.5	18	4.0	2.9	2	5	39	14
Nov. 11-20-----	10,700	55	33	4.5	3.3	24	7.0	13	3.2	1.7	4.8	4.8	20	4.0	3.8	2	7	53	16
Nov. 21-30-----	5,837	48	27	4.4	2.9	24	7.0	13	4.0	1.6	5.2	5.2	22	5.1	2.4	2	6	46	17
Dec. 1-10-----	4,982	47	10	3.2	2.0	14	6.9	11	3.6	1.6	4.5	4.5	20	3.9	2.8	2	6	41	16
Dec. 11-20-----	4,711	46	5	2.2	1.8	12	7.1	12	3.8	1.5	5.6	5.6	22	3.5	3.6	2	6	44	16
Dec. 21-31-----	4,815	42	9	2.7	2.1	8	7.2	12	4.1	1.6	5.9	5.9	25	3.7	3.6	0	3	46	17
Jan. 1-10, 1948----	4,370	42	10	2.4	2.0	24	7.0	13	4.0	1.1	5.1	5.1	24	4.0	3.2	2	4	48	17
Jan. 11-20-----	4,173	41	13	2.4	2.0	24	7.2	14	4.1	1.6	6.6	6.6	26	4.0	3.4	2	5	49	17
Jan. 21-31-----	4,584	39	24	3.5	2.2	12	6.9	12	4.1	1.7	5.6	5.6	23	4.7	3.4	1	8	48	17
Feb. 1-10-----	6,945	37	20	3.0	2.2	10	7.0	11	4.3	1.7	5.9	5.9	24	4.7	3.6	1	5	46	18
Feb. 11-20-----	14,220	40	52	4.0	2.2	14	6.7	8.0	3.4	1.6	3.9	3.9	16	5.7	2.5	1	8	40	15
Feb. 21-29-----	5,093	44	37	3.5	2.5	16	6.8	7.7	3.4	1.4	3.5	3.5	15	5.0	2.4	1	8	37	14
Mar. 1-10-----	7,340	48	21	2.8	2.0	18	7.1	10	3.3	1.4	4.5	4.5	18	4.4	2.6	1	6	39	14
Mar. 11-20-----	6,761	50	28	2.8	2.0	7	7.0	11	3.8	1.5	4.5	4.5	20	4.4	2.6	1	6	41	16
Mar. 21-31-----	9,628	57	46	3.1	2.1	8	6.9	12	3.6	1.4	4.6	4.6	19	4.0	2.8	2	6	40	15
Apr. 1-10-----	15,200	56	124	5.6	2.6	7	6.8	13	3.2	1.5	3.1	3.1	16	3.6	2.2	2	8	36	14
Apr. 11-20-----	7,812	63	66	4.3	2.4	7	6.8	10	3.4	1.3	4.0	4.0	18	3.8	2.2	1	7	38	14
Apr. 21-30-----	5,599	65	52	3.7	2.4	3	6.9	11	4.0	1.3	4.4	4.4	16	3.6	2.4	1	6	39	14
May 1-10-----	4,430	66	25	3.5	2.0	3	6.9	12	4.0	1.7	4.7	4.7	22	3.5	2.5	1	7	43	17
May 11-20-----	5,586	69	20	2.7	1.6	4	7.0	11	4.1	1.6	4.7	4.7	23	4.0	2.5	1	7	43	17
May 21-31-----	4,868	71	44	4.0	2.2	7	6.9	11	4.1	1.5	3.9	3.9	21	3.9	2.4	1	8	43	17

PEE DEE RIVER BASIN--Continued  
YADKIN RIVER AT HIGH ROCK, N. C.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (' F.)	Suspended matter	Oxygen consumed		Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered															
June 1-10, 1948-----	5,158	72	70	3.4	2.3	7	6.6	12	0.04	3.8	1.6		4.5	21	4.0	2.6	0.1	0.7	43	16
June 11-20-----	4,320	73	71	3.6	2.3	11	6.6	12	.02	4.0	1.7	3.9	3.9	22	2.1	2.9	.1	1.2	44	17
June 21-30-----	4,392	76	50	3.0	2.3	7	6.0	11	.03	4.4	1.8		5.5	26	3.6	3.1	.1	.9	47	18
July 1-10-----	3,977	79	47	5.7	2.9	7	6.7	11	.03	5.5	1.9	5.9	2.1	29	3.7	3.8	.1	.8	52	21
July 11-20-----	3,555	80	52	3.0	2.2	7	6.8	12	.01	4.4	1.7		5.6	25	4.0	3.2	.1	.9	46	16
July 21-31-----	3,298	80	48	2.9	2.0	6	6.9	11	.02	4.4	1.6		5.9	25	4.0	3.5	.1	.7	46	18
Aug. 1-10-----	3,873	78	74	4.0	2.2	4	6.6	9.9	.02	4.3	1.6		5.0	22	4.6	3.0	.1	1.1	41	17
Aug. 11-20-----	4,156	75	83	5.0	2.4	8	6.5	9.3	.03	3.2	1.3	4.4	4.4	17	3.5	2.5	.2	1.4	39	13
Aug. 21-31-----	3,639	77	42	3.6	3.0	7	6.6	10	.08	4.4	1.9		3.6	25	4.3	3.5	.1	1.0	48	19
Sept. 1-10-----	4,494	77	21	2.8	2.2	6	6.8	11	.03	4.6	1.9		5.9	27	4.4	3.1	.1	.7	48	19
Sept. 11-20-----	2,976	76	53	3.0	2.2	8	6.7	11	.27	4.2	1.5		7.1	27	3.6	3.6	.1	1.2	48	17
Sept. 21-30-----	3,669	73	22	5.0	2.3	4	7.2	12	.04	5.2	1.7	6.6	3.3	27	4.2	3.8	.3	.5	50	20
Average-----	5,795	61	43	3.8	2.4	11	--	11	0.03	3.9	1.6		5.1	21	4.1	3.0	0.1	0.8	44	16

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	63	64	47	42	37	46	59	65	72	78	80	79
2	63	64	48	42	37	47	58	65	72	78	81	78
3	62	63	46	43	37	47	58	66	72	78	80	78
4	62	63	47	43	37	47	57	66	72	78	80	78
5	62	60	47	42	37	48	57	67	72	78	80	77
6	63	60	47	42	37	48	57	67	72	79	79	77
7	63	58	47	42	37	47	59	66	71	80	76	77
8	63	58	48	42	38	48	60	66	72	79	76	76
9	63	58	48	42	38	48	60	66	72	79	76	77
10	64	57	48	43	37	49	60	67	72	80	75	77
11	65	58	48	42	38	49	60	67	72	79	75	78
12	65	57	48	43	37	48	61	66	72	80	75	76
13	65	57	47	42	38	49	62	67	72	80	75	76
14	65	56	46	42	37	48	63	69	72	80	75	76
15	66	55	47	42	39	48	63	69	73	80	75	76
16	66	55	45	41	39	49	63	68	73	80	75	75
17	65	53	45	41	41	50	64	69	73	80	76	75
18	65	53	45	41	42	51	64	70	73	80	75	74
19	66	52	45	40	43	51	63	70	74	80	75	74
20	66	51	45	40	44	52	63	71	75	81	76	76
21	66	50	45	40	44	53	64	70	76	80	76	76
22	66	50	44	40	44	54	64	72	74	81	75	76
23	66	50	43	40	42	57	63	71	75	81	76	76
24	67	43	43	40	43	57	64	70	75	81	77	75
25	66	48	43	37	43	59	65	70	76	80	78	74
26	66	48	42	38	44	57	65	70	76	79	77	72
27	66	48	41	39	45	58	65	71	76	80	78	72
28	66	47	41	38	45	60	67	71	76	80	77	70
29	66	43	41	38	47	59	66	71	77	80	76	69
30	66	48	42	39	--	59	65	71	78	80	76	68
31	65	--	42	38	--	59	--	71	--	80	79	--
Average	65	55	45	41	40	52	62	69	74	80	77	75

PEE DEE RIVER BASIN--Continued  
PEE DEE RIVER NEAR ROCKINGHAM, N. C.

LOCATION.--At gaging station at bridge on U. S. Highway 74, 1 mile upstream from Falling Creek, 4 miles downstream from Blewett Falls hydroelectric plant, and 6 miles west of Rockingham, Richmond County.

DRAINAGE AREA.--6 870 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948.

Water temperatures: October 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 54 parts per million Jan. 11-20, Mar. 21-31; minimum, 38 parts per million Mar. 1-10.

Total hardness: Maximum, 24 parts per million Mar. 21-31; minimum, 13 parts per million Mar. 1-10.

Water temperatures: Maximum, 83° F.; July 30-31, Aug. 1; minimum, 33° F.; Feb. 13.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspension after	Oxygen consumed		Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered															
Oct. 1-10, 1947	3,506	67	45	4.6	3.3	24	6.8	7.7	0.06	3.8	1.5	4.2	1.4	22	4.3	3.6	0.2	1.0	44	16
Oct. 11-20	5,308	68	47	4.6	3.0	19	6.8	10	.01	4.3	1.6	6.9		24	4.4	5.6	.0	1.2	51	16
Oct. 21-31	7,916	66	91	7.4	3.6	34	6.7	8.1	.01	3.8	1.7	6.9		22	4.7	4.8	.2	1.7	47	16
Nov. 1-10	16,880	64	64	5.1	3.4	26	7.0	10	.02	4.0	1.6	4.8		18	5.1	4.1	.2	.9	44	17
Nov. 11-20	19,890	57	47	6.2	4.3	30	7.0	9.7	.02	3.9	1.7	4.8		18	5.2	4.5	.1	.6	45	17
Nov. 21-30	10,460	50	31	4.6	3.4	26	7.0	11	.02	3.8	1.7	5.8		20	5.6	4.0	.2	.7	46	16
Dec. 1-10	6,324	49	16	3.8	2.6	14	7.0	10	.01	3.9	1.7	5.5		21	4.7	4.0	.2	.6	45	17
Dec. 11-20	8,963	47	38	5.3	4.0	20	7.0	9.5	.02	3.8	1.8	6.1		20	5.7	4.8	.2	.6	46	17
Dec. 21-31	6,899	43	20	4.3	3.0	24	7.1	11	.03	4.0	1.7	6.2		22	5.1	4.4	.2	.5	46	17
Jan. 1-10, 1948	6,635	--	--	--	--	--	--	--	--	--	--	--	2.5	--	--	--	--	--	--	--
Jan. 11-20	10,940	42	20	5.5	4.1	34	6.8	11	.03	4.0	1.8	6.9		25	5.6	6.9	.2	.5	54	17
Jan. 21-31	10,040	38	22	4.4	3.4	24	6.6	12	.04	3.9	1.8	6.3		20	4.9	4.6	.2	2.7	52	17
Feb. 1-10	37,530	35	29	6.0	3.8	26	6.6	12	.03	3.8	1.8		6.5	20	5.1	5.6	.2	1.1	51	17
Feb. 11-20	35,900	35	50	5.0	3.4	7	6.6	9.8	.02	3.6	1.8	5.4		19	4.8	4.4	.2	1.0	44	16
Feb. 21-29	10,130	36	46	4.8	3.4	7	6.8	9.5	.02	3.6	1.6	4.6		17	4.8	3.9	.2	.8	41	16
Mar. 1-10	18,550	40	42	4.8	3.2	12	6.8	9.1	.02	3.2	1.6	4.1		15	4.7	2.8	.2	.8	38	13
Mar. 11-20	13,700	43	42	4.6	3.0	7	6.9	9.5	.02	3.5	1.7	4.9		18	4.7	4.1	.1	.8	40	16
Mar. 21-31	12,690	47	84	4.9	2.9	8	6.6	12	.02	5.5	2.6	6.0		32	4.8	3.9	.1	.5	54	24
Apr. 1-10	24,440	51	55	4.8	3.6	16	7.5	10	.01	3.7	1.5	3.2	1.3	18	4.0	2.5	.2	.7	40	15
Apr. 11-20	11,770	56	60	4.3	2.9	8	6.7	11	.02	3.6	1.6	6.3		24	4.2	3.0	.1	1.0	50	16
Apr. 21-30	7,590	65	60	4.1	2.2	6	6.8	10	.06	3.6	1.6	5.3		21	4.4	3.0	.1	.9	41	16
May 1-10	5,358	67	55	3.4	2.0	6	6.9	12	.01	4.0	1.6	5.4		23	4.2	3.0	.1	.8	44	17
May 11-20	7,791	69	93	4.2	2.6	11	6.8	11	.02	4.0	1.7	6.0		22	5.7	3.5	.1	1.2	45	17
May 21-31	7,144	70	52	4.1	2.2	4	7.1	10	.01	4.5	1.7	4.1		21	4.2	3.4	.1	.6	43	18



June 1-10 -----	7,903	73	62	4.4	2.8	7	6.9	10	.03	4.2	1.6	4.7	22	3.8	3.1	.1	.9	42	17
June 11-20 -----	6,231	74	65	4.5	2.5	4	6.8	12	.02	4.6	1.6	5.5	24	3.9	3.5	.2	1.0	47	18
June 21-30 -----	5,815	75	54	6.0	2.9	4	6.9	10	.02	4.6	1.6	5.8	24	4.0	3.8	.2	1.1	49	18
July 1-10 -----	4,829	80	55	5.3	3.3	4	6.8	11	.02	4.6	1.7	4.9	23	3.7	3.2	.2	1.2	49	18
July 11-20 -----	4,413	79	61	4.4	2.5	6	6.8	12	.03	4.3	1.7	5.8	25	4.3	3.1	.1	1.0	46	18
July 21-31 -----	4,980	81	51	3.6	2.3	3	6.5	11	.01	4.6	1.9	5.3	24	4.7	3.6	.1	.8	47	19
Aug. 1-10 -----	8,158	81	92	5.8	3.2	6	6.7	10	.03	4.7	1.8	4.3	21	5.3	3.2	.1	1.2	44	19
Aug. 11-20 -----	4,881	78	56	3.7	2.5	6	6.7	11	.04	4.2	1.9	4.7	23	4.1	3.2	.1	.9	48	18
Aug. 21-31 -----	5,003	79	42	3.5	2.1	3	6.8	11	.03	4.2	2.0	5.9	26	4.1	3.5	.1	1.0	48	19
Sept. 1-10 -----	4,692	77	37	3.2	2.2	3	6.9	10	.04	4.0	2.0	5.8	26	3.9	3.4	.0	.7	48	18
Sept. 11-20 -----	3,815	74	29	3.4	2.6	10	6.8	9.4	.22	4.4	1.7	6.0	25	4.0	3.4	.3	1.0	50	18
Sept. 21-30 -----	4,672	71	21	3.7	2.6	6	7.2	11	.03	4.9	1.7	3.5	24	3.4	3.2	.2	.5	44	19
Average-----	9,735	61	50	4.7	3.0	13	--	10	0.04	4.1	1.7	5.5	22	4.6	3.9	0.2	0.9	46	17

PEE DEE RIVER BASIN--Continued  
 PRE DEE RIVER NEAR ROCKINGHAM, N. C.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	64	64	48	--	--	39	49	66	73	79	83	78
2	--	64	48	--	--	34	39	67	72	79	82	78
3	64	64	49	--	35	39	50	68	72	79	82	78
4	64	65	50	--	35	39	50	67	71	79	81	78
5	65	64	49	--	36	40	50	67	72	80	81	78
6	69	64	49	--	36	41	51	67	74	80	81	77
7	69	64	49	--	35	41	52	66	74	81	80	77
8	68	64	49	--	35	40	53	66	74	80	79	77
9	69	64	50	--	34	39	53	66	74	80	80	76
10	69	--	50	--	34	40	54	67	75	80	80	76
11	69	62	49	43	--	40	54	67	74	79	79	76
12	68	61	49	43	--	40	55	68	73	78	79	75
13	68	59	48	42	33	41	55	68	74	78	78	74
14	68	58	48	39	34	41	55	68	73	78	78	74
15	68	57	47	41	34	42	55	69	74	79	--	73
16	--	56	47	42	34	43	56	69	74	80	78	72
17	67	55	47	42	35	44	56	70	75	80	78	72
18	67	54	46	42	36	45	56	70	75	80	77	73
19	68	53	46	40	36	45	57	70	75	81	77	73
20	68	52	46	41	36	45	58	69	76	81	77	74
21	--	51	45	39	35	46	62	69	75	80	77	73
22	64	51	45	39	35	46	63	69	75	80	77	73
23	67	51	44	38	35	46	63	70	76	80	78	72
24	67	51	43	38	35	46	64	70	77	81	78	72
25	67	50	42	37	35	47	65	70	77	81	79	71
26	67	50	42	37	36	47	66	71	76	82	79	71
27	--	49	42	38	37	47	68	70	76	82	80	70
28	65	49	42	39	38	47	67	70	77	82	80	70
29	65	49	42	39	39	48	66	70	77	82	80	71
30	64	49	42	38	--	48	65	71	78	83	79	71
31	64	--	43	38	--	48	--	71	--	83	79	--
Average	67	57	46	--	35	43	57	69	75	80	79	74

LOCATION --At gaging station 14 miles northwest of North Wilkesboro, Wilkes County, 14 miles upstream from North Wilkesboro municipal dam and 2 miles upstream from mouth.  
 DRAINAGE AREA --93.9 square miles.  
 RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1948.  
 EXTREMES 1947-48 --Dissolved solids: Maximum, 35 parts per million Aug. 16; minimum, 25 parts per million Feb. 17.  
 Total hardness: Maximum 11 parts per million Sept. 16; minimum, 7 parts per million Jan. 16, Feb. 17, Apr. 16.  
 REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 15, 1947	118		12	6.9		12	0.04	2.1	1.0	2.2	0.9	14	1.9	1.2	0.1	0.2	29	9
Nov. 11	218		10	7.6		9.4	.05	2.0	.9	2.4		11	2.4	1.0	.3	.3	27	9
Dec. 17	130		14	7.1		11	.02	1.8	.8	3.0		12	2.3	1.4	.0	.2	28	8
Jan. 16, 1948	120		6	7.1		12	.08	1.6	.7	2.2	.9	12	1.9	1.1	.0	.2	26	7
Feb. 17	188		14	7.1		10	.08	1.5	.7	3.0		11	1.9	1.2	.1	.4	23	7
Mar. 15	130		3	7.0		11	.02	2.0	.8	2.4		11	2.3	1.2	.1	.2	28	8
Apr. 16	213		2	7.3		11	.01	1.8	.7	2.7	.4	13	1.7	1.0	.2	.1	26	7
May 16	116		3	7.1		11	.04	2.3	.9	1.8		13	1.4	.9	.0	.0	26	9
June 15	120		3	7.0		11	.03	2.2	.9	2.8		14	1.8	1.1	.1	.2	30	9
July 21	95		2	6.9		12	.02	2.2	.9	2.6	1.6	15	1.2	1.2	.1	.1	32	9
Aug. 16	96		2	6.9		12	.09	2.2	.8	5.9		20	2.3	1.8	.1	.1	35	9
Sept. 16	72		2	7.0		12	.04	2.6	1.0	2.6	1.5	16	1.6	1.1	.1	.1	32	11
Average	1135		6	--		11	0.04	2.0	0.8	3.0		14	1.9	1.2	0.1	0.2	29	8

1/ Mean discharge for water year October 1947 to September 1948 was 161 second-feet.

PEE DEE RIVER BASIN--Continued  
FISHER RIVER NEAR COPELAND, N. C.

LOCATION --At gaging station 300 feet upstream from bridge on State Highway 268, half a mile upstream from Cody Creek, and 2 miles west of Copeland, Swain County, 121 square miles.  
DRAINAGE AREA AVAILABLE: October 1947 to September 1948.  
RECORDS AVAILABLE: Maximum, 30 parts per million Sept. 15; minimum, 22 parts per million Feb. 15.  
EXTREMES, 1947-48:--Dissolved solids: Maximum, 17, Aug. 18, Sept. 15; minimum, 7 parts per million Jan. 15.  
Total hardness: Maximum, 41 parts per million, May 17, Aug. 18, Sept. 15; minimum, 7 parts per million Jan. 15.  
REMARKS:--Records of water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 13, 1947 -----	203		14	7.1		9.0	0.02	2.0	1.0	1.4	0.7	11	2.1	1.4	0.1	0.3	25	9
Nov. 15 -----	493		16	6.8		5.8	.01	1.9	1.0	2.3		9	3.1	2.0	.1	.3	25	9
Dec. 15 -----	148		4	7.0		7.6	.09	1.9	1.0	2.2		11	2.0	1.5	.1	.2	24	9
Jan. 15, 1948 -----	156		6	7.0		8.9	.07	1.6	.8	1.8	1.1	11	2.1	1.2	.0	.1	23	7
Feb. 15 -----	365		6	6.7		7.1	.02	1.6	.9	2.1		9	2.7	1.2	.0	.5	22	8
Mar. 15 -----	166		3	6.8		9.1	.02	2.2	.8	2.4		12	2.1	1.1	.1	.1	25	9
Apr. 14 -----	298		3	6.7		8.7	.03	2.0	.8	2.5	.2	9	3.6	1.1	.1	.2	23	8
May 17 -----	146		3	7.0		9.0	.09	2.6	1.2	.6		12	1.2	1.1	.1	.0	25	11
June 15 -----	151		2	6.7		8.6	.03	2.2	.9	2.3		12	2.0	1.2	.1	.3	25	9
July 14 -----	147		2	6.5		9.1	.02	2.0	.9	2.0	1.4	12	3.8	1.1	.1	.3	26	9
Aug. 18 -----	113		3	6.7		8.6	.06	2.8	1.0	1.9		13	2.3	1.2	.1	.2	26	11
Sept. 15 -----	.78		2	7.0		11	.03	2.6	1.1	2.0	1.4	15	1.5	.9	.1	.1	30	11
Average -----	1/205		5	--		8.5	0.04	2.1	1.0	2.2		11	2.4	1.2	0.1	0.2	25	9

1/ Mean discharge for water year October 1947 to September 1948 was 194 second-feet.

## PEE DEE RIVER BASIN--Continued

## SOUTH YADKIN RIVER AT COOLEEMEE, N. C.

LOCATION --At gaging station just downstream from tailrace of Erwin Cotton Mills at Cooleemee, Davie County, just upstream from North Carolina State Highway 801 and 2 1/2 miles downstream from Bear Creek.

DRAINAGE AREA --569 square miles

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES 1947-48 --Dissolved solids: Maximum 42 parts per million July 1-10; minimum, 30 parts per million Feb. 1-10.

Total hardness: Maximum 17 parts per million June 1-10, Sept. 1-10, 21-30; minimum, 10 parts per million Mar. 21-31.

Water temperatures: Maximum 82° F. July 22-24; minimum, 32° F. Jan. 25.

REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Tem- perature (° F.)	Sus- pended matter	Oxygen consumed		Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Nitrate (NO <sub>3</sub> )	Dis- solved solids	Total hardness as CaCO <sub>3</sub>
				Unfil- tered	Fil- tered															
Oct. 1-10, 1947	393	60	81	3.9	2.0	14	6.8	13	0.04	3.4	1.7	2.9		22	2.1	2.0	0.2	0.3	39	16
Oct. 11-20	620	65	134	5.8	2.4	12	6.9	12	.05	3.2	1.6	3.4	1.4	18	3.3	2.2	.2	.3	39	15
Oct. 21-31	680	61	97	4.9	2.6	16	7.0	11	.04	3.1	1.5	4.0		20	2.5	2.0	.2	.2	37	14
Nov. 1-10	1,564	55	204	6.5	2.4	16	6.9	10	.02	3.1	1.5	3.6		19	2.7	2.0	.1	.4	36	14
Nov. 11-20	1,370	48	66	4.2	2.0	22	6.9	11	.02	3.0	1.5	2.8		16	3.0	2.1	.1	.3	35	14
Nov. 21-30	765	45	19	2.4	1.7	6	7.0	13	.03	3.2	1.5	3.1		19	2.8	1.5	.1	.2	36	14
Dec. 1-10	494	43	4	1.4	.9	8	7.0	13	.05	3.4	1.5	3.8		22	1.8	1.8	.1	.2	37	15
Dec. 11-20	544	40	14	3.0	2.1	6	7.2	12	.02	3.3	1.5	4.3		22	2.4	2.0	.1	.2	38	14
Dec. 21-31	456	37	3	1.8	1.4	6	7.3	13	.02	3.2	1.4	4.3		22	1.8	2.2	.0	.2	37	14
Jan. 1-10, 1948	454	40	10	2.1	1.5	10	7.3	12	.02	3.2	1.4	3.0	1.2	21	2.1	2.1	.0	.2	37	14
Jan. 11-20	686	36	22	2.4	1.8	12	7.2	12	.03	2.8	1.3	3.6		19	2.1	1.6	.0	.2	32	12
Jan. 21-31	709	35	23	2.8	1.6	8	7.0	12	.02	3.2	1.4	3.6		20	2.6	1.5	.0	.4	34	14
Feb. 1-10	1,446	38	123	4.6	1.8	8	6.9	10	.03	2.8	1.2	2.5		14	3.0	1.6	.1	.5	30	12
Feb. 11-20	1,941	42	71	3.6	1.6	7	6.8	8.9	.02	2.6	1.2	2.9		15	2.5	1.5	.1	.6	31	11
Feb. 21-29	720	46	18	2.3	1.7	8	7.3	12	.02	2.8	1.3	3.7		19	1.6	1.9	.1	.3	36	12
Mar. 1-10	977	47	35	3.2	--	3	6.9	11	.03	2.9	1.5	3.4		18	2.8	1.8	.1	.4	34	13
Mar. 11-20	944	51	43	3.0	1.8	3	7.0	11	.02	2.9	1.4	3.5		18	2.6	1.9	.1	.3	34	13
Mar. 21-31	1,654	58	378	8.0	2.3	6	6.6	9.6	.02	2.4	1.1	3.3		15	2.8	1.4	.1	.4	31	10
Apr. 1-10	2,647	58	376	7.3	2.3	4	6.7	9.4	.02	2.8	1.1	2.5	.8	14	2.9	1.2	.1	.3	31	12
Apr. 11-20	1,163	60	99	4.7	1.8	4	6.8	11	.02	2.7	1.1	4.0		17	2.5	2.1	.1	.4	33	11
Apr. 21-30	689	63	42	4.9	1.3	3	7.1	13	.02	3.1	1.4	3.8		20	2.2	1.8	.1	.4	35	11
May 1-10	597	62	115	4.4	1.5	3	6.9	14	.03	3.4	1.5	3.4		21	1.8	1.8	.1	.4	36	15
May 11-20	932	66	43	2.6	1.3	3	6.9	13	.02	3.0	1.4	3.7		20	2.1	1.6	.1	.4	36	13
May 21-31	777	68	184	5.0	1.5	4	7.0	12	.01	3.1	1.3	2.7		17	2.5	1.5	.0	.4	35	13

## PEE DEE RIVER BASIN--Continued

## SOUTH YADKIN RIVER AT COOLEEMEE, N. C.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (°F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
June 1-10, 1948 -----	594	68	137	4.5	1.6	3	6.9	12	4.5	1.4			18	2.3	1.8	0.0	0.5	36	17
June 11-20 -----	462	70	96	3.3	1.4	3	6.9	13	4.1	1.3	1.4	3.7	22	2.0	1.8	.2	.6	39	16
June 21-30 -----	467	70	218	6.5	2.0	3	6.9	12	4.0	1.3	3.7	3.9	22	2.4	1.5	.2	.8	40	15
July 1-10 -----	374	77	120	6.8	2.5	2	6.8	14	.02	1.7	3.5	1.5	24	1.6	2.1	.1	.7	42	16
July 11-20 -----	457	76	188	5.3	1.2	2	6.7	13	.04	1.5			18	2.1	1.5	.1	.4	36	13
July 21-31 -----	317	79	72	3.3	1.3	2	6.7	14	.03	1.7	3.4		22	2.6	1.8	.1	.4	36	16
Aug. 1-10 -----	1,013	74	352	8.6	1.8	3	6.5	11	3.4	1.5		2.6	17	3.5	1.5	.1	.3	33	15
Aug. 11-20 -----	450	73	189	4.1	1.4	2	6.8	13	.02	1.5	2.7		19	2.1	1.4	.1	.5	36	14
Aug. 21-31 -----	319	76	213	3.6	1.3	2	6.7	13	.02	1.7	3.2		22	2.1	1.8	.0	.3	40	16
Sept. 1-10 -----	72	70	106	3.7	1.6	3	6.8	14	.02	1.6	2.6		22	1.7	1.9	.0	.3	40	17
Sept. 11-20 -----	239	70	80	3.6	1.5	6	6.8	14	.04	1.5	3.3		21	1.9	1.5	.1	.4	37	14
Sept. 21-30 -----	240	66	60	3.2	1.8	3	7.1	14	.03	1.6	3.4	2.0	24	1.7	1.8	.1	.2	39	17
Average -----	790	58	112	4.2	1.7	6	--	12	0.03	1.4	3.4		19	2.3	1.8	0.1	0.4	36	14

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	57	40	40	33	53	56	64	69	75	80	74
2	57	55	39	44	33	50	56	63	69	75	78	71
3	57	56	37	42	35	49	56	64	66	75	77	71
4	57	56	39	40	37	49	57	62	64	77	75	70
5	58	55	42	39	40	48	56	60	67	77	75	70
6	60	56	45	38	38	45	57	61	70	79	73	71
7	61	55	46	38	40	42	59	61	70	80	73	71
8	62	55	46	38	41	43	60	63	71	79	71	72
9	63	52	46	38	42	45	60	64	69	77	71	73
10	65	50	46	40	36	47	58	62	68	76	71	73
11	62	51	43	37	34	49	56	65	68	77	72	72
12	61	52	42	37	37	51	59	66	68	74	72	72
13	62	50	43	38	38	50	64	65	71	73	74	70
14	63	48	40	38	42	46	65	64	71	74	74	68
15	64	48	38	38	43	46	62	66	70	75	75	69
16	65	48	39	33	41	50	60	67	70	77	75	70
17	67	48	38	33	43	52	61	67	71	78	73	69
18	68	47	38	37	45	54	58	66	71	80	72	69
19	68	45	37	35	46	54	58	64	70	78	71	70
20	66	45	37	34	46	56	60	65	73	78	70	71
21	64	46	37	34	47	62	62	65	71	80	73	72
22	62	45	36	38	44	62	62	68	75	82	75	72
23	61	47	36	40	42	63	60	69	75	82	74	71
24	61	50	37	36	43	60	62	69	76	82	75	69
25	61	50	37	32	42	59	65	69	77	80	76	67
26	61	47	36	34	46	58	65	68	78	78	76	64
27	60	44	37	33	50	59	65	67	80	79	76	62
28	61	43	38	34	56	56	66	68	79	77	77	62
29	62	41	37	34	55	55	63	68	79	76	77	61
30	61	41	37	36	--	50	64	68	78	77	78	63
31	59	--	38	35	--	53	--	67	--	80	75	--
Average	62	49	40	37	42	52	60	65	72	78	74	69

## PEE DEE RIVER BASIN--Continued

## ABBOTTS CREEK AT LEXINGTON, N. C.

LOCATION.--At bridge on county road, 1,000 feet downstream from gaging station, 0.5 mile downstream from bridge on U. S. Highway 64, and 1½ miles southeast of Lexington, Davidson County.

DRAINAGE AREA.--174 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 136 parts per million Sept. 21-30; minimum, 58 parts per million Feb. 11-20.

Total hardness: Maximum, 46 parts per million Sept. 11-30; minimum, 22 parts per million Feb. 11-20.

Water temperatures: Maximum, 83° F. July 22; minimum, 32° F. Dec. 14-15, Jan. 25-26, 31, Feb. 10.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112. Records of quantities of suspended matter available in district office at Raleigh, N. C.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
Oct. 1-10, 1947-----	77.9	61	58	4.7	3.4	26	17	0.03	7.9	3.1	12	2.3	42	9.2	10	0.2	0.8	88	32
Oct. 11-20-----	121	66	46	5.2	4.2	22	16	.03	8.9	3.4	12		47	8.8	10	.1	.3	91	36
Oct. 21-31-----	63.3	62	35	4.4	3.6	26	21	.02	13.6	4.0	15		56	7.4	14	.1	.5	105	44
Nov. 1-10-----	222	55	66	6.2	4.2	26	16	.02	8.6	3.6	12		77	8.3	9.8	.2	.7	89	37
Nov. 11-20-----	646	48	103	6.9	5.0	36	14	.02	6.8	2.9	7.0		26	9.6	6.9	.2	.6	68	29
Nov. 21-30-----	188	46	23	3.6	2.9	14	19	.03	8.2	3.4	10		42	9.8	8.0	.1	.8	83	34
Dec. 1-10-----	73.9	44	11	3.2	2.6	18	21	.02	9.1	3.6	13		49	9.0	11	.2	.8	94	38
Dec. 11-20-----	178	39	76	5.0	2.9	16	18	.01	8.8	3.5	12		45	9.5	9.6	.3	1.0	87	36
Dec. 21-31-----	98.5	38	11	2.9	2.2	18	16	.02	8.8	3.5	9.6		77	7.7	7.1	.1	.7	84	36
Jan. 1-10, 1948-----	91.2	41	15	3.0	2.6	22	19	.02	9.0	3.6	12	2.0	52	8.5	10	.2	.9	90	37
Jan. 11-20-----	284	37	125	6.2	3.4	14	15	.03	7.5	3.1	9.3		34	11	7.4	.2	.8	76	31
Jan. 21-31-----	260	35	52	4.2	2.7	16	6.9	.02	7.2	3.0	9.3		37	9.5	7.1	.2	.9	74	31
Feb. 1-10-----	658	36	69	4.6	3.0	22	13	.04	6.0	2.6	6.9		27	10	5.0	.2	.8	62	26
Feb. 11-20-----	871	42	93	4.1	3.0	12	6.9	.02	5.4	2.1	6.8		28	9.5	4.5	.1	1.0	58	22
Feb. 21-28-----	200	47	33	3.5	2.4	12	11	.02	7.3	3.0	9.4		36	9.1	6.9	.1	.6	75	31
Mar. 1-10-----	452	49	86	5.4	3.5	6	6.8	.02	6.6	2.7	7.6		32	8.8	6.2	.2	1.1	63	28
Mar. 11-20-----	228	53	40	3.5	2.6	8	7.0	.02	7.4	2.8	9.6		39	8.6	5.2	.2	.8	72	30
Mar. 21-31-----	240	61	137	5.9	3.4	9	16	.03	6.1	3.2	8.5		42	7.9	5.8	.2	.6	75	33
Apr. 1-10-----	545	60	109	5.2	3.3	8	7.0	.01	7.4	2.8	6.8	1.4	36	7.4	4.6	.2	.7	67	30
Apr. 11-20-----	211	63	82	4.4	3.4	11	7.0	.02	8.2	3.2	8.7		44	7.0	5.6	.2	.9	77	34
Apr. 21-30-----	62.5	65	29	3.2	2.4	4	7.1	.02	9.2	3.5	11		52	6.4	7.8	.2	1.1	89	37
May 1-10-----	71.0	63	75	3.8	2.4	3	7.0	.02	8.6	3.6	12		53	7.2	8.8	.2	1.5	94	39
May 11-20-----	65.1	68	99	4.7	2.6	7	7.2	.01	10	3.5	10		50	6.2	8.6	.1	1.7	94	39
May 21-31-----	56.5	69	124	5.2	2.9	7	7.3	.02	9.3	3.3	12		50	6.6	9.9	.2	1.6	95	37



June 1-10, 1948 ----	51.2	69	122	5.0	2.9	8	7.0	21	0.03	9.6	3.4	13	52	7.0	10	0.2	1.8	98	38
June 11-20 -----	44.3	73	141	4.9	2.9	7	7.0	21	.02	9.9	3.3	16	54	7.4	13	.2	2.4	106	38
June 21-30 -----	54.3	79	162	6.2	3.5	7	7.0	21	.02	9.7	3.5	11	55	8.4	12	.3	1.9	107	39
July 1-10 -----	64.3	77	178	7.3	4.2	7	7.0	18	.02	10	3.5	11	52	6.5	8.2	.2	2.0	94	39
July 11-20 -----	69.5	78	366	8.8	3.8	10	6.8	18	.04	8.4	3.1	12	45	7.9	9.5	.2	1.1	90	34
July 21-31 -----	22.4	80	132	4.8	2.8	7	6.9	20	.02	11	3.8	17	57	8.2	16	.2	2.1	112	43
Aug. 1-10 -----	183	73	848	9.0	3.8	7	6.7	13	.04	7.5	2.7	9.3	36	8.6	7.1	.2	.9	81	30
Aug. 11-20 -----	105	74	371	7.0	3.0	11	6.8	17	.03	7.7	2.9	11	40	7.8	9.4	.1	1.5	87	31
Aug. 21-31 -----	43.9	76	125	4.4	2.7	5	7.0	21	.07	10	3.8	18	60	8.4	14	.1	1.2	111	41
Sept. 1-10 -----	33.1	72	146	5.1	2.9	7	7.0	20	.02	10	3.8	17	59	8.3	14	.2	1.2	108	41
Sept. 11-20 -----	18.0	70	53	3.6	2.9	18	7.0	23	.04	12	3.9	22	69	7.3	19	.2	1.8	122	46
Sept. 21-30 -----	21.5	66	76	6.0	3.6	12	7.0	20	.04	12	3.8	27	70	9.2	23	.3	.6	136	46
Average -----	185	60	120	5.0	3.2	13	--	18	0.03	8.7	3.3	12	46	8.3	9.6	0.2	1.1	89	35

PEE DEE RIVER BASIN--Continued  
 ABBOTTS CREEK AT LEXINGTON, N. C.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	52	39	47	35	54	60	64	70	75	75	72
2	56	55	38	46	36	48	62	66	70	74	75	70
3	58	57	40	42	38	48	56	67	65	76	76	70
4	59	58	41	38	37	51	56	64	67	77	74	70
5	60	58	47	40	37	47	60	66	70	80	74	70
6	63	56	49	40	39	45	61	64	72	82	71	70
7	62	55	47	38	38	46	62	63	72	80	71	73
8	65	55	49	38	41	50	65	62	69	77	72	74
9	68	51	46	37	33	47	63	65	67	74	72	75
10	65	52	43	41	32	50	59	68	70	74	73	72
11	62	54	43	--	33	54	57	69	70	75	73	72
12	64	54	42	--	34	50	66	69	73	77	75	70
13	65	50	40	43	36	46	71	70	71	78	76	71
14	65	49	32	38	46	47	67	70	73	78	76	69
15	65	46	32	34	44	52	63	68	73	75	75	70
16	68	48	41	35	45	56	63	69	72	75	74	69
17	68	47	39	45	45	58	62	70	75	80	74	68
18	68	46	38	38	48	57	60	66	72	79	75	69
19	68	45	38	34	50	48	61	65	75	79	69	69
20	68	46	42	34	--	64	64	66	77	79	72	71
21	65	45	38	36	45	--	66	68	77	81	73	72
22	63	48	38	39	40	72	65	70	81	83	74	70
23	63	49	38	36	40	64	62	68	78	82	75	68
24	62	52	38	33	39	61	65	69	76	82	76	65
25	62	48	36	32	43	60	65	69	81	78	76	63
26	63	45	38	32	52	65	70	68	81	80	77	64
27	62	42	37	31	53	64	70	78	80	80	77	62
28	62	42	35	34	57	56	66	68	80	78	78	62
29	65	43	37	35	57	52	59	70	79	77	81	64
30	61	42	36	35	--	56	61	70	78	78	73	66
31	58	--	40	32	--	56	--	70	--	80	75	--
Average	63	50	40	37	42	54	63	67	74	78	75	69

## PEE DEE RIVER BASIN--Continued

## UHARRIE RIVER NEAR ELDORADO, N. C.

LOCATION.--At gaging station 300 feet downstream from bridge on State Highway 109, 1 mile upstream from McLeans Creek, and 3 miles south of Eldorado, Montgomery County.

DRAINAGE AREA.--347 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMS, 1947-48.--Dissolved Solids: Maximum, 67 parts per million July 15; minimum, 34 parts per million Feb. 15.

Total hardness: Maximum, 33 parts per million Sept. 15; minimum, 14 parts per million Feb. 15.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
Oct. 15, 1947	94		35	7.0		12	0.03	5.8	2.8	4.4	1.5	31	6.8	3.8	0.2	0.3	58	26
Nov. 15	1,350		44	7.3		11	.02	4.6	2.3	4.4		23	4.9	3.8	3	.5	49	21
Dec. 15	160		12	7.1		16	.16	6.5	3.2	5.8		40	3.7	3.5	.0	.3	60	29
Jan. 15, 1948	913		35	7.0		11	.02	4.2	2.0	4.1	1.2	22	5.5	3.0		.8	45	19
Feb. 15	3,980		34	6.5		6.6	.03	3.1	1.4	2.9		13	5.1	2.0	.2	.6	34	14
Mar. 15	368		4	7.2		13	.02	4.6	2.4	5.3		29	4.2	3.1	.1	.3	48	21
Apr. 16	740		17	7.3		13	.02	4.8	2.1	4.4	1.3	25	3.7	3.2	.2	.2	49	21
May 15	170		7	7.2		16	.13	7.0	3.2	5.2		42	2.8	3.2	.0	.5	63	31
June 15	150		7	7.1		15	.05	7.1	3.2	4.3		38	3.3	3.4	.1	.8	60	31
July 15	46		7	7.0		18	.02	7.5	3.3	5.5	2.1	43	2.9	3.1	.2	.8	67	32
Aug. 15	56		6	7.1		14	.05	7.0	2.9	5.9		40	4.1	3.2	.1	.5	61	29
Sept. 15	35		7	7.3		16	.09	7.5	3.4	5.7	1.8	44	3.2	3.0	.1	.1	66	33
Average	1/ 672		18	--		13	0.05	5.8	2.7	5.2		32	4.2	3.2	0.1	0.5	55	26

1/ Mean discharge for water year October 1947 to September 1948 was 403 second-feet.

PEE DEE RIVER BASIN--Continued  
ROCKY RIVER NEAR NORWOOD, N. C.

LOCATION.--At bridge on county road 1 mile downstream from gaging station at Hyatts Ford, and 5½ miles southwest of Norwood, Stanly County.

DRAINAGE AREA.--1,370 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum 172 parts per million Sept. 21-30; minimum, 43 parts per million Feb. 11-20.

Total hardness: Maximum 47 parts per million Sept. 21-30; minimum, 16 parts per million Feb. 11-20.

Water temperatures: Maximum, 85° F. July 23; minimum, 32° F. Jan. 16, 19, 26, Feb. 1-2, 10.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112. Records of quantities of suspended matter available in district office at Raleigh, N. C.

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Suspended matter	Oxygen consumed		Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered															
Oct. 1-10, 1947-----	320	63	44	4.3	3.2	16	7.2	14	0.02	7.7	3.6	23	3.4	62	13	18	0.2	0.5	116	34
Oct. 11-20-----	811	67	179	6.8	3.9	18	7.0	14	.03	6.3	2.9	12		35	9.5	9.5	.2	.6	78	28
Oct. 21-31-----	1,252	64	198	7.9	3.9	32	7.0	11	.02	6.0	3.0		9.0	33	7.9	7.5	.2	.7	68	27
Nov. 1-10-----	4,532	56	210	7.0	4.3	26	6.8	9.7	.02	5.4	2.5		6.7	24	7.7	6.6	.3	.7	58	24
Nov. 11-20-----	4,946	50	92	6.4	4.2	34	6.9	9.7	.02	4.7	2.3	5.9		20	7.8	5.8	.3	.7	59	21
Nov. 21-30-----	1,567	46	28	4.2	3.3	22	7.3	12	.03	5.5	2.8		10	29	9.3	9.0	.2	.8	68	25
Dec. 1-10-----	546	43	8	4.4	2.7	22	7.3	16	.03	6.8	3.3	15		44	9.3	11	.2	.5	84	30
Dec. 11-20-----	1,773	41	38	4.6	3.5	24	6.9	11	.02	5.6	2.6	11		28	9.2	9.9	.3	.7	68	24
Dec. 21-31-----	987	38	13	3.4	2.6	18	7.2	12	.02	5.8	2.8		9.1	30	8.1	8.5	.1	.5	65	26
Jan. 1-10, 1948-----	930	40	26	4.4	3.2	22	7.5	10	.03	6.0	2.9	11	1.8	37	8.5	10	.2	.3	73	27
Jan. 11-20-----	3,160	35	40	4.8	3.8	24	7.2	10	.06	5.0	2.4	10		27	10	7.6	.2	.8	65	22
Jan. 21-31-----	2,998	36	53	4.6	3.2	24	6.9	9.3	.04	4.9	2.4		8.7	24	8.6	8.0	.2	.8	59	22
Feb. 1-10-----	4,505	38	78	5.4	5.0	22	6.9	9.5	.05	4.1	2.0		6.4	18	7.7	5.8	.2	1.2	48	18
Feb. 11-20-----	10,230	42	87	4.8	4.0	22	7.0	8.8	.06	3.4	1.8		5.5	16	6.5	5.1	.1	.8	43	16
Feb. 21-29-----	1,621	46	42	2.8	2.3	13	7.1	10	.02	4.4	2.1	8.2		24	7.2	6.8	.1	.5	57	20
Mar. 1-10-----	5,543	48	84	5.3	3.4	9	6.8	8.8	.02	4.1	2.1	7.0		21	7.0	6.2	.1	.7	50	19
Mar. 11-20-----	2,080	52	48	3.8	2.8	8	7.0	9.1	.03	4.3	2.0	8.1		25	6.5	5.8	.2	.6	52	19
Mar. 21-31-----	1,786	60	109	5.4	3.0	12	7.0	10	.03	5.2	2.4	8.6		30	6.3	6.6	.2	.5	58	23
Apr. 1-10-----	4,780	59	150	6.2	3.6	12	6.9	11	.02	4.6	2.0	5.6	1.2	22	6.0	4.0	.2	.6	52	20
Apr. 11-20-----	1,249	64	31	4.4	3.0	9	7.2	12	.02	5.8	2.6		9.2	35	5.9	6.9	.1	.4	64	25
Apr. 21-30-----	451	66	9	3.2	2.5	9	7.4	11	.02	7.1	3.2	14		49	6.9	10	.1	.1	77	31
May 1-10-----	332	67	12	3.4	2.5	6	7.3	12	.02	8.8	3.8	22		65	9.6	15	.2	.3	104	33
May 11-20-----	1,371	69	196	6.2	3.0	9	7.1	12	.01	6.5	2.8	9.8		37	7.0	7.4	.1	.9	69	28
May 21-31-----	1,179	71	61	7.9	3.0	9	7.2	11	.01	6.4	2.7	14		42	7.6	10	.2	.9	76	27

June 1-10-----	638	71	140	6.3	3.4	9	7.0	12	.02	6.8	2.9	12	38	7.6	9.8	-2	1.6	76	29
June 11-20-----	246	76	186	5.8	3.2	7	7.1	15	.02	8.1	3.3	17	52	8.5	13	-2	1.6	100	34
June 21-30-----	476	79	700	8.8	3.6	8	6.9	11	.02	6.5	2.5	13	37	7.7	10	-2	2.4	82	26
July 1-10-----	221	80	424	7.4	4.8	7	7.0	14	.02	7.7	3.3	15	47	8.6	11	-2	2.4	93	33
July 11-20-----	309	79	600	12	3.6	12	7.0	12	.02	8.0	3.4	19	56	8.0	14	-2	1.2	98	34
July 21-31-----	228	80	366	6.8	3.2	10	6.8	8.8	.02	7.4	3.1	16	49	7.9	11	-2	2.4	86	31
Aug. 1-10-----	2,676	74	1,034	9.9	3.9	8	6.5	9.8	.01	5.2	2.3	6.6	24	7.0	5.6	-2	1.1	54	22
Aug. 11-20-----	203	77	47	4.1	3.1	7	7.2	16	.04	7.4	3.3	18	51	9.1	11	-2	.6	96	32
Aug. 21-31-----	156	79	58	3.9	3.0	8	7.3	14	.02	8.8	3.8	24	66	10	17	-1	.5	116	38
Sept. 1-10-----	229	74	134	4.8	3.7	12	7.2	7.8	.04	8.6	3.8	27	74	9.5	18	-1	.5	116	37
Sept. 11-20-----	106	70	52	4.6	3.4	17	7.2	3.8	.23	9.2	4.1	34	85	12	21	-2	.5	131	40
Sept. 21-30-----	196	68	50	4.8	4.0	17	7.7	5.2	.02	11	4.8	40	109	14	30	-3	.1	172	47
Average -----	1,783	60	156	5.6	3.4	15	--	11	0.03	6.4	2.9	14	41	8.4	10	0.2	0.8	79	28

## PEE DEE RIVER BASIN--Continued

## ROCKY RIVER NEAR NORWOOD, N. C.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	60	58	39	42	32	53	57	63	70	80	--	77
2	57	57	36	46	32	52	59	67	69	80	75	73
3	57	57	37	44	35	49	56	71	68	77	75	71
4	58	57	39	41	37	50	56	68	68	79	76	75
5	60	57	42	39	41	49	57	67	69	80	73	74
6	62	56	45	38	42	45	62	67	74	82	73	75
7	67	55	45	35	42	43	61	68	76	82	72	75
8	68	57	48	35	42	45	62	64	74	80	72	73
9	70	54	48	38	43	48	64	64	71	78	72	76
10	70	53	47	42	32	49	60	67	70	78	74	71
11	66	54	45	38	--	50	--	70	71	79	76	75
12	65	56	44	--	36	53	61	73	73	78	78	69
13	65	52	43	--	36	47	65	70	75	79	79	69
14	66	50	39	--	40	41	69	69	76	81	80	71
15	66	49	38	38	43	47	67	68	77	80	81	71
16	67	48	41	32	42	54	64	69	77	80	76	70
17	70	47	40	37	43	56	64	70	75	79	77	69
18	71	48	40	38	44	56	61	69	75	82	75	69
19	69	46	40	32	47	58	60	68	77	77	76	68
20	68	47	39	33	51	60	61	68	80	79	76	70
21	66	46	39	36	48	64	64	67	75	81	77	72
22	64	47	38	38	45	66	66	72	77	84	78	74
23	68	48	38	40	41	63	64	70	78	85	79	72
24	67	51	38	35	40	62	64	72	75	83	78	69
25	64	50	40	33	40	60	66	74	81	80	78	67
26	62	47	37	32	45	60	70	68	82	78	77	65
27	62	43	35	35	50	63	71	71	80	79	78	63
28	65	43	38	33	54	--	67	71	83	80	79	65
29	65	41	37	36	55	53	67	72	82	78	80	67
30	62	41	37	36	--	52	71	71	79	73	80	66
31	60	--	36	37	--	55	--	69	--	79	80	--
Average	65	50	40	37	42	53	63	69	75	80	77	71

## SANTÉE RIVER BASIN

## BROAD RIVER NEAR CARLISLE, S. C.

LOCATION.--At gaging station at bridge on State Highway 72, 2 miles upstream from Sandy River, 2 miles downstream from Seaboard Air Line Railroad bridge, 24 miles east of Carlisle, Union County, and 5 miles downstream from Neals Shoals Dam.

DRAINAGE AREA.--2,790 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

TOTAL HARDNESS: Maximum, 46 parts per million June 15; minimum, 32 parts per million Feb. 17.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 46 parts per million Oct. 13, Feb. 17, July 16.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
Oct. 15, 1947	2,070	--	199	3.6	1.8	7	9.9	0.17	2.8	0.9	4.9		18	2.5	2.4	0.1	0.5	36	11
Nov. 17	7,980	--	104	4.2	2.7	10	6.9	0.05	3.5	1.2	4.3		19	4.2	2.0	0.1	0.1	37	14
Dec. 15	3,650	42	21	3.0	2.5	8	6.9	0.08	4.5	1.8	4.3		25	3.2	2.5	0.1	0.3	44	19
Jan. 19, 1948	3,640	37	10	1.2	1.0	40	7.1	0.06	3.8	1.7	5.0		24	3.6	2.5	0.1	0.1	42	16
Feb. 17	8,200	44	86	3.2	1.9	16	6.9	0.02	2.8	1.0	3.7		14	3.5	2.5	0.0	0.6	32	11
Mar. 12	5,940	52	18	0.8	0.4	5	7.1	0.01	3.6	1.3	5.1		18	3.3	4.8	0.1	0.4	35	14
Apr. 19	4,240	66	42	1.1	1.0	25	7.1	0.02	3.3	1.6	4.3		21	2.4	2.8	0.1	0.3	38	15
May 14	5,140	72	8	1.2	0.8	5	7.1	0.09	3.9	1.3	4.6		21	3.3	2.5	0.1	0.7	40	25
June 15	3,340	80	64	5.7	4.5	18	6.9	0.02	3.8	1.4	3.8		23	2.2	1.1	0.1	0.6	46	25
July 16	4,240	81	105	3.8	2.6	3	6.4	0.02	2.9	1.0	4.3		18	2.1	2.1	0.1	0.8	37	11
Aug. 16	2,100	78	56	2.2	1.3	3	6.7	0.02	3.3	1.5	6.2		22	3.0	3.8	0.1	1.5	44	14
Sept. 14	2,300	75	42	2.4	1.4	6	6.9	0.02	2.8	1.3	5.2		21	2.2	2.4	0.1	0.6	42	12
Average	1/4,403	63	63	2.7	1.8	12	--	0.05	3.4	1.3	4.6		20	3.0	2.6	0.1	0.5	40	14

1/ Mean discharge for water year October 1947 to September 1948 was 4,798 second-feet.

## SANTÉE RIVER BASIN--Continued

ENOREE RIVER NEAR ENOREE, S. C.

LOCATION.--At gaging station half a mile upstream from Yarbroughs Bridge, three-quarters of a mile upstream from Warrior Creek, and 4 miles southeast of Enoree, Spartanburg County.

DRAINAGE AREA.--307 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 56 parts per million Oct. 15; minimum, 34 parts per million Feb. 17.

Total hardness: Maximum, 15 parts per million May 17; minimum, 7 parts per million July 15.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered														
Oct. 15, 1947	155	--	34	2.8	1.8	5	16	0.10	3.0	1.0	11		34	3.7	2.8	0.1	0.3	56	12
Nov. 17	672	--	50	3.6	2.0	8	6.4	0.04	2.5	.9	4.7		15	3.7	2.5	.0	.5	35	10
Dec. 17	468	41	113	4.8	2.6	10	6.5	.02	2.4	1.1	6.7		21	4.3	2.2	.0	.4	40	10
Jan. 19, 1948	336	39	6	1.1	.9	20	7.1	.02	3.2	1.0	6.7		22	4.2	2.8	.0	.5	43	12
Feb. 17	696	46	108	3.4	2.1	18	6.9	.03	2.6	.8	4.9		15	3.9	2.5	.0	.7	34	10
Mar. 12	610	53	22	1.0	.6	7	7.1	.01	2.9	1.1	7.1		20	5.4	3.2	.1	.5	42	12
Apr. 19	478	65	25	1.6	1.5	20	7.1	.02	3.2	1.5	5.5		23	2.5	2.8	.1	.6	41	14
May 17	338	69	23	2.4	1.7	15	7.1	.04	3.6	1.4	7.1		26	4.1	2.8	.0	.8	52	15
June 15	249	78	28	5.8	5.4	25	6.4	.16	2.9	1.0	4.8		20	2.4	1.1	.1	1.4	48	11
July 15	284	75	113	4.3	2.6	3	6.5	.12	1.8	.7	8.2		16	6.0	3.2	.1	1.4	47	7
Aug. 16	230	--	72	3.8	2.4	4	6.8	.03	2.6	.9	8.1		24	3.8	2.2	.1	1.0	46	10
Sept. 14	162	71	59	3.0	1.7	7	6.9	.15	.04	.9	9.0		24	3.0	3.2	.1	1.3	53	9
Average	1/390	60	54	3.1	2.1	12	--	.13	0.05	2.7	7.0		22	3.9	2.6	0.1	0.8	45	11

1/ Mean discharge for water year October 1947 to September 1948 was 463 second-feet.



## EDISTO RIVER BASIN

## NORTH FORK EDISTO RIVER AT ORANGEBURG, S. C.

LOCATION. --At gaging station at bridge on State Highway 4 at Orangeburg, Orangeburg County, 0.5 mile upstream from Atlantic Coast Line Railroad bridge, and 14 miles downstream from Cav Swamp.

DRAINAGE AREA. --683 square miles.

RECORDS AVAILABLE. --Chemical analyses: October 1947 to September 1948.

EXTREMES 1947-48. --Dissolved solids: Maximum, 42 parts per million Sept. 14; minimum, 26 parts per million Aug. 16.

Total hardness: Maximum, 12 parts per million Jan. 19; minimum, 6 parts per million Oct. 15, July 14.

REMARKS. --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112.

Chemical analyses in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Suspended matter	Oxygen consumed		Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
				Unfiltered	Filtered															
Oct. 15, 1947	491	--	95	8.5	5.4	30	6.3	6.5	0.01	1.7	0.5	6.1	17	0.9	0.3	3.0	0.1	0.1	31	6
Nov. 21	1,460	48	4	12	11	42	5.1	6.8	.03	1.8	.5	2.3	6.0	1.9	3.2	3.2	.0	.3	34	7
Dec. 16	1,320	46	6	12	10	40	5.8	5.8	.01	1.8	.7	1.8	6.0	2.1	2.9	2.9	.0	.2	32	7
Jan. 19, 1948	1,200	39	1	3.4	3.5	--	6.5	4.6	.02	3.3	.8	1.5	8.0	3.1	3.5	3.5	.0	.1	31	12
Feb. 16	2,410	46	52	7.4	6.4	20	6.7	3.6	.01	2.5	.5	3.2	10	2.8	3.0	3.0	.0	.1	30	8
Mar. 9	2,570	53	2	6.7	4.9	27	6.6	2.7	.01	2.0	.9	2.7	9.0	2.3	3.2	3.2	.1	.2	29	9
Apr. 22	1,050	64	6	6.9	6.7	55	6.7	4.2	.02	2.2	1.2	1.0	7.0	1.9	3.2	3.2	.1	.2	34	10
May 11	912	66	1	8.3	7.6	65	6.7	4.9	.09	2.4	1.1	1.2	8.0	2.5	2.8	2.8	.0	.1	34	10
June 18	602	73	12	9.9	9.2	34	5.9	6.2	.01	2.0	.6	1.0	8	1.2	1.1	1.1	.1	.1	32	7
July 14	593	75	8	7.5	6.4	17	5.7	7.7	.05	1.4	.5	2.9	7.0	1.5	2.8	2.8	.1	.4	29	6
Aug. 16	489	74	2	5.8	3.6	17	5.9	5.8	.01	2.2	.8	1.7	9.0	1.2	2.5	2.5	.0	.5	26	9
Sept. 14	1,050	69	3	14	11	55	5.6	7.8	.04	2.3	.8	1.1	5.0	1.6	3.9	3.9	.0	.1	42	9
Average	1,120	59	16	8.5	7.1	37	--	5.6	0.03	2.1	0.7	2.2	8.3	1.9	2.9	2.9	0.0	0.2	32	8

1/Average discharge for water year October 1947 to September 1948 was 1,120 second-feet.

## ST. JOHNS RIVER BASIN

## ST. JOHNS RIVER NEAR DE LAND, FLA.

LOCATION --Crows Bluff Bridge on State Highway 44, 5 miles west of De Land, Volusia County.

DRAINAGE AREA --about 3000 square miles.

RECORDS AVAILABLE --Chemical analyses: January 1948 to September 1948.

Water temperatures: January 1948 to September 1948.

EXTREMES, 1948--Dissolved solids: Maximum, 920 parts per million Aug. 1-10; minimum, 353 parts per million Jan. 1-10.

Total hardness: Maximum, 261 parts per million Aug. 1-10; minimum, 103 parts per million Jan. 1-10.

Water temperatures: Maximum, 89 F.; June 25; minimum, 50 F. Jan. 16-18.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1112. Records of specific conductance of daily samples available in Washington, D. C.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Jan. 1-10, 1948-----	4,443	95	6.7	620	4.4	0.02	23	11	77	3.1	46	27	150	0.0	0.4	353	103	65
Jan. 11-20-----	3,601	90	6.8	678	4.0	.02	24	12	84	3.6	48	30	160	.0	.4	378	109	70
Jan. 21-31-----	4,095	95	6.7	664	3.9	.01	25	12	80	4.0	48	32	160	.0	.4	371	112	72
Feb. 1-10-----	5,452	110	6.7	674	4.1	.01	24	12	84	4.0	42	31	160	.0	.4	369	109	75
Feb. 11-20-----	5,048	105	6.7	703	2.8	.01	25	12	89	3.6	40	32	170	.0	.4	391	112	79
Feb. 21-29-----	3,917	100	6.8	760	3.0	.01	27	13	97	3.6	46	35	190	.0	.3	417	121	83
Mar. 1-10-----	3,500	100	6.9	791	3.8	.01	30	14	100	3.8	49	37	190	.0	.3	433	132	92
Mar. 11-20-----	3,321	95	6.9	828	5.7	.01	31	14	104	4.0	55	39	200	.0	.4	458	135	90
Mar. 21-31-----	3,754	95	7.0	840	8.1	.03	31	15	106	4.0	54	40	200	.0	.4	466	139	95
Apr. 1-10-----	2,763	90	6.7	915	5.6	.03	34	16	119	3.2	58	46	222	.0	.4	517	151	103
Apr. 11-20-----	1,868	70	6.7	1,000	5.6	.02	37	17	129	3.4	62	50	242	.0	.4	564	162	111
Apr. 21-30-----	1,559	50	6.9	1,200	8.4	.03	46	22	154	4.0	86	61	288	.0	.4	662	205	135
May 1-10-----	1,782	50	7.0	1,180	6.7	.01	46	21	149	3.8	84	63	282	.0	.2	659	201	132
May 11-20-----	1,585	45	7.0	1,250	7.5	.01	48	22	150	4.0	86	66	300	.0	.5	698	210	140
May 21-31-----	1,466	40	7.1	1,370	10	.07	51	24	190	8.2	104	73	335	.0	.1	741	221	141

June 1-10, 1948-----	1,392	35	7.2	1,350	9.0	0.08	53	25	146	5.6	102	72	320	0.0	0.1	742	235	151
June 11-20-----	1,524	40	7.2	1,400	9.0	.08	57	25	182	4.8	109	80	335	.0	.2	782	245	156
June 21-30-----	1,755	40	7.3	1,460	6.8	.07	54	26	198	7.8	95	76	370	.0	.1	783	242	164
July 1-10-----	1,762	35	7.2	1,440	9.4	.07	56	24	190	7.5	101	81	350	.0	.0	786	239	156
July 11-20-----	1,781	40	7.3	1,390	9.0	.13	62	25	176	6.4	98	106	320	.0	.9	776	258	173
July 21-31-----	2,525	75	7.2	1,500	8.4	.16	60	26	205	6.6	83	108	370	.0	.5	839	257	189
Aug. 1-10-----	3,014	80	7.1	1,650	7.6	.20	57	29	215	6.2	58	121	410	.0	.3	920	261	218
Aug. 11-20-----	3,545	180	7.1	1,380	8.8	.16	55	24	181	6.9	58	121	330	.0	.2	783	236	188
Aug. 21-31-----	4,545	180	6.7	1,300	6.4	.14	48	26	171	3.0	49	105	315	.0	.4	742	227	186
Sept. 1-10-----	4,045	220	6.7	1,140	2.6	.04	40	22	144	11	45	81	276	.0	.4	646	190	153
Sept. 11-20-----	3,568	210	6.7	1,110	3.0	.04	38	21	137	12	61	69	269	.0	1.0	619	181	131
Sept. 21-30-----	5,896	180	6.7	970	2.4	.08	34	18	125	5.4	54	56	239	.0	.6	526	159	115
Average-----	3,000	94	6.9	1,004	6.1	0.06	41	20	140	5.3	57	64	264	0.0	0.4	608	184	123

ST. JOHNS RIVER BASIN--Continued  
ST. JOHNS RIVER NEAR DE LAND, FLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1				63	61	72	74	79	82	86	83	84
2				64	59	70	74	79	82	85	83	83
3				64	59	70	74	80	81	85	83	83
4				62	60	74	74	80	82	82	82	84
5				60	62	72	72	81	82	85	83	84
6				59	61	70	72	82	82	85	82	84
7				59	63	68	74	81	82	83	83	81
8				60	65	69	72	81	82	84	84	85
9				59	67	68	78	79	82	83	84	85
10				60	66	70	78	80	--	83	82	86
11				60	64	70	77	80	82	84	84	86
12				60	65	73	79	80	81	83	84	84
13				61	66	71	77	80	81	84	83	84
14				59	67	70	78	81	82	84	83	82
15				56	66	68	78	81	82	84	84	84
16				54	65	70	77	82	83	85	84	82
17				54	65	69	78	83	84	84	83	81
18				54	66	72	78	82	84	86	83	80
19				55	68	73	78	82	84	86	83	80
20				56	67	75	77	81	84	86	83	80
21				59	68	75	77	81	84	85	84	80
22				59	70	76	76	81	84	86	84	79
23				59	69	77	78	82	85	85	84	79
24				60	68	76	78	82	87	84	84	79
25				60	68	77	78	81	89	82	85	80
26				59	70	77	77	82	86	84	84	79
27				59	70	77	77	82	82	84	84	79
28				61	74	76	78	83	86	86	84	78
29				61	74	74	78	81	86	84	84	80
30				61	--	72	78	80	86	84	85	84
31				63	--	71	--	81	--	82	84	--
Average				59	66	72	76	81	84	84	84	82

## MISCELLANEOUS ANALYSES OF STREAMS IN SOUTH ATLANTIC SLOPE BASINS IN NORTH CAROLINA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Suspended matter	Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
DAN RIVER AT LEAKSVILLE																	
Aug. 17, 1948	658		4	6.9	14	0.02	4.3	1.4	7.6		23	3.5	1.8	0.1	0.4	44	16
SMITH RIVER AT SPRAY																	
Aug. 17, 1948	310		5	7.0	7.0	0.03	6.3	2.3	4.8		35	2.6	2.6	0.1	0.4	44	25
TAR RIVER AT GREENVILLE																	
Sept. 15, 1948			8	7.1	18	0.04	5.1	1.9	6.2		29	3.5	4.1	0.2	0.4	62	20
CONTENTNEA CREEK AT HOOKERTON																	
Aug. 18, 1948	109		27	6.3	8.8	0.05	4.4	1.1	4.5		11	7.7	5.2	0.2	0.4	49	16
BONNIE DOONE, GLENVILLE AND KORNOU LAKES AT FAYETTEVILLE 1/																	
Apr. 28, 1948		21	9	6.6	2.5	0.01	0.8	0.5	4.3		7	1.9	3.5	0.1	0.5	21	4
YADKIN RIVER AT YADKIN COLLEGE																	
Sept. 15, 1948	1,500		5	7.0	14	0.04	3.4	1.2	4.3		20	2.1	2.5	0.1	0.5	43	13
LUMBER RIVER AT BOARDMAN																	
Sept. 29, 1948	300		32	5.8	6.4	0.11	2.0	0.7	1.6		4	2.4	3.2	0.3	0.3	28	8
CATAWBA RIVER NEAR MARION																	
Mar. 8, 1948	519		7	7.3	8.6	0.02	1.8	0.6	2.9		10	3.0	1.2	0.0	0.2	25	7
Sept. 21, 1948	267		6	6.9	11	0.03	3.8	1.1	2.6		15	3.2	2.4	0.2	0.2	34	14
CATAWBA RIVER AT CATAWBA																	
Mar. 9, 1948	4,290		3	6.9	8.7	0.02	2.4	1.0	2.0		13	0.6	2.0	0.0	0.6	28	10

1/Source: Big Beaver Creek.

## MISCELLANEOUS ANALYSES OF STREAMS IN SOUTH ATLANTIC SLOPE BASINS IN NORTH CAROLINA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Suspended matter	Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
LINVILLE RIVER AT BRANCH																	
Mar. 9, 1948 -----	254		16	6.9	6.2	0.01	1.3	0.6	1.7		6	2.7	0.8	0.1	0.3	19	6
HENRY FORK NEAR HENRY RIVER																	
Mar. 9, 1948 -----	256		9	6.8	6.1	0.01	1.0	0.6	3.1		6	2.7	2.5	0.1	0.2	20	5
SOUTH FORK CATAWBA RIVER AT LOWELL																	
Mar. 10, 1948 -----	1,440		4	6.5	10	0.02	3.2	1.2	3.3		16	3.3	2.2	0.1	0.3	34	13

PART 3. OHIO RIVER BASIN  
OHIO RIVER MAIN STEM

ALLEGHENY RIVER AT KITTANNING, PA.

LOCATION.--At city raw-water intake, about 1,000 feet upstream from bridge on U. S. Highway 422, at Kittanning, Armstrong County.

DRAINAGE AREA.--8,973 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1906 to September 1907, October 1944 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 463 Nov. 1-10; minimum, 103 Mar. 21-31.

EXTREMES, 1906-07, 1944-48.--Dissolved solids (1906-07, 1944-47): Maximum, 304 parts per million Oct. 11-20, 1945; minimum, 54 parts per million Jan. 7-15, 1907.

Total hardness (1906-07, 1944-47): Maximum, 135 parts per million Oct. 1-20, 1946; minimum, 29 parts per million Jan. 7-15, 1907.

Specific conductance (1944-48): Maximum, 521 Oct. 11-20, 1946; minimum, 101 Mar. 21-31, 1945.

Water temperatures (1944-48): Maximum, 81° F. July 9, 25, 1945; minimum, 33° F. Dec. 31, 1944, Jan. 1, 1945.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947	2,041	66	5	7.1	368	2.4	0.03	31	6.9	29		56	47	52	0.1	0.4	202	106	60
Oct. 11-20	1,400	64	7	7.1	393							61	49	55					
Oct. 21-31	1,551	62	7	7.1	411							63	57	55					
Nov. 1-10	2,129	59	9	7.2	463							62	69	63					
Nov. 11-20	4,531	48	12	7.1	434							54	63	61					
Nov. 21-30	7,251	46	12	7.0	374							48	54	53					
Dec. 1-10	14,986	42	12	6.8	270							36	40	35					
Dec. 11-20	17,070	38	17	6.7	178							29	32	17					
Dec. 21-31	7,182	38	13	7.0	201							29	34	21					
Jan. 1-10, 1948	14,586	38	15	6.8	268	4.7	.11	16	4.3	14		26	39	21	.1	1.7	122	63	41
Jan. 11-20	6,432	38	12	7.0	227							30	40	22					
Jan. 21-31	4,293	37	14	7.1	269							38	48	28					
Feb. 1-10	3,554	36	20	7.1	303							48	47	35					
Feb. 11-20	35,310	36	15	7.4	229							34	39	26					
Feb. 21-29	36,369	37	16	6.7	128							14	28	10					
Mar. 1-10	24,680	38	10	6.7	143							20	28	12		1.5			
Mar. 11-20	27,655	38	16	6.7	170							25	31	15		1.4			
Mar. 21-31	69,927	42	40	6.6	103							18	30	6		1.4			
Apr. 1-10	29,480	47	11	6.5	137	4.6	.08	13	9.2	7.8		20	37	12	.1	1.1	62	46	29
Apr. 11-20	58,970	46	13	6.2	116							16	25	8		1.5			
Apr. 21-30	26,590	52	11	6.5	144							19	32	9		1.0			
May 1-10	22,050	54	5	6.6	161							19	35	14		.8			
May 11-20	23,800	57	7	6.8	153							23	38	12		.7			
May 21-31	17,355	56	8	6.7	151							25	34	14		.7			

OHIO RIVER MAIN STEM--Continued  
ALLEGHENY RIVER AT KITTANNING, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
June 1-10, 1948	8,597	64	5	6.9	188	--	--	--	--	--	--	31	31	18	--	0.6	--	--	--
June 11-20	10,064	65	7	6.9	204	--	--	--	--	--	--	30	38	18	--	.7	--	--	--
June 21-30	11,446	65	5	6.5	204	--	--	--	--	--	--	28	37	20	--	.7	--	--	--
July 1-10	6,397	71	5	6.6	223	--	--	--	--	--	--	33	36	23	--	.8	--	--	--
July 11-20	4,691	72	10	6.8	258	--	--	--	--	--	--	42	40	28	--	.4	--	--	--
July 21-31	7,947	72	7	6.7	249	--	--	--	--	--	--	36	41	27	--	.7	--	--	--
Aug. 1-10	5,321	72	10	6.8	262	--	--	--	--	--	--	38	43	30	--	.6	--	--	--
Aug. 11-20	6,254	72	5	7.1	251	--	--	--	--	--	--	28	50	26	--	.6	--	--	--
Aug. 21-31	3,014	72	7	7.2	302	--	--	--	--	--	--	43	48	36	--	.4	--	--	--
Sept. 1-10	1,573	72	15	7.2	343	2.4	0.02	30	6.9	23	--	50	55	39	0.2	.4	195	103	62
Sept. 11-20	1,237	72	10	7.1	398	--	--	--	--	--	--	67	63	48	--	.6	--	--	--
Sept. 21-30	1,210	69	10	7.2	430	--	--	--	--	--	--	61	69	52	--	.3	--	--	--
Average	14,640	54	11	--	251	--	--	--	--	--	--	36	41	28	--	--	--	--	--



OHIO RIVER MAIN STEM--Continued  
ALLEGHENY RIVER AT SHARPSBURG, PA.

LOCATION.--At Sharpsburg Bridge, Allegheny County.

RECORDS AVAILABLE.--Chemical analyses: Monthly cross-section samples October 1947 to September 1948.

REMARKS.--Station 100 is approximately 100 feet from north (right) bank and station 800 is approximately 90 feet from south (left) bank. Records of discharge for water year October 1947 to September 1948 computed on basis of discharge of Allegheny River at Natrona given in Water-Supply Paper 1113.

Records of specific conductance of daily samples in district office at Philadelphia, Pa.

Chemical analyses of cross-section samples, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second- feet)	Station	Time	Temperature (° F.)	Color	pH	Specific conductance (micromhos at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Total hardness as CaCO <sub>3</sub>
Oct. 14, 1947 -----	2,020	800	12:20 p.m.	67	2	4.35	568	0	171	52	4.3	165
		600	12:28 p.m.	67	3	5.2	547	4	178	50	4.0	156
		410	12:30 p.m.	67	4	5.2	546	4	166	50	3.8	162
		250	12:40 p.m.	67	3	5.2	546	4	170	50	3.7	150
		100	12:40 p.m.	68	5	5.1	548	6	168	50	3.8	162
Nov. 10-----	3,700	800	5:05 p.m.	54	1	4.00	625	0	200	46	5.4	180
		600	5:02 p.m.	54	2	4.15	616	0	193	47	4.7	183
		410	5:00 p.m.	54	2	4.15	611	0	195	47	4.1	183
		250	4:58 p.m.	54	1	4.20	611	0	198	49	4.3	183
		100	4:55 p.m.	55	1	4.20	609	0	200	48	4.2	183
Dec. 24-----	10,800	800	9:05 a.m.	34	3	6.2	222	20	56	16	4.2	87
		600	9:10 a.m.	34	3	6.2	222	24	56	20	3.8	78
		410	9:15 a.m.	34	3	6.2	220	20	52	19	3.4	84
		250	9:25 a.m.	34	3	6.3	221	20	50	19	3.5	78
		100	9:30 a.m.	34	3	6.2	224	24	54	21	3.4	78
Jan. 16, 1948 -----	7,050	800	9:50 a.m.	34	2	6.0	254	12	74	19	2.5	93
		600	9:44 a.m.	33	3	6.0	252	12	72	19	2.6	90
		410	9:39 a.m.	33	3	6.0	249	10	73	19	2.4	93
		250	9:35 a.m.	34	2	6.0	251	12	72	21	2.5	87
		100	9:32 a.m.	34	3	6.0	252	12	72	19	2.4	96
Feb. 17 -----	58,900	800	3:57 p.m.	35	2	5.7	209	16	53	18	4.6	75
		600	3:54 p.m.	35	3	5.8	202	10	51	18	4.4	66
		410	3:51 p.m.	35	4	5.8	198	10	47	18	4.1	64
		250	3:48 p.m.	36	5	6.1	202	16	46	19	3.6	62
		100	3:45 p.m.	36	4	6.1	201	14	44	19	3.7	60

OHIO RIVER MAIN STEM--Continued  
 ALLEGHENY RIVER AT SHARPSBURG, PA.--Continued

Chemical analyses of cross-section samples, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Discharge (second- feet)	Station	Time	Temperature (° F.)	Color	pH	Specific conductance (microhms at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Total hardness as CaCO <sub>3</sub>
Mar. 16, 1948	16,200	800	--	--	--	--	--	--	--	--	--	--
		600	7:25 p.m.	41	3	5.5	256	6	80	15	2.9	90
		410	7:20 p.m.	41	2	5.6	252	8	76	16	2.3	90
		250	7:15 p.m.	42	2	5.6	250	8	77	16	3.5	90
Apr. 15	136,000	100	7:10 p.m.	42	4	5.6	252	8	71	16	3.9	90
		800	10:00 a.m.	46	3	5.0	150	2	52	6	3.3	52
		600	10:04 a.m.	46	6	5.2	140	4	48	5	2.7	51
		410	10:06 a.m.	46	6	5.2	136	3	45	7	2.3	51
May 14	29,200	250	10:08 a.m.	46	5	5.1	137	2	49	6	2.6	50
		100	10:11 a.m.	46	6	5.4	135	4	42	7	2.9	50
		800	7:50 a.m.	61	5	6.1	194	10	59	12	1.0	63
		600	7:55 a.m.	61	6	5.8	195	8	68	12	1.0	60
June 18	9,080	410	8:00 a.m.	61	4	6.2	185	11	66	12	1.0	64
		250	8:05 a.m.	61	4	6.3	186	11	67	11	1.0	66
		100	8:10 a.m.	61	1	6.3	189	12	73	13	1.0	68
		800	11:20 a.m.	73	2	5.8	270	8	93	16	1.3	96
July 20	5,800	600	11:23 a.m.	73	2	5.3	274	2	93	15	2.8	93
		410	11:25 a.m.	73	4	5.5	270	4	102	14	1.3	98
		250	11:28 a.m.	72	3	5.6	272	4	98	16	1.2	96
		100	11:32 a.m.	73	3	5.4	270	2	94	16	1.7	94
Aug. 18	5,490	800	8:21 a.m.	78	3	6.1	309	12	101	20	3.1	114
		600	8:27 a.m.	78	3	6.3	306	20	99	21	2.3	114
		410	8:45 a.m.	78	3	6.3	304	18	94	20	2.6	117
		250	8:52 a.m.	78	2	6.2	304	24	98	20	2.2	117
Sept. 21	1,580	100	9:02 a.m.	77	3	6.2	304	16	100	20	2.4	114
		800	10:10 a.m.	76	4	6.1	324	12	95	28	1.3	111
		600	10:03 a.m.	76	3	6.1	324	12	100	26	1.2	120
		410	9:55 a.m.	76	2	6.2	324	12	103	26	1.4	111
Sept. 21	1,580	250	9:40 a.m.	76	2	6.1	321	12	96	26	1.3	105
		100	9:30 a.m.	73	1	6.1	324	14	103	26	1.4	111
		800	8:00 a.m.	75	1	3.90	673	0	246	35	4.2	174
		600	7:55 a.m.	75	1	4.00	666	0	235	36	5.3	177
Sept. 21	1,580	410	7:50 a.m.	76	1	4.00	664	0	236	36	5.0	183
		250	7:45 a.m.	76	1	3.80	679	0	241	36	4.1	174
		100	7:40 a.m.	76	2	4.6	632	0	240	35	0.9	174

## OHIO RIVER MAIN STEM--Continued

## OHIO RIVER AT AMBRIDGE, PA.

LOCATION.--At bridge on State Highway 930, at Ambridge, Beaver County, 1.2 miles downstream from Sewickley Creek, and approximately 5 miles below gaging station at Sewickley, Allegheny County.

DRAINAGE AREA.--19,560 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 770 Nov. 1-10; minimum, 131 Mar. 21-31.

Water temperatures: Maximum, 81° F. Aug. 29-30; minimum, freezing point on several days in January and February.

EXTREMES, 1945-48.--Dissolved solids (1945-47): Maximum, 600 parts per million Oct. 1-10, 1946; minimum, 79 parts per million Apr. 1-10, 1947.

Total hardness (1945-47): Maximum, 302 parts per million Oct. 1-10, 1946; minimum, 43 parts per million Apr. 1-10, 1947.

Specific conductance: Maximum, 921 Oct. 1-10, 1946; minimum, 128 Apr. 1-10, 1947.

Water temperatures: Maximum, 86° F. Aug. 20-21, 1947; minimum, freezing point on many days in winter months.

REMARKS.--Samples collected daily from highway bridge at point 400 feet from east bank of river. Due to cross-sectional differences in concentration of dissolved solids water samples also collected once a month at points 625, 870, 1090, and 1380 feet from east bank of river. Discharge records for gaging station at Sewickley, Pa. for water year October 1947 to September 1948 given in Water-Supply Paper 1113. No appreciable inflow between gaging station and sampling point except during periods of heavy local rains. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
Oct. 1-10, 1947--	4,527	67	3	4.5	535	7.2	0.2	0.03	0.88	46	12	37		0	194	30	0.1	2.2	343	167	--	14
Oct. 11-20-----	3,414	69	3	4.40	633	6.4	2.1	.03	.9	55	13	35		0	212	38	.3	6.4	416	205	--	14
Oct. 21-31-----	3,643	68	3	4.5	710	--	--	.02	--	--	--	--	--	0	237	44	--	--	--	--	--	16
Nov. 1-10-----	6,730	63	3	4.30	770	--	--	.03	--	--	--	--	--	0	285	40	--	--	--	--	--	19
Nov. 11-20-----	14,465	55	3	4.6	613	--	--	.03	--	--	--	--	--	0	234	32	--	--	--	--	--	20
Nov. 21-30-----	16,258	45	6	5.7	437	--	--	.02	--	--	--	--	--	0	139	31	--	--	--	--	--	--
Dec. 1-10-----	24,580	41	2	8.3	335	--	--	.02	--	--	--	--	--	16	90	29	--	--	--	--	--	--
Dec. 11-20-----	31,180	37	5	6.3	224	--	--	--	--	--	--	--	--	12	66	15	--	--	--	--	--	--
Dec. 21-31-----	13,890	37	5	6.3	270	--	--	.06	--	--	--	--	--	12	81	16	--	--	--	--	--	--
Jan. 1-10, 1948--	47,370	37	3	6.0	248	5.6	--	.03	.31	22	5.8	15	10	1	73	17	1	3.5	152	79	71	--
Jan. 11-20-----	22,420	35	7	5.1	254	--	--	.15	--	--	--	--	--	1	85	12	--	--	--	--	--	--
Jan. 21-31-----	10,866	34	1	5.0	342	--	--	.06	--	--	--	--	--	2	120	15	--	--	--	--	--	11
Feb. 1-10-----	9,201	33	2	5.3	411	--	--	.03	--	--	--	--	--	4	145	22	--	--	--	--	--	--
Feb. 11-14-----	34,300	33	10	5.3	438	--	--	.06	--	--	--	--	--	4	163	18	--	--	--	--	--	--
Feb. 15-20-----	123,833	34	8	6.1	194	--	--	.12	--	--	--	--	--	8	52	13	--	--	--	--	--	--
Feb. 21-29-----	79,378	36	13	6.2	157	--	--	.12	--	--	--	--	--	8	43	9.0	--	--	--	--	--	--
Mar. 1-10-----	60,050	37	2	6.1	179	--	--	.04	--	--	--	--	--	8	50	10	--	--	--	--	--	--
Mar. 11-20-----	46,890	39	3	6.1	220	--	--	.06	--	--	--	--	--	8	66	14	--	--	--	--	--	--
Mar. 21-31-----	110,573	46	12	6.0	131	--	--	.12	--	--	--	--	--	10	34	7.0	--	--	--	--	--	--

## OHIO RIVER MAIN STEM--Continued

## OHIO RIVER AT AMBRIDGE, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Alum-inum (Al)	Iron (Fe)	Man-ga-nese (Mn)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dis-solved solids	Hardness as CaCO <sub>3</sub>		Total acid-ity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbon-ate	
Apr. 1-10, 1948--	54,210	49	3	6.1	185	5.7	--	0.05	0.07	17	4.6	9.0	--	10	53	11	0.1	2.2	112	61	53	--
Apr. 11-20 -----	149,780	48	4	5.7	160	--	--	.04	--	--	--	--	--	7	49	7.2	--	2.7	--	--	--	--
Apr. 21-30 -----	51,070	55	1	5.2	219	--	--	.01	--	--	--	--	--	5	74	8.5	--	1.4	--	--	--	--
May 1-10 -----	64,500	54	5	5.4	223	--	--	.01	--	--	--	--	--	2	76	12	--	1.4	--	--	--	--
May 11-20 -----	49,160	60	5	6.0	211	--	--	.01	--	--	--	--	--	8	68	11	--	1.2	--	--	--	--
May 21-31 -----	295,545	63	0	5.9	249	--	--	.01	--	--	--	--	--	7	83	12	--	.9	--	--	--	--
June 1-10 -----	19,040	71	1	4.5	359	--	--	.02	--	--	--	--	--	0	136	14	--	1.1	--	--	--	16
June 11-20 -----	32,670	70	2	5.1	311	--	--	.03	--	--	--	--	--	2	111	14	--	1.3	--	--	--	--
June 21-30 -----	31,010	74	3	5.4	273	--	--	.03	--	--	--	--	--	4	94	12	--	2.6	--	--	--	--
July 1-10 -----	21,930	76	1	5.0	311	--	--	.03	--	--	--	--	--	1	115	12	--	1.8	--	--	--	--
July 11-20 -----	19,400	78	2	4.8	373	--	--	.03	--	--	--	--	--	2	143	13	--	1.0	--	--	--	--
July 21-31 -----	30,882	76	1	5.1	290	--	--	.02	--	--	--	--	--	2	104	12	--	2.8	--	--	--	--
Aug. 1-10 -----	22,290	75	3	4.7	319	--	--	.05	--	--	--	--	--	1	113	14	--	2.6	--	--	--	12
Aug. 11-20 -----	16,470	75	1	5.6	355	--	--	.01	--	--	--	--	--	3	126	17	--	2.5	--	--	--	--
Aug. 21-31 -----	8,262	79	1	4.45	428	--	--	.03	--	--	--	--	--	0	159	18	--	1.5	--	--	--	18
Sept. 1-10 -----	5,007	79	10	4.00	534	7.8	1.4	.08	1.6	44	13	27	--	0	197	22	.2	2.9	337	179	--	24
Sept. 11-20 -----	5,559	78	5	4.25	614	--	--	.01	--	--	--	--	--	0	223	24	--	1.2	--	--	--	41
Sept. 21-30 -----	9,688	72	5	4.00	694	--	--	.04	--	--	--	--	--	0	253	26	--	.8	--	--	--	86
Average -----	33,560	56	4	--	357	--	--	0.07	--	--	--	--	--	4	124	18	--	--	--	--	--	--

## OHIO RIVER MAIN STEM--Continued

## OHIO RIVER AT AMBRIDGE, PA.--Continued

Chemical analyses of cross-section samples, in parts per million,  
water year October 1947 to September 1948

Date	Dis-charge (second-foot)	Station	Time	Tem- pera- ture (° F.)	Color	pH	Specific conduct- ance (micro- mhos at 25° C.)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Ni- trate (NO <sub>3</sub> )	Total hard- ness as CaCO <sub>3</sub>
Oct. 18, 1948 --	11,100	1380	4:35 p. m.	60	2	4.30	633	0	252	27	2.6	218
		1090	4:39 p. m.	60	4	3.80	687	0	280	29	5.5	218
		870	4:43 p. m.	60	3	4.05	653	0	259	27	4.0	202
		625	4:49 p. m.	60	4	3.90	655	0	254	28	4.2	202
		340	4:52 p. m.	60	2	4.10	643	0	252	28	3.0	210
Nov. 15 -----	13,200	1380	11:35 a. m.	52	2	4.7	478	1	184	21	1.2	132
		1090	11:25 a. m.	52	1	4.7	479	2	183	20	1.0	150
		870	11:15 a. m.	52	1	4.7	499	1	182	22	1.0	156
		625	11:10 a. m.	52	1	4.8	514	2	205	21	1.0	144
		340	11:05 a. m.	53	1	4.8	515	2	207	25	1.0	150
Dec. 22 -----	58,500	1380	2:15 p. m.	44	10	4.30	241	0	87	6	1.5	90
		1090	2:20 p. m.	43	11	4.30	234	0	70	5	1.5	90
		870	2:25 p. m.	43	11	4.40	223	0	72	6	1.5	--
		625	2:30 p. m.	41	6	4.9	208	4	73	8	2.2	81
		340	2:35 p. m.	39	11	5.6	209	7	63	11	2.5	84
Jan. 18, 1949 --	39,600	1380	12:50 p. m.	48	4	4.10	303	0	110	8	2.2	96
		1090	12:45 p. m.	46	4	4.30	289	0	102	8	2.4	90
		870	12:40 p. m.	44	5	4.30	266	0	91	10	3.2	72
		625	12:35 p. m.	41	4	4.9	232	2	77	12	2.8	66
		340	12:30 p. m.	40	5	5.6	219	8	68	12	2.7	69
Feb. 11 -----	37,800	1380	11:30 a. m.	39	4	4.30	308	0	115	9	3.0	87
		1090	11:30 a. m.	39	5	4.30	297	0	107	9	3.2	78
		870	11:35 a. m.	38	5	4.40	287	0	102	9	2.8	78
		625	11:40 a. m.	37	4	4.6	264	2	91	12	5.2	76
		340	11:40 a. m.	36	4	4.7	258	2	88	12	5.2	75
Mar. 22 -----	33,300	1380	1:35 p. m.	42	10	4.00	358	0	128	12	2.8	111
		1090	1:30 p. m.	42	10	4.10	348	0	121	14	1.5	108
		870	1:25 p. m.	42	12	4.20	316	0	108	13	2.5	96
		625	1:20 p. m.	42	9	4.40	289	0	94	14	2.2	90
		340	1:15 p. m.	42	10	4.8	286	0	88	18	2.0	87
Apr. 18 -----	35,100	1380	5:30 p. m.	52	10	6.3	263	5	95	10	.8	84
		1090	5:25 p. m.	52	10	6.3	217	11	67	12	1.2	64
		870	5:35 p. m.	51	11	5.9	237	6	78	11	2.0	66
		625	5:20 p. m.	51	10	5.3	255	4	86	10	2.0	81
		340	5:15 p. m.	51	9	6.2	211	12	60	12	1.5	60
May 13 -----	11,000	1380	11:00 a. m.	68	5	5.4	364	4	127	16	3.0	112
		1090	10:55 a. m.	68	4	4.8	374	2	132	16	3.2	112
		870	10:50 a. m.	68	5	5.3	368	4	130	16	2.5	116
		625	10:45 a. m.	68	6	5.1	384	4	135	17	3.4	120
		340	10:40 a. m.	68	5	6.1	368	9	126	16	3.0	116
June 14 -----	6,540	1380	10:00 a. m.	78	2	5.3	396	4	141	16	4.5	122
		1090	10:05 a. m.	77	2	5.4	384	5	139	17	5.1	116
		870	10:15 a. m.	78	2	5.0	392	4	141	16	4.7	114
		625	10:20 a. m.	78	2	5.7	386	7	142	16	5.5	134
		340	10:25 a. m.	78	2	5.0	382	3	144	18	4.7	126
July 15 -----	16,100	1380	12:00 m.	80	2	5.3	475	3	171	24	1.2	--
		1090	11:55 a. m.	80	2	5.6	475	7	166	24	1.1	--
		870	11:50 a. m.	79	2	5.5	475	4	172	24	1.2	150
		625	11:50 a. m.	80	2	5.5	476	4	167	24	1.4	153
		340	11:45 a. m.	81	1	5.5	475	5	166	24	1.3	150
Aug. 17 -----	9,520	1380	12:55 p. m.	83	1	5.3	423	8	152	20	5.1	128
		1090	1:00 p. m.	82	1	5.4	421	7	150	20	4.9	128
		870	1:05 p. m.	82	1	5.4	420	6	156	22	4.7	128
		625	1:08 p. m.	83	1	5.7	422	10	154	20	4.3	130
		340	1:08 p. m.	83	1	5.4	419	6	144	21	4.4	128
Sept. 14 -----	5,640	1380	6:35 p. m.	73	1	5.3	401	4	151	18	4.9	126
		1090	6:31 p. m.	73	1	5.4	400	4	145	18	4.3	122
		870	6:29 p. m.	73	1	5.2	401	4	149	18	4.3	122
		625	6:22 p. m.	73	1	5.3	406	6	150	19	4.6	122
		340	6:15 p. m.	73	1	5.4	404	5	145	18	4.7	124

OHIO RIVER MAIN STEM--Continued  
OHIO RIVER AT AMBRIDGE, PA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	66	67	39	39	33	38	48	55	66	77	79	79
2	67	66	41	39	33	38	47	55	76	76	79	79
3	66	65	41	37	34	38	47	55	70	77	80	79
4	67	64	42	37	34	36	47	55	71	76	79	80
5	68	63	43	36	35	37	49	55	70	78	76	80
6	68	63	43	36	35	36	50	55	71	76	74	79
7	68	63	40	36	32	37	51	53	71	75	72	78
8	68	62	39	36	32	37	52	53	71	76	72	79
9	68	61	39	37	32	37	50	54	71	76	72	79
10	68	58	39	37	32	37	50	54	71	76	71	78
11	67	68	39	36	32	36	50	57	71	77	78	78
12	69	66	38	36	32	36	49	59	71	78	74	77
13	69	55	37	36	38	36	48	59	70	80	74	79
14	69	54	37	35	--	37	47	60	69	79	74	78
15	69	53	37	34	--	38	47	60	69	79	72	77
16	69	52	37	35	34	40	46	61	70	78	75	78
17	71	50	37	35	34	41	46	61	70	78	75	78
18	70	50	36	34	34	39	47	60	71	78	75	77
19	70	50	36	34	37	42	48	61	71	78	75	77
20	69	49	35	34	34	42	50	59	71	78	75	78
21	70	48	37	35	34	44	50	61	69	79	77	77
22	69	48	37	36	34	47	52	59	68	78	77	75
23	70	49	36	35	34	48	53	61	73	78	77	74
24	68	49	37	34	34	48	54	62	73	78	77	73
25	68	47	37	33	35	49	54	63	75	76	79	71
26	69	47	37	33	36	39	56	64	74	75	80	70
27	68	43	37	33	36	47	58	64	75	77	80	70
28	68	42	36	33	39	46	56	64	75	76	80	69
29	68	41	36	32	38	46	56	64	77	77	81	70
30	67	40	36	33	--	46	56	65	77	77	81	--
31	66	--	37	32	--	47	--	66	--	77	80	--
Average	68	54	38	35	34	41	50	59	72	77	76	76

## ALLEGHENY RIVER TRIBUTARIES

## CLARION RIVER NEAR PINEY, PA.

LOCATION --At hydroelectric plant of Pennsylvania Electric Co., 2½ miles from Piney, Clarion County.

DRAINAGE AREA --951 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1946 to September 1948.

EXTREMES, 1947-48 --Specific conductance: Maximum, 570 Nov. 11-20; minimum, 100 Mar. 21-31, Apr. 11-20.

EXTREMES, 1946-48 --Dissolved solids (1946-47): Maximum, 317 parts per million Sept. 11-20, 1947; minimum, 59 parts per million Apr. 1-10, 1947.

Total hardness (1946-47): Maximum, 182 parts per million Sept. 11-20, 1947; minimum, 28 parts per million Apr. 1-10, 1947.

REMARKS --Samples collected by Pennsylvania Electric Co. Discharge records computed by subtracting discharge at Ridgeway from discharge at St. Petersburg given in Water-Supply 1113. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Color	pH	Specific conductance (micromhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947	136																		
Oct. 11-20	119	55	6.4	349	5.0	0.90	0.11	31	5.6	26		34	56	50	0.1	0.6	218	100	73
Oct. 21-31	251	55	6.6	395	4.2	1.5	2.2	36	6.1	21		34	59	56	.3	.7	253	124	96
Nov. 1-10	171	65	6.6	435								44	64	67					
Nov. 11-20	452	75	6.7	476								48	70	74					
Nov. 21-30	771	95	6.8	570								57	83	89					
		70	6.7	513								48	73	82					
Dec. 1-10	1,132	35	6.5	306								30	48	43					
Dec. 11-20	1,284	25	6.4	199								17	35	25					
Dec. 21-31	683	30	6.4	188								16	34	24					
Jan. 1-10, 1948	1,536	23	6.4	206	4.6	.15	.10	16	3.6	16		19	37	29	.1	.4	132	60	44
Jan. 11-20	776	26	6.6	172								15	32	20					
Jan. 21-31	401	24	6.4	220								22	36	26					
Feb. 1-10	282	28	6.5	247								26	40	31					
Feb. 11-20	3,696	38	6.4	236								23	41	28					
Feb. 21-28	3,542	20	6.4	110								8	26	9.0					
Mar. 1-10	2,618	16	6.0	114								7	27	10		.8			
Mar. 11-20	2,161	21	6.2	151								10	33	13		.4			
Mar. 21-31	3,968	16	5.8	100								6	24	7.9		1.0			
Apr. 1-10	2,589	12	5.9	128	4.5	.23	.23	11	3.2	5.9		5	32	11	.1	.4	83	41	37
Apr. 11-20	7,474	10	5.4	100								4	28	7.0		.7			
Apr. 21-30	3,500	12	5.3	130								3	36	10		.5			
May 1-10	2,941	15	5.6	128								6	33	11		.4			
May 11-20	2,348	30	5.9	134								7	31	13		.4			
May 21-31	1,395	25	6.0	135								7	31	13		.4			

## ALLEGHENY RIVER TRIBUTARIES--Continued

## CLARION RIVER NEAR PINEY, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Color	pH	Specific conductance (micromhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
June 1-10, 1948	856	30	6.2	181	--	--	--	--	--	--	--	11	38	20	--	0.4	--	--	--
June 11-20	1,038	30	6.1	231	--	--	--	--	--	--	--	17	48	26	--	.4	--	--	--
June 21-30	1,179	28	5.9	227	--	--	--	--	--	--	--	17	46	28	--	.3	--	--	--
July 1-10	380	25	6.0	221	--	--	--	--	--	--	--	16	46	25	--	.4	--	--	--
July 11-20	407	30	6.0	257	--	--	--	--	--	--	--	20	51	32	--	.4	--	--	--
July 21-31	949	35	6.1	327	--	--	--	--	--	--	--	27	59	45	--	.5	--	--	--
Aug. 1-10	634	32	6.6	306	--	--	--	--	--	--	--	20	57	41	--	.6	--	--	--
Aug. 11-20	832	35	6.7	321	--	--	--	--	--	--	--	20	61	42	--	.6	--	--	--
Aug. 21-31	383	36	6.6	335	--	--	--	--	--	--	--	22	61	45	--	.6	--	--	--
Sept. 1-10	184	35	6.7	337	6.2	0.16	0.05	29	6.4	24	24	25	63	46	0.1	.4	208	99	78
Sept. 11-20	89	35	6.5	342	--	--	--	--	--	--	--	22	67	45	--	.6	--	--	--
Sept. 21-30	144	55	6.6	403	--	--	--	--	--	--	--	32	71	55	--	.8	--	--	--
Average	1,414	34	--	256	--	--	--	--	--	--	--	21	47	33	--	--	--	--	--



## ALLEGHENY RIVER TRIBUTARIES--Continued

## KISKIMINETAS RIVER AT LEECHBURG, PA.

LOCATION --At raw-water intake of West Leechburg plant of Allegheny-Ludlum Steel Corp., 0.2 mile below Brandy Run, Armstrong County.  
DRAINAGE AREA --1,860 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1946 to September 1948.

Water temperatures: October 1946 to September 1948.

EXTREMES, 1947-48 --Specific conductance: Maximum, 2,060 Sept. 21-30; minimum, 269 June 20.

Water temperatures: Maximum, 84° F. Aug. 27-29; minimum, freezing point on many days in December, January, and February.

EXTREMES, 1946-48 --Dissolved solids (1946-47): Maximum, 786 parts per million Oct. 1-10, 1946; minimum, 183 parts per million Jan. 1-10, 1947.

Total hardness (1946-47): Maximum, 514 parts per million Oct. 1-10, 1946; minimum, 119 parts per million Jan. 1-10, 1947.

Specific conductance: Maximum, 2,060 Sept. 21-30, 1948; minimum, 269 June 20, 1948.

Water temperatures: Maximum, 84° F. Aug. 11, 1947, Aug. 27-29, 1948; minimum, freezing point on many days in winter months.

REMARKS --Chemical quality fluctuates rapidly due to presence of industrial wastes. Samples collected by Allegheny-Ludlum Steel Corp. Records of discharge computed on basis of records for Kiskiminetas River at Vandegrift given in Water-Supply Paper 1113. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Tem- pera- ture (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Alum- inum (Al)	Iron (Fe)	Man- ga- nese (Mn)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Hardness as CaCO <sub>3</sub>		Total acid- ity as H <sub>2</sub> SO <sub>4</sub>
																			Total	Non-carbon- ate	
Oct. 1-10, 1947 --	426	61	7	2.95	1,580	18	12	4.2	4.8	101	35	58	--	0	616	20	0.4	1.3	863	546	223
Oct. 11-20 -----	359	66	5	3.10	1,600	19	13	2.9	4.6	112	34	65	--	0	640	18	.4	.3	934	553	214
Oct. 21-31 -----	407	60	4	2.95	1,740	--	--	4.0	--	--	--	--	--	0	690	21	--	--	--	--	232
Nov. 1-10 -----	665	--	--	--	--	--	--	.60	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 11-20 -----	1,058	44	4	3.20	981	--	--	--	--	--	--	--	--	0	360	12	--	--	--	--	130
Nov. 21-30 -----	2,231	40	7	3.45	623	--	--	.28	--	--	--	--	--	0	226	9	--	--	--	--	74
Dec. 1-10 -----	1,872	39	0	3.35	616	--	--	.20	--	--	--	--	--	0	224	10	--	--	--	--	73
Dec. 11-20 -----	2,065	35	2	3.55	469	--	--	.11	--	--	--	--	--	0	164	7	--	--	--	--	53
Dec. 21-31 -----	1,000	33	3	3.30	746	11	5.9	.24	3.3	46	16	19	--	0	261	10	.2	2.8	387	248	86
Jan. 1-10, 1948 --	4,419	36	1	3.50	429	--	--	.10	--	--	--	--	--	--	150	6	--	--	--	--	46
Jan. 11-20 -----	1,984	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 21-31 -----	1,315	32	1	3.25	848	--	--	1.9	--	--	--	--	--	--	323	9	--	--	--	--	109
Feb. 1-10 -----	975	32	4	3.30	1,010	--	--	3.2	--	--	--	--	--	0	398	10	--	--	--	--	134
Feb. 11-14 -----	3,600	--	1	3.35	833	--	--	.80	--	--	--	--	--	0	296	10	--	--	--	--	105
Feb. 15-20 -----	9,427	37	1	3.85	306	--	--	.06	--	--	--	--	--	0	97	4	--	--	--	--	34
Feb. 21-29 -----	6,123	40	5	3.60	396	--	--	.08	--	--	--	--	--	0	132	5	--	--	--	--	43
Mar. 1-10 -----	4,359	40	4	3.50	447	--	--	1.1	--	--	--	--	--	0	146	4	--	--	--	--	54
Mar. 11-20 -----	4,302	43	5	3.40	548	--	--	.24	--	--	--	--	--	0	154	4	--	3.8	--	--	63
Mar. 21-31 -----	6,148	51	3	3.60	391	--	--	.38	--	--	--	--	--	0	134	4	--	3.8	--	--	41

ALLEGHENY RIVER TRIBUTARIES--Continued  
KISKIMINETAS RIVER AT LEECHBURG, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (' F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
Apr. 1-10, 1948--	4,230	53	0	3.45	515	9.0	5.2	0.14	1.3	29	12		6.4	0	169	4.6	0.1	3.6	268	172		66
Apr. 11-20-----	18,273	51	3	3.80	361	--	--	.10	--	--	--	--	--	0	123	3	--	5.6	--	--	--	38
Apr. 21-30-----	5,505	60	1	3.40	718	--	--	.41	--	--	--	--	--	0	245	5	--	3.0	--	--	--	98
May 1-10-----	7,750	56	2	3.65	405	--	--	.10	--	--	--	--	--	0	138	2	--	2.9	--	--	--	48
May 11-20-----	4,470	64	0	3.50	534	--	--	.11	--	--	--	--	--	0	182	5	--	2.9	--	--	--	70
May 21-31-----	2,233	68	5	3.35	813	--	--	.38	--	--	--	--	--	0	288	7	--	2.6	--	--	--	102
June 1-10-----	1,480	72	5	3.30	946	--	--	.43	--	--	--	--	--	0	342	8	--	2.0	--	--	--	130
June 11-19-----	2,754	73	0	3.40	748	--	--	.26	--	--	--	--	--	0	287	6	--	2.4	--	--	--	97
June 20-----	20,400	--	0	4.20	269	--	--	--	--	--	--	--	--	0	100	4	--	4.6	--	--	--	23
June 21-30-----	5,631	74	2	3.55	430	--	--	.37	--	--	--	--	--	0	147	5	--	4.5	--	--	--	59
July 1-10-----	2,828	75	5	3.35	593	--	--	.14	--	--	--	--	--	0	209	6	--	2.2	--	--	--	82
July 11-20-----	2,503	78	3	3.30	680	--	--	.16	--	--	--	--	--	0	241	6	--	2.0	--	--	--	97
July 21-31-----	1,826	78	2	3.15	825	--	--	.38	--	--	--	--	--	0	283	7	--	1.9	--	--	--	116
Aug. 1-10-----	1,115	75	1	3.00	1,120	--	--	1.0	--	--	--	--	--	0	408	10	--	1.7	--	--	--	164
Aug. 11-20-----	1,884	74	2	3.00	1,180	--	--	.98	--	--	--	--	--	0	437	10	--	1.5	--	--	--	164
Aug. 21-31-----	720	80	1	2.95	1,310	--	--	1.8	--	--	--	--	--	0	486	12	--	1.6	--	--	--	186
Sept. 1-10-----	454	74	5	2.83	1,660	20	16	2.6	8.0	112	46	18	--	0	659	16	.4	1.2	951	671	--	260
Sept. 11-20-----	384	72	4	2.85	1,790	--	--	7.7	--	--	--	--	--	0	710	19	--	1.5	--	--	--	288
Sept. 21-30-----	392	66	10	2.70	2,060	--	--	.38	--	--	--	--	--	0	801	18	--	27	--	--	--	415
Average-----	3,081	56	3	--	848	--	--	2.1	--	--	--	--	--	0	312	8.9	--	--	--	--	--	--

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	--	34	34	32	42	54	53	68	73	80	74
2	56	--	35	32	32	42	54	63	71	72	81	72
3	58	--	38	36	32	41	50	59	76	77	80	74
4	58	--	39	37	32	41	50	57	71	79	74	74
5	61	--	43	37	32	39	51	55	71	78	68	74
6	63	--	41	36	32	38	55	55	70	76	73	74
7	65	--	40	35	32	39	53	57	73	76	70	74
8	65	--	43	34	32	36	61	53	72	73	67	76
9	64	--	40	36	32	39	50	55	69	75	74	--
10	64	--	37	35	32	42	55	55	75	79	76	74
11	65	46	37	34	32	37	50	59	72	76	72	73
12	64	48	37	33	32	38	50	65	70	84	74	71
13	67	45	35	34	32	36	49	69	69	80	75	72
14	66	44	34	33	32	44	47	65	71	75	74	79
15	65	41	33	32	32	41	48	68	75	73	74	72
16	65	42	35	32	35	48	52	62	75	76	74	70
17	68	42	34	31	37	43	52	63	76	76	75	72
18	68	42	35	32	39	45	51	62	76	79	74	72
19	67	44	34	32	39	47	54	64	71	78	74	72
20	67	43	33	32	39	54	55	60	64	81	70	72
21	61	42	34	32	38	50	55	63	71	78	76	73
22	61	42	33	32	36	52	57	63	69	81	72	67
23	61	43	35	32	39	50	58	66	72	79	81	66
24	60	45	33	32	39	59	63	61	75	75	79	60
25	59	42	33	32	39	49	63	70	75	73	82	65
26	63	40	33	32	42	53	60	70	74	78	80	65
27	63	37	33	32	42	54	68	75	74	75	84	67
28	61	38	32	32	41	49	61	70	76	78	84	68
29	58	38	33	32	45	46	56	72	79	77	84	66
30	56	36	33	32	--	50	54	66	76	83	83	67
31	56	--	33	32	--	48	--	71	--	82	79	--
Average	62	--	36	32	34	45	55	63	73	77	76	71

## MONONGAHELA RIVER BASIN

## TYGART RIVER AT ELKINS, W. VA.

LOCATION.--At city water plant at Elkins, Randolph County, 2½ miles upstream from gaging station.

DRAINAGE AREA.--268 square miles above water plant (272 square miles above gaging station).

RECORDS AVAILABLE.--Water temperatures: January 1947 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 83° F. Aug. 27-28; minimum, freezing point on many days in November, December, January, and February.

EXTREMES, January 1947-September 1948.--Water temperatures: Maximum, 84° F. Aug. 13, 1947; minimum, freezing point on many days in November, December, January, and February.

REMARKS.--No appreciable inflow between water plant and gaging station except during periods of heavy local rains. During flood periods part of flow is diverted around water plant in flood by-pass channel.

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	57	51	32	36	32	42	55	52	68	78	73	75
2	36	49	34	35	32	46	52	55	68	79	77	76
3	39	48	34	35	32	45	50	52	68	77	71	75
4	62	50	36	34	32	44	50	52	72	80	69	70
5	60	49	38	35	32	40	51	51	69	80	65	70
6	62	48	36	35	32	38	55	54	71	81	65	70
7	65	46	39	35	32	40	57	49	69	77	65	73
8	63	46	40	36	32	41	60	51	68	76	64	76
9	60	42	33	40	32	42	52	59	65	77	68	72
10	60	43	34	38	32	42	50	63	67	77	72	70
11	60	43	33	34	33	40	51	63	70	78	70	68
12	62	43	33	38	34	39	55	66	74	79	74	67
13	65	42	32	35	--	38	53	67	67	78	71	71
14	65	39	32	--	34	42	54	60	67	72	71	72
15	63	41	35	--	36	44	50	64	72	74	71	71
16	65	41	32	33	39	48	55	62	69	73	71	70
17	64	39	32	32	40	48	54	61	68	75	70	73
18	64	38	33	32	42	49	54	60	67	78	71	70
19	63	38	35	32	45	53	58	61	68	76	72	65
20	64	39	33	32	41	53	63	65	70	73	73	67
21	65	38	33	32	39	53	59	62	76	78	72	66
22	67	39	33	32	40	56	60	63	80	74	72	64
23	65	41	32	32	39	56	63	67	79	72	73	63
24	62	42	33	32	41	49	66	69	78	70	75	64
25	64	38	32	32	42	49	70	70	76	69	82	63
26	65	37	32	32	44	46	72	68	80	70	81	58
27	63	35	32	32	44	53	70	72	82	72	83	68
28	63	36	32	32	47	45	61	69	82	74	83	59
29	59	36	32	32	39	44	51	67	80	75	79	61
30	55	32	35	32	--	49	51	66	78	76	82	64
31	52	--	36	32	--	48	--	67	--	75	77	--
AVERAGE	62	42	34	34	37	46	57	62	72	76	73	68

MONONGAHELA RIVER BASIN--Continued  
MONONGAHELA RIVER AT CHARLEROI, PA.

LOCATION --At Mercantile Bridge Co. toll bridge, approximately 1½ miles downstream from gaging station at Charleroi, Washington County, and 1 mile downstream from Lock 4.

DRAINAGE AREA --5 213 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1944 to September 1948.

Water temperatures: October 1944 to September 1948.

EXTREMES 1947-48 --Specific conductance: Maximum, 752 Sept. 1-10; minimum, 176 Apr. 13-14.

Water temperatures: Maximum, 86° F. Sept. 1; minimum, freezing point Jan. 23-24, 29-31.

EXTREMES 1944-48 --Dissolved solids (1944-47): Maximum, 749 parts per million Sept. 11-20, 1946; minimum, 99 parts per million Feb. 11-20, 1946.

Total hardness (1944-47): Maximum, 399 parts per million Sept. 11-20, 1946; minimum, 52 parts per million Apr. 1-10, 1947.

Specific conductance: Maximum, 163 Nov. 21-30, 1945.

Water temperatures: Maximum, 86° F. Sept. 1 1948; minimum, freezing point on many days in winter months.

REMARKS --Discharge records for gaging station at Charleroi, Pa., for water year October 1947 to September 1948 given in Water-Supply Paper 1113. No appreciable inflow between gaging station and sampling point, except during periods of heavy local rains. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
Oct. 1-10, 1947 --	1,102	66	1	3.70	557	6.2	2.8	0.13	0.80	37	12	33	--	0	215	12	0.2	0.8	337	169	169	45
Oct. 11-20 -----	1,778	68	2	3.70	700	8.0	3.9	.27	1.4	49	16	35	--	0	272	12	.3	.8	444	223	223	56
Oct. 21-30 -----	838	69	1	3.65	712	--	--	.22	--	--	--	--	--	0	295	14	--	1.1	--	--	--	58
Nov. 1-10 -----	2,273	60	0	3.45	740	--	--	.25	--	--	--	--	--	0	287	16	--	1.1	--	--	--	75
Nov. 11-20 -----	5,582	52	0	3.70	517	--	--	.12	--	--	--	--	--	0	192	12	--	1.1	--	--	--	52
Nov. 21-30 -----	4,643	45	0	4.30	356	--	--	.01	--	--	--	--	--	0	134	8	--	--	--	--	--	15
Dec. 1-10 -----	5,094	42	2	4.25	347	--	--	.02	--	--	--	--	--	0	130	8	--	--	--	--	--	14
Dec. 11-20 -----	6,836	39	1	4.8	241	--	--	.01	--	--	--	--	--	2	90	5	--	--	--	--	--	9
Dec. 21-31 -----	2,547	35	0	4.30	274	--	--	.02	--	--	--	--	--	0	101	5	--	--	--	--	--	10
Jan. 1-10, 1948 --	20,458	39	4	4.30	241	5.2	.7	.03	.60	20	5.8	9.1	--	0	88	4.4	.1	3.2	150	81	81	11
Jan. 11-20 -----	9,544	36	1	4.00	267	--	--	.04	--	--	--	--	--	0	94	3	--	--	--	--	--	22
Jan. 21-31 -----	3,193	33	1	3.80	369	--	--	.04	--	--	--	--	--	0	130	5	--	--	--	--	--	31
Feb. 1-10 -----	2,632	34	0	3.60	501	--	--	.08	--	--	--	--	--	0	186	5	--	--	--	--	--	41
Feb. 11-13 -----	7,890	34	1	3.40	576	--	--	.12	--	--	--	--	--	0	203	7	--	--	--	--	--	56
Feb. 14-20 -----	4,630	38	0	4.15	196	--	--	.03	--	--	--	--	--	0	67	1	--	--	--	--	--	13
Feb. 21-29 -----	2,442	41	3	3.85	218	--	--	.03	--	--	--	--	--	0	73	1	--	--	--	--	--	18
Mar. 1-10 -----	20,260	43	1	4.05	206	--	--	.03	--	--	--	--	--	0	71	3	--	--	--	--	--	16
Mar. 11-20 -----	8,883	44	1	3.90	256	--	--	.04	--	--	--	--	--	0	107	4	--	2.3	--	--	--	26
Mar. 21-31 -----	22,791	52	3	4.35	230	--	--	.04	--	--	--	--	--	0	86	3.4	--	2.4	--	--	--	16

MONONGAHELA RIVER BASIN--Continued  
MONONGAHELA RIVER AT CHARLESTON, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Tem- per-a- ture (° F.)	Color	pH	Specific conduct- ance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water, year October 1941 to September, 1950												Hardness as CaCO <sub>3</sub>	Total acid- ity as H <sub>2</sub> SO <sub>4</sub>			
						Silica (SiO <sub>2</sub> )	Alum- inum (Al)	Iron (Fe)	Man- gan- ese (Mn)	Cal- cium (Ca)	Mag- nesium (Mg)	Sod- ium (Na)	Pot- as- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)			Ni- trate (NO <sub>3</sub> )	Dis- solved solids	Total carbon- ate
Apr. 1-10, 1948--	12,485	55	2	4.00	273	5.0	1.9	0.02	0.42	21	7.4	7.3		0	104	2.5	0.1	3.8	166	99	99	23
Apr. 11-12, 15-20	32,820	54	3	4.10	303			.04						2	112	2.5		2.0				30
Apr. 13-14--	102,100	53	3	5.0	176			.02						2	68	2.2		3.2				5
Apr. 21-30--	7,945	59	0	3.75	471			.13						0	172	4.2		1.5				56
May 1-4--	16,812	60	5	3.40	565			.12						0	194	4		1.5				80
May 5-10--	22,950	58	0	4.15	216			.02						0	77	3		1.6				18
May 11-20--	12,620	62	0	4.10	270			.02						0	103	3		1.5				25
May 21-31--	4,509	64	3	3.90	395			.05						0	154	6		1.2				38
June 1-10--	5,944	68	2	3.65	486			.10						0	179	6		1.1				54
June 11-20--	10,229	70	0	3.85	344			.04						0	124	5		1.2				30
June 21-30--	5,494	74	2	4.30	285			.02						0	110	4		2.4				22
July 1-10--	5,807	76	1	3.80	381			.04						0	138	6		2.9				40
July 11-20--	7,092	76	4	3.75	428			.06						0	156	5		2.9				40
July 21-31--	16,126	74	1	4.35	205			.03						0	72	3		2.2				16
Aug. 1-10--	11,406	73	1	4.05	266			.02						0	92	4		2.6				26
Aug. 11-20--	4,661	72	5	3.90	340			.04						0	120	6		2.2				33
Aug. 21-31--	2,288	76	3	3.70	461			.08						0	169	6		1.7				53
Sept. 1-10--	1,376	76	5	3.40	752	8.8	6.7	.21	1.3	46	18	34		0	286	10	.2	.9	445	250	250	86
Sept. 11-20--	2,176	75	1	3.43	751			.26						0	281	10		1.0				86
Sept. 21-24--	8,145	70	2	3.40	737			.17						0	269	8		1.0				89
Sept. 25, 27-30--	4,975	69	2	3.80	437			.05						0	162	6		1.0				40
Average	9,918	57	2	--	402	--	--	0.08	--	--	--	--	--	0	149	5.9	--	1.8	--	--	--	--

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	65	64	41	37	34	44	53	61	66	76	77	86
2	65	65	41	38	34	45	53	60	68	75	75	75
3	67	62	42	39	34	44	53	59	68	76	75	75
4	66	62	41	40	34	43	52	59	69	78	75	74
5	65	59	43	39	33	43	53	58	68	77	72	75
6	66	58	42	--	34	42	54	58	68	77	70	74
7	66	58	42	39	34	43	56	57	68	77	75	75
8	66	57	42	39	34	41	56	57	66	75	70	75
9	65	56	41	40	33	42	58	59	68	75	71	74
10	65	56	41	38	33	44	57	60	69	76	71	74
11	62	56	41	39	35	42	54	62	69	76	71	78
12	67	55	39	39	33	42	54	62	69	76	73	77
13	68	55	39	38	34	41	53	63	69	77	71	75
14	68	54	41	36	34	42	52	62	70	77	72	77
15	69	52	39	35	35	42	53	62	70	74	72	76
16	70	50	40	35	37	44	44	62	70	77	73	74
17	70	50	38	34	39	45	54	61	70	77	72	73
18	69	49	37	33	40	47	55	61	69	77	72	--
19	70	49	37	34	41	47	56	62	70	77	72	--
20	70	49	36	35	40	44	58	62	70	76	73	73
21	69	48	36	34	40	49	52	62	70	76	74	71
22	69	48	36	34	40	52	54	61	71	75	73	70
23	70	48	36	32	39	50	58	63	73	76	74	69
24	69	47	36	31	40	52	59	63	73	74	68	68
25	69	45	36	33	41	54	60	64	74	--	76	68
26	68	44	35	34	42	54	61	65	74	72	74	--
27	68	42	36	33	43	54	64	66	75	73	78	77
28	68	42	35	34	43	51	62	66	73	73	78	76
29	69	42	34	32	43	51	61	66	--	74	78	66
30	69	40	34	32	--	52	61	66	77	75	78	66
31	67	--	36	32	--	52	--	66	--	75	76	--
Average	68	52	38	36	37	46	56	62	70	76	74	73

MONONGAHELA RIVER BASIN--Continued  
SHAVERS FORK AT PARSONS, W. VA.

LOCATION.--At Armour Leather Co. plant at Parsons, Tucker County.

DRAINAGE AREA.--214 square miles.

RECORDS AVAILABLE.--October 1946 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 76° F. July 3; minimum, freezing point on many days in January and February.

EXTREMES, 1946-48.--Water temperatures: Maximum, 80° F. July 1, 1947; minimum, freezing point on many days in winter months.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	54	50	34	--	--	38	44	58	62	74	--	71
2	--	--	34	38	32	38	46	--	60	75	68	--
3	53	52	34	38	32	36	--	60	--	76	68	67
4	53	52	34	--	32	36	--	--	62	--	66	67
5	--	50	34	34	32	34	52	63	62	74	--	--
6	58	50	--	34	32	--	53	62	--	74	59	--
7	58	48	--	34	32	--	50	63	62	74	64	64
8	58	--	45	32	--	37	50	64	60	--	68	68
9	62	--	38	32	32	38	51	--	60	74	56	--
10	63	38	34	32	32	38	51	62	--	74	56	64
11	64	39	34	--	32	36	--	62	60	--	59	64
12	--	40	34	32	33	36	50	62	62	73	--	--
13	62	40	--	32	34	--	52	62	--	74	62	64
14	62	38	--	32	34	--	54	62	62	74	65	64
15	64	--	33	32	--	41	52	58	62	--	--	64
16	65	--	34	32	34	44	52	--	60	74	64	--
17	64	38	34	32	38	42	50	58	--	74	66	64
18	64	38	34	--	38	40	54	58	58	--	66	--
19	--	38	34	32	40	42	--	56	60	74	68	--
20	58	38	34	32	40	--	53	57	--	74	68	61
21	55	38	--	32	37	--	54	58	69	74	68	64
22	55	--	34	32	37	49	55	58	72	--	--	62
23	55	--	33	32	36	54	55	--	72	73	68	--
24	55	38	33	32	32	50	56	60	62	72	68	--
25	55	40	--	--	37	44	--	60	74	--	68	58
26	--	38	34	32	40	46	56	61	74	62	--	--
27	--	38	35	32	41	--	56	62	--	74	74	54
28	60	34	--	32	41	--	57	62	73	68	--	55
29	--	36	34	--	--	38	--	62	73	--	--	55
30	58	--	34	32	--	41	57	--	74	69	--	--
31	53	--	35	32	--	44	--	62	--	70	74	--
Average	58	--	--	33	35	--	53	61	--	--	--	--



## MONONGAHELA RIVER BASIN--Continued

## YOUGHIOGENY RIVER AT SUTERSVILLE, PA.

LOCATION.--At gaging station at bridge on State Highway 31, approximately 2 miles downstream from Sewickley Creek, Westmoreland County. DRAINAGE AREA.--1,715 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 563 parts per million Oct. 11-20; minimum, 68 parts per million May 4-10.

TOTAL HARDNESS: Maximum, 302 parts per million Oct. 1-10; minimum, 38 parts per million May 4-10.

REMARKS.--Samples collected from point about 75 feet from west (left) bank. Some differences in quality across river occur owing to influence of Sewickley Creek. Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total carbonate	Non-carbonate	
Oct. 1-10, 1947-	357	58	4	3.20	1,040	8.2	5.5	0.76	1.4	58	21	45	3.2	0	381	7.1	0.2	1.2	549	302	302	110
Oct. 11-20-----	321	65	3	3.20	1,040	7.6	4.3	.62	1.4	59	22	49	3.8	0	393	7.5	.3	1.2	593	301	301	103
Oct. 21-31-----	398	58	2	3.30	876	7.0	5.0	.62	1.1	51	19	40	3.2	0	324	7.0	.4	1.2	468	256	256	81
Nov. 1-10-----	1,011	51	3	3.85	422	4.8	1.3	.06	.62	28	9.4	20	3.5	0	189	4.8	.2	1.0	242	124	124	30
Nov. 11-20-----	1,963	43	3	4.45	231	4.0	1.5	.02	.22	16	5.2	11	2.2	0	63	2.9	.1	2.0	133	66	66	9
Nov. 21-30-----	2,324	40	2	4.7	191	4.6	.2	.02	.25	15	4.4	10	2.2	1	69	3.0	.1	2.9	118	57	56	7
Dec. 1-10-----	1,766	38	3	4.30	264	4.8	.4	.05	.25	19	6.2	14	2.0	0	95	3.5	.1	2.6	156	78	78	11
Dec. 11-20-----	2,233	34	0	4.45	181	4.6	.2	.01	.31	14	4.3	9.6	1.6	0	65	3.4	.1	4.2	110	55	55	18
Dec. 21-31-----	1,077	33	2	3.90	317	5.3	.4	.01	.36	21	6.9	18	1.6	0	117	3.0	.1	2.4	188	90	90	14
Jan. 1-10, 1948-	6,300	36	5	5.2	134	4.9	.1	.04	.17	13	3.6	4.1	1.8	3	43	3.0	.1	5.2	85	47	45	--
Jan. 11-20-----	2,368	--	0	5.0	171	3.8	.4	.02	.22	14	4.8	6.0	2.0	1	62	3.8	.1	4.4	105	57	57	8
Jan. 21-31-----	1,365	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 1-10-----	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 11-20-----	7,082	--	0	5.5	146	4.7	--	.02	.08	14	4.2	4.3	1.4	4	48	3.0	.1	3.8	91	52	49	--
Feb. 21-29-----	6,141	--	1	5.1	130	4.9	--	.03	.11	11	3.4	4.8	1.1	4	45	2.4	.1	2.6	81	41	38	--
Mar. 1-10-----	5,436	36	0	5.2	133	4.5	--	.01	.21	12	3.6	4.8	1.0	4	46	2.5	.1	2.0	82	45	41	--
Mar. 11-20-----	3,330	41	0	4.9	168	4.2	.3	.01	.21	16	4.8	8.0	1.1	4	68	3.8	.1	2.0	116	62	58	5
Mar. 21-31-----	4,878	31	0	5.8	161	5.0	--	.04	.16	14	4.5	6.6	1.4	4	57	2.9	.0	3.4	102	53	50	--
Apr. 1-10-----	3,255	32	5	5.6	195	5.1	--	.03	.31	17	5.6	8.4	1.4	2	73	2.8	.0	2.7	124	65	64	--
Apr. 11-20-----	14,359	32	10	6.0	165	5.7	--	.18	.13	16	4.8	5.4	1.6	6	57	2.2	.0	3.4	106	60	55	--
Apr. 21-30-----	4,153	56	0	4.6	218	5.6	1.0	.04	.38	18	6.1	7.4	1.4	0	83	2.2	.0	2.3	137	76	76	15
May 1-3-----	3,393	55	1	4.5	209	2.0	--	.05	.02	19	6.4	11	2.6	0	84	3.0	.4	3.4	138	77	77	10
May 4-10-----	6,834	55	3	6.0	108	4.1	--	.03	.00	10	3.1	4.1	1.2	4	36	2.0	--	3.1	68	38	34	--
May 11-20-----	3,825	58	--	4.7	170	4.6	.3	.01	.27	15	4.7	7.1	1.1	0	63	1.8	.3	2.5	107	59	59	9
May 21-30-----	3,240	56	--	3.35	911	--	--	.55	1.2	48	26	--	--	0	337	5.0	--	2.5	--	255	114	--
May 22-31-----	2,260	61	1	4.15	254	5.2	.1	.02	.40	19	6.3	9.4	1.9	0	95	2.0	.2	1.9	151	78	78	20

MONONGAHELA RIVER BASIN--Continued  
YOUNGHOGENY RIVER AT SUTERSVILLE, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>		Total acidity as H <sub>2</sub> SO <sub>4</sub>
																				Total	Non-carbonate	
June 1-10, 1948 -	2,159	62	1	4.20	274	4.9	0.1	0.02	0.43	19	6.6	12	1.4	0	103	2.4	0.2	1.8	164	79	79	20
June 11-20 -	4,450	63	3	4.7	155	4.6	.4	.03	.26	12	4.0	6.5	1.3	0	56	2.1	.2	1.8	96	49	49	9
June 21-30 -	3,619	68	25	5.4	175	4.4	.2	.02	.1	18	4.2	6.7	1.4	3	64	7.5	.1	3.0	111	63	61	--
July 1-3 -	1,840	69	15	4.3	253	4.8	.5	.05	.2	22	6.8	10		0	99	3.2	.1	3.4	156	88	88	14
July 4-10 -	5,994	69	10	5.4	127	2.4	.0	.03	.1	14	3.1	7.6	1.7	3	50	4.5	.1	3.5	78	48	45	--
July 11-20 -	3,217	74	5	5.5	180	4.4	--	.03	.10	17	6.5	4.8	1.8	6	65	3.2	.1	3.5	114	69	64	--
July 21, 27 -	2,780	72	10	3.50	499	--	--	.26	--	30	21		2.3	0	162	8.0	--	4.1	--	178	178	52
July 22-26, 28-31	2,527	73	5	5.2	178	4.3	.6	.02	.15	15	5.6	6.8	3.2	6	67	2.5	.1	2.8	113	64	59	--
Aug. 1-10 -	1,932	70	5	4.8	219	4.1	.6	.03	.23	18	5.5	8.6	2.4	4	83	3.0	.1	3.3	136	71	68	13
Aug. 11-20 -	1,638	71	10	4.6	232	3.7	.6	.03	.25	19	6.0	9.9	2.4	2	87	2.8	.1	3.9	144	76	74	13
Aug. 21-31 -	1,351	75	5	4.2	266	4.1	1.1	.04	.15	19	6.2	12	2.2	0	97	2.8	.1	3.6	159	82	82	16
Sept. 1-10 -	1,241	71	10	4.2	256	5.6	.6	.00	.1	19	4.9	13	1.0	0	95	1.8	.1	1.4	150	76	76	14
Sept. 11-20 -	1,157	--	15	4.2	260	5.5	.4	.02	1.0	20	5.3	14	1.2	0	94	5.8	.1	1.1	150	79	79	44
Sept. 21-30 -	1,177	63	10	4.10	262	5.2	.4	.02	1.2	21	6.0	11	1.3	0	95	3.8	.1	1.0	150	86	86	63
Average -----	3,130	55	5	--	295	4.8	--	0.10	0.4	21	7.4	13	1.9	2	108	3.6	0.1	2.7	159	92	91	--

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	52	55	34	38	--	--	39	48	62	70	70	72
2	53	58	34	36	--	--	40	48	60	68	75	71
3	55	50	37	38	--	--	40	47	59	69	75	70
4	56	52	38	37	--	--	42	48	54	72	75	69
5	56	54	40	38	--	--	38	54	62	70	68	70
6	60	52	40	38	--	--	36	54	64	70	64	70
7	64	52	40	34	--	--	36	54	65	66	65	74
8	60	48	42	33	--	--	38	56	64	68	66	70
9	64	46	39	34	--	--	36	54	62	70	70	70
10	64	42	35	--	--	--	38	50	64	68	72	71
11	65	45	36	34	--	--	36	52	62	70	71	--
12	65	46	35	--	--	--	34	53	64	75	75	--
13	66	45	35	35	--	--	33	46	64	75	73	--
14	65	42	32	34	35	35	34	48	65	70	68	--
15	63	42	32	32	34	34	38	47	65	72	68	--
16	65	41	34	--	37	45	45	54	63	84	72	--
17	67	42	32	--	38	47	47	52	60	74	71	--
18	66	42	35	--	38	47	54	56	63	72	70	--
19	64	44	35	--	40	50	56	58	64	71	71	--
20	64	43	34	--	40	50	54	56	63	72	75	--
21	62	42	33	--	36	54	54	58	62	72	68	67
22	58	41	32	--	38	55	55	59	66	73	69	63
23	60	45	34	--	36	55	53	59	68	74	70	63
24	58	44	35	--	38	45	45	56	68	70	76	62
25	54	41	--	--	39	48	48	59	68	66	79	58
26	52	39	33	--	40	54	54	60	68	70	80	63
27	60	39	32	--	40	55	55	61	70	72	72	83
28	61	38	35	--	44	55	58	62	70	74	76	83
29	58	38	34	--	45	45	57	64	70	75	72	85
30	56	36	32	--	--	48	57	64	72	78	76	85
31	54	--	33	--	--	48	--	60	--	75	74	--
Average	60	45	35	--	--	44	53	58	65	72	72	--

BEAVER RIVER BASIN  
MAHONING RIVER AT WARREN, OHIO

LOCATION --At Ohio Public Service Company power plant in Warren, Trumbull County, 6 miles downstream from gaging station at Leavittsburg, Trumbull County, and  $7\frac{1}{2}$  miles downstream from Eagle Creek.

DRAINAGE AREA --580 square miles at gaging station.

RECORDS AVAILABLE --Chemical analyses: July 1946 to September 1948.

Water temperatures: July 1946 to September 1948.

EXTREMES, 1947-48 --Water temperatures: Maximum, 78° F. Aug. 29; minimum, 33° F. on several days in winter months.

EXTREMES, July 1946-September 1947 --Dissolved solids: Maximum, 281 parts per million Dec. 21-31; minimum, 122 parts per million Apr. 1-10.

Water hardness: Maximum, 186 parts per million Dec. 21-31; minimum, 77 parts per million Apr. 1-10.

REMARKS --Discharge records reported are for gaging station at Leavittsburg. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. Records of specific conductance of daily samples available in district office at Columbus, Ohio.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947	312	62	20	6.8	286	2.6	0.06	33	9.2	4.2		42	66	6.0	0.3	21	194	120	86
Oct. 11-20	277	63	20	6.8	292	--	--	--	--	--	--	43	67	7.2	--	--	--	--	--
Oct. 21-31	278	61	25	6.9	307	--	--	--	--	--	--	51	72	8.0	--	--	--	--	--
Nov. 1-10	288	54	25	7.0	337	--	--	--	--	--	--	60	79	9.0	--	--	--	--	--
Nov. 11-20	251	45	30	7.0	357	--	--	--	--	--	--	56	81	10	--	--	--	--	--
Nov. 21-30	232	39	30	7.0	397	--	--	--	--	--	--	60	84	11	--	--	--	--	--
Dec. 1-10	231	39	5	6.6	442	--	--	--	--	--	--	58	93	13	--	66	--	--	--
Dec. 11-20	233	37	7	6.7	473	--	--	--	--	--	--	59	102	13	--	92	--	--	--
Dec. 21-31	178	39	8	6.6	497	--	--	--	--	--	--	55	112	18	--	68	--	--	--
Jan. 1-10, 1948	418	37	13	6.7	429	4.6	.08	45	15	10	--	38	105	15	.2	43	270	174	143
Jan. 11-20	207	37	7	6.6	508	--	--	--	--	--	--	56	121	18	--	61	--	--	--
Jan. 21-31	169	40	9	6.5	575	--	--	--	--	--	--	54	125	20	--	111	--	--	--
Feb. 1-10	160	40	17	6.8	598	--	--	--	--	--	--	84	124	22	--	100	--	--	--
Feb. 11-13	180	41	9	6.7	632	--	--	--	--	--	--	60	117	23	--	77	--	--	--
Feb. 14-20	1,209	36	18	6.8	249	--	--	--	--	--	--	25	61	9	--	22	--	--	--
Feb. 21-29	386	38	17	6.5	336	--	--	--	--	--	--	23	78	11	--	39	--	--	--
Mar. 1-10	364	36	13	6.8	333	--	--	--	--	--	--	28	87	12	--	28	--	--	--
Mar. 11-20	818	40	17	6.5	355	--	--	--	--	--	--	34	87	12	.2	34	--	--	--
Mar. 21-31	615	48	28	6.8	283	--	--	--	--	--	--	32	74	8	.2	20	--	--	--
Apr. 1-10	248	55	7	6.8	356	4.0	.06	40	12	8.2	--	50	84	11	.1	30	227	149	108
Apr. 11-20	975	53	21	6.8	260	--	--	--	--	--	--	38	69	6	--	11	--	--	--
Apr. 21-30	562	59	13	7.1	306	--	--	--	--	--	--	55	72	8	--	12	--	--	--
May 1-10	1,670	57	24	7.1	232	--	--	--	--	--	--	40	59	6	--	6.3	--	--	--
May 11-20	1,251	61	20	7.2	262	--	--	--	--	--	--	44	64	8	--	9.9	--	--	--
May 21-31	391	62	8	7.0	313	--	--	--	--	--	--	54	81	10	--	14	--	--	--

June 1-10, 1948	362	65	9	7.3	334	--	--	--	--	51	85	12	--	19	--	--	--
June 11-20	419	69	8	7.1	343	--	--	--	--	58	86	10	--	17	--	--	--
June 21-30	377	74	7	7.2	334	--	--	--	--	58	81	10	--	14	--	--	--
July 1-10	343	73	7	7.1	341	4.4	0.06	--	11	7.1	82	10	0.2	15	206	140	97
July 11-20	322	75	6	7.3	339	--	--	--	--	57	84	9	--	15	--	--	--
July 21-31	368	74	7	7.1	351	--	--	--	--	57	84	12	--	18	--	--	--
Aug. 1-10	328	71	4	7.3	353	--	--	--	--	62	76	10	--	10	--	--	--
Aug. 11-20	418	71	6	7.1	350	--	--	--	--	60	69	10	--	21	--	--	--
Aug. 21-31	338	75	6	7.3	344	--	--	--	--	68	75	10	--	9.5	--	--	--
Sept. 1-10	331	71	7	7.1	359	--	--	--	--	63	90	13	--	13	--	--	--
Sept. 11-20	340	70	8	7.2	359	--	--	--	--	66	92	14	--	9.2	--	--	--
Sept. 21-30	349	65	6	7.2	373	--	--	--	--	68	89	13	--	14	--	--	--
Average	436	55	13	--	368	--	--	--	--	52	85	12	--	32	--	--	--

BEAVER RIVER BASIN--Continued  
MAHONING RIVER AT WARREN, OHIO--Continued  
Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	60	58	38	42	40	35	--	55	62	75	74	70
2	60	59	39	35	42	35	50	56	66	72	74	70
3	59	57	41	33	42	36	48	57	65	70	74	69
4	62	57	42	40	38	33	53	58	65	73	73	68
5	62	53	39	41	39	36	54	55	68	74	71	72
6	64	55	39	42	38	38	64	56	69	73	69	72
7	65	53	40	33	38	37	60	58	69	73	68	71
8	65	52	40	33	40	34	60	54	62	73	69	72
9	63	50	38	35	42	--	56	60	62	70	70	74
10	62	50	36	36	37	--	51	60	64	74	69	71
11	62	49	38	35	42	33	--	61	62	74	71	70
12	64	46	40	36	43	37	53	62	67	70	70	71
13	62	46	38	36	37	36	53	61	71	75	70	70
14	64	47	38	37	33	38	52	60	72	--	69	69
15	62	43	38	37	--	38	49	58	74	74	71	68
16	63	47	35	37	38	40	50	62	70	75	71	68
17	62	43	33	35	33	44	51	62	68	73	70	70
18	64	43	34	39	35	42	--	60	68	73	72	70
19	62	42	33	42	40	44	54	64	68	77	71	71
20	62	42	39	39	39	48	62	59	66	76	71	73
21	63	42	40	40	33	42	57	62	--	76	72	70
22	62	45	37	39	38	48	55	60	69	73	73	67
23	62	40	43	37	38	53	57	62	71	75	73	63
24	60	40	39	36	36	52	58	62	74	73	73	64
25	59	40	37	41	38	51	59	60	74	74	74	62
26	61	39	36	43	39	49	60	63	75	73	76	62
27	63	38	33	39	40	55	64	61	76	72	77	70
28	63	36	40	43	40	40	60	62	76	73	77	63
29	61	35	40	39	36	41	57	63	77	73	78	62
30	60	33	40	40	--	48	63	--	77	75	77	63
31	59	--	42	38	--	47	--	--	--	73	--	--
Average	62	46	38	38	38	42	56	60	69	74	72	69

## BEAVER RIVER BASIN--Continued

## BEAVER RIVER AT NEW BRIGHTON, PA.

LOCATION.--At head of intake canal of Beaver Falls Municipal Authority, 3 miles upstream from mouth, and 2.5 miles downstream from gaging station at Beaver Falls, Beaver County.

DRAINAGE AREA.--3,112 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 665 Feb. 1-10; minimum, 210 Feb. 15-20.

Water temperatures: Maximum, 87° F. Jan. 15, 18-19, 28.

EXTREMES, 1945-48.--Dissolved solids (1945-47): Maximum, 362 parts per million Nov. 21-30, 1946; minimum, 136 parts per million Apr. 1-10, 1947.

Total hardness (1945-47): Maximum, 199 parts per million Nov. 11-30, 1946; minimum, 85 parts per million Mar. 1-10, 1946.

Specific conductance: Maximum, 665 Feb. 1-10, 1948; minimum, 210 June 1-10, 1947, Feb. 15-20, 1948.

Water temperatures: Maximum, 87° F. July 22, 1948; minimum, freezing point Feb. 7, 11, 1947.

REMARKS.--Intake canal located on east bank of river. Samples collected by Beaver Falls Municipal Authority. Discharge based on records for Beaver River at Beaver Falls given in Water-Supply Paper 1113. Records of specific conductance of daily samples available in district office at Philadelphia, Pa.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Oct. 1-10, 1947-----	833	66	5	6.3	473	4.4	0.02	0.4	52	10	21		20	143	26	0.8	16	313	171	154
Oct. 11-20-----	754	69	12	6.2	527								22	174	28					
Oct. 21-31-----	820	66	13	6.3	513								33	163	27					
Nov. 1-10-----	1,040	59	12	6.5	543								36	159	36					
Nov. 11-20-----	1,145	49	11	6.5	510								25	137	36					
Nov. 21-30-----	1,183	46	14	6.4	505									145	34					
Dec. 1-10-----	1,620	42	14	6.3	484								23	139	32					
Dec. 11-20-----	1,981	40	26	6.3	398								26	109	24					
Dec. 21-31-----	935	38	13	6.2	472								15	138	30		21			
Jan. 1-10, 1948-----	3,414	36	15	6.4	387	6.5	.14	.24	41	9.1	19		28	106	23	.3	17	246	140	117
Jan. 11-18, 20-----	1,308	34																		
Jan. 19-----	796																			
Jan. 20-----	740	35	12	6.5	486								62	134	30					
Jan. 21-31-----	740	35	17	6.3	584								24	183	36		23			
Feb. 1-10-----	644	37	25	7.0	665		.26						56	203	36		31			
Feb. 11-14-----	5,155				644								20	200	38		33			
Feb. 15-20-----	12,950		15	6.5	210								21	51	9.0		7.8			
Feb. 21-29-----	4,624	41	15	6.5	281								19	78	14		8.2			
Mar. 1-10-----	3,707	43	26	6.7	312								24	85	16		11			
Mar. 11-20-----	4,749	45	32	6.3	367								29	103	19		12			
Mar. 21-31-----	7,487	54	65	6.4	240								31	62	10		5.6			

BEAVER RIVER BASIN--Continued  
BEAVER RIVER AT NEW BRIGHTON, PA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Sample size (cc)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																			Total	Non-carbonate
Apr. 1-10, 1948-----	3,604	55	3	6.5	287	4.0	0.08	0.00	31	7.1	10		29	75	15	0.3	6.4	191	107	83
Apr. 11-20-----	13,256	53	12	6.6	256	--	--	--	--	--	--	--	33	68	11	--	5.6	--	--	--
Apr. 21-30-----	6,048	60	11	6.7	307	--	--	--	--	--	--	--	40	82	14	--	5.8	--	--	--
May 1-10-----	10,978	59	17	6.7	240	--	--	--	--	--	--	--	40	61	9.0	--	2.8	--	--	--
May 11-20-----	5,568	64	15	6.6	278	--	--	--	--	--	--	--	40	72	11	--	5.8	--	--	--
May 21-31-----	1,976	68	10	6.6	354	--	--	--	--	--	--	--	44	95	17	--	6.6	--	--	--
June 1-10-----	1,372	73	5	6.6	483	--	--	--	--	--	--	--	38	135	24	--	10	--	--	--
June 11-20-----	2,124	74	10	6.7	407	--	--	--	--	--	--	--	43	110	22	--	8.4	--	--	--
June 21-30-----	2,395	79	10	6.5	354	--	--	--	--	--	--	--	40	97	26	--	8.2	--	--	--
July 1-10-----	1,687	79	10	6.5	373	--	--	--	--	--	--	--	46	81	18	--	9.0	--	--	--
July 11-20-----	1,443	82	12	6.5	409	--	--	--	--	--	--	--	50	106	22	--	9.0	--	--	--
July 21-31-----	2,380	79	13	6.5	361	--	--	--	--	--	--	--	40	96	19	--	7.4	--	--	--
Aug. 1-10-----	1,416	78	12	6.5	410	--	--	--	--	--	--	--	38	116	22	--	8.8	--	--	--
Aug. 11-20-----	3,719	74	10	6.4	337	--	--	--	--	--	--	--	33	89	19	--	8.9	--	--	--
Aug. 21-31-----	1,379	82	10	6.5	403	--	--	--	--	--	--	--	36	115	22	--	8.2	--	--	--
Sept. 1-10-----	1,047	78	17	6.7	436	4.8	.04	.51	49	10	18		34	130	21	.6	11	261	163	136
Sept. 11-20-----	954	76	5	6.6	479	--	--	--	--	--	--	--	39	139	26	--	12	--	--	--
Sept. 21-30-----	953	70	7	6.6	489	--	--	--	--	--	--	--	36	141	28	--	11	--	--	--
Average-----	3,010	58	14	--	412	--	--	--	--	--	--	--	33	117	23	--	--	--	--	--



Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	63	63	40	38	37	43	54	58	72	81	81	76
2	62	62	40	37	36	44	55	59	71	78	81	76
3	62	61	42	38	37	43	52	60	72	78	80	77
4	62	60	44	36	36	43	--	--	71	77	80	78
5	64	60	42	--	38	42	51	65	74	80	78	78
6	65	60	43	36	38	41	55	54	74	82	77	78
7	67	59	42	35	36	42	58	59	76	80	75	78
8	78	59	42	35	38	42	59	58	74	78	73	78
9	68	56	45	35	37	42	--	55	73	75	75	79
10	67	54	42	38	37	43	58	58	70	78	75	78
11	67	53	42	34	38	44	55	54	72	80	78	79
12	68	49	41	35	38	42	55	69	72	82	73	78
13	68	49	42	35	40	40	54	68	75	82	70	77
14	69	49	40	34	36	41	51	68	74	83	70	76
15	68	48	39	33	37	44	48	58	72	80	71	73
16	69	48	40	34	37	47	51	65	74	80	71	75
17	70	47	40	36	38	53	50	67	74	--	73	76
18	70	48	40	33	40	47	54	66	75	82	75	74
19	71	48	38	33	40	48	55	65	74	82	77	76
20	70	47	40	34	40	48	58	64	--	83	77	78
21	69	47	38	34	41	56	60	65	72	82	75	78
22	69	48	40	37	38	54	58	64	74	87	78	75
23	68	48	40	37	42	57	58	66	77	80	78	76
24	66	50	40	36	38	56	58	66	78	82	80	70
25	65	49	38	35	42	55	61	66	81	74	81	66
26	66	47	38	34	48	55	56	67	81	75	83	67
27	66	43	38	34	40	54	--	68	80	75	85	67
28	65	42	38	33	41	52	70	70	80	76	85	68
29	66	42	38	35	42	51	59	72	82	76	86	68
30	65	40	37	36	--	50	58	70	83	77	86	69
31	64	--	38	36	--	52	--	73	--	80	83	--
Average	67	51	40	35	39	47	56	64	75	80	78	75

MUSKINGUM RIVER BASIN  
TUSCARAWAS RIVER AT NEWCOMERSTOWN, OHIO

LOCATION.--At gaging station at bridge on U. S. Highway 36, three-quarters of a mile south of Newcomerstown, Tuscarawas County, 2 miles upstream from Buckhorn Creek, and 4 miles downstream from Dunlap Creek.

RAINFALL AREA.--2,436 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1948.

Water temperatures: July 1946 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 82° F. Aug. 29; minimum, freezing point on many days in winter months. Minimum, 3,490 parts per million Sept. 21-30, 1946; minimum, 191 parts per million June 1-10, 1947.

EXTREMES, July 1946-September 1947.--Dissolved solids: Maximum, 3,490 parts per million Sept. 21-30, 1946; minimum, 191 parts per million June 1-10, 1947.

Total hardness: Maximum, 1,540 parts per million Sept. 21-30, 1946; minimum, 191 parts per million June 1-10, 1947.

Water temperatures: Maximum, 79° F. on 5 days in August 1947; minimum, freezing point on many days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. Daily sampling in some instances is considered questionable as evidenced by consecutive or distributed identical daily specific conductance and/or chloride results, which may be due to collecting samples for several days at one time. Records of specific conductance and chloride of daily samples available in district office at Columbus, Ohio.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947	590	60	4	7.4	4,420	8.4	0.05	425	25	384		124	198	1,190	1.0	13	2,550	1,160	1,060
Oct. 11-20	512	62	4	7.3	4,910							127	202	1,400					
Oct. 21-31	439	60	5	7.4	4,630							137	211	1,320					
Nov. 1-10	798	50	5	7.2	4,680							106	206	1,380					
Nov. 11-20	628	38	6	7.1	3,490							112	197	955					
Nov. 21-30	582	36	7	7.2	3,620							122	185	1,010					
Dec. 1-10	617	34	5	7.0	4,090							107	201	1,160					
Dec. 11-20	878	34	7	7.0	3,580							97	160	1,020					
Dec. 21-31	549	33	8	7.1	3,540							106	167	1,000					
Jan. 1-10, 1948	2,764	34	5	7.1	1,180	8.4	.05	129	23	55	55	70	109	255	.3	6.4	714	416	359
Jan. 11-20	871	32	3	7.2	2,500							102	159	638		7.0			
Jan. 21-31		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 1-10		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 11-20	7,721	36	9	7.3	477							50	58	71		6.6			
Feb. 21-29	4,358	38	4	7.3	930			1	--			62	95	183		5.7			
Mar. 1-10	3,245	36	6	7.3	1,020							73	117	199		6.5			
Mar. 11-20	3,255	36	14	7.1	733							72	200	118		2	5.3		
Mar. 21-31	8,052	50	11	7.2	560							52	84	82		4.8			

Apr. 1-10	4,885	52	3	7.2	814	7.2	.06	87	12	48	71	94	149	.3	4.3	565	266	208
Apr. 11-20	11,350	51	7	7.1	515	--	--	--	--	--	38	79	88	--	3.6	--	--	--
Apr. 21-30	7,693	57	4	7.1	440	--	--	--	--	--	55	91	44	--	3.7	--	--	--
May 1-10	5,490	56	5	7.2	527	--	--	--	--	--	74	104	54	--	3.2	--	--	--
May 11-20	4,053	62	3	7.3	582	--	--	--	--	--	73	107	71	--	3.7	--	--	--
May 21-31	1,943	63	3	7.4	755	--	--	--	--	--	94	132	100	--	3.6	--	--	--
June 1-10	1,056	66	5	7.5	1,130	--	--	--	--	--	112	166	188	--	7.2	--	--	--
June 11-20	1,580	68	6	7.5	733	--	--	--	--	--	95	137	88	--	4.6	--	--	--
June 21-30	1,390	74	4	7.3	797	--	--	--	--	--	90	146	105	--	7.4	--	--	--
July 1-10	1,009	75	4	7.3	936	8.8	13	92	18	63	93	150	144	.9	4.7	560	304	227
July 11-20	719	78	4	7.3	1,760	--	--	--	--	--	104	170	385	--	7.9	--	--	--
July 21-31	755	77	5	7.3	2,520	--	--	--	--	--	97	165	640	--	6.8	--	--	--
Aug. 1-10	609	73	4	7.0	2,910	--	--	--	--	--	98	163	770	--	8.1	--	--	--
Aug. 11-20	1,455	72	3	7.1	1,990	--	--	--	--	--	72	130	490	--	8.3	--	--	--
Aug. 21-31	731	77	3	7.3	2,550	--	--	--	--	--	100	150	660	--	7.7	--	--	--
Sept. 1-10	469	73	6	7.2	4,000	--	--	--	--	--	108	190	1,120	--	9.0	--	--	--
Sept. 11-20	465	71	6	7.2	4,090	--	--	--	--	--	112	205	1,150	--	9.0	--	--	--
Sept. 21-30	725	63	7	7.3	3,390	--	--	--	--	--	96	195	902	--	10	--	--	--
Average	2,300	55	5	--	2,190	--	--	--	--	--	91	151	563	--	--	--	--	--

## MUSKINGUM RIVER BASIN--Continued

## TUSCARAWAS RIVER AT NEWCOMERSTOWN, OHIO--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	57	53	37	36	--	38	49	55	62	78	78	73
2	57	53	37	35	--	38	49	55	64	76	78	73
3	58	52	35	35	--	38	48	55	65	70	75	72
4	60	51	35	33	--	37	51	55	66	75	76	72
5	61	50	35	34	--	35	53	55	68	--	73	73
6	61	50	34	34	--	36	54	56	68	74	68	73
7	61	50	34	33	--	35	53	55	68	75	67	73
8	61	50	33	35	--	35	53	56	66	74	71	73
9	60	45	32	35	--	36	58	58	66	74	70	73
10	61	46	32	35	--	36	50	60	66	75	72	72
11	64	38	34	32	--	34	51	--	68	75	72	71
12	64	37	34	32	--	34	51	65	68	77	72	71
13	63	36	34	32	--	33	51	66	68	78	71	72
14	63	36	34	32	32	32	51	64	67	78	71	72
15	61	38	34	32	33	32	49	61	70	78	71	71
16	61	40	35	32	33	35	51	63	70	78	70	70
17	63	39	33	32	35	35	49	61	68	78	71	70
18	63	38	33	32	39	39	51	61	68	80	72	70
19	61	40	32	32	39	42	52	60	69	81	72	70
20	61	41	32	--	38	46	55	59	68	80	73	71
21	61	37	34	--	32	53	55	61	68	80	72	70
22	61	37	34	--	32	53	56	61	70	78	73	65
23	61	37	35	--	32	53	56	61	73	78	74	65
24	61	36	35	--	38	50	57	82	80	77	74	63
25	61	36	34	--	40	50	58	61	74	78	76	61
26	61	36	33	--	40	53	61	82	75	75	80	61
27	61	34	32	--	42	53	61	82	76	75	80	61
28	61	34	33	--	44	50	60	84	76	77	80	61
29	60	34	32	--	44	50	55	85	78	77	82	61
30	59	34	32	--	45	45	55	85	75	77	79	63
31	56	--	33	--	--	41	--	64	--	--	--	--
Average	61	41	34	--	--	41	53	60	70	77	74	69

## LITTLE KANAWHA RIVER BASIN

## LITTLE KANAWHA RIVER AT GLENVILLE, W. VA.

LOCATION.--At water plant, at Glenville, Gilmer County, half a mile upstream from gaging station.

DRAINAGE AREA--2366 square miles.

RECORDS AVAILABLE--October 1946 to September 1948.

EXTREMES, 1947-48--Water temperatures: Maximum, 78° F. June 26-30; minimum, freezing point on many days in December, January, February, and March.

EXTREMES, 1946-48--Water temperatures: Maximum, 86° F. Aug. 22, 1947; minimum, freezing point on many days in winter months.

REMARKS.--Records furnished by West Virginia Water Service Co.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	60	57	32	33	32	40	48	52	65	76	68	68
2	60	56	32	32	32	38	48	52	65	70	68	68
3	58	55	32	33	32	38	50	52	66	72	68	67
4	56	54	33	33	32	38	50	52	64	73	67	67
5	57	54	33	32	32	38	50	52	62	74	64	66
6	58	54	32	32	32	36	50	54	63	75	64	66
7	59	53	32	32	32	36	50	60	63	75	64	66
8	60	53	34	32	32	34	48	62	62	74	64	65
9	62	50	33	34	32	34	46	65	60	73	64	65
10	62	48	33	33	32	32	50	67	59	72	64	65
11	61	48	33	32	32	32	52	67	60	72	64	64
12	60	46	32	32	32	32	50	67	62	73	63	64
13	60	46	32	32	34	32	50	67	64	73	62	64
14	61	44	32	32	33	32	52	65	63	72	63	65
15	62	44	32	32	34	34	52	64	65	70	64	65
16	62	44	32	32	36	36	54	62	65	70	64	66
17	63	43	32	32	38	40	54	61	65	70	65	66
18	63	42	32	32	38	42	56	60	65	68	64	65
19	64	42	32	32	40	46	56	58	66	68	63	65
20	64	42	32	32	40	50	58	58	66	69	63	64
21	62	43	32	32	39	48	58	58	68	69	64	64
22	62	44	32	32	40	48	60	58	70	70	64	65
23	62	44	32	32	42	44	62	58	72	70	64	65
24	62	46	32	32	44	44	64	57	74	68	65	64
25	60	44	32	32	44	46	66	56	76	68	65	64
26	60	43	32	32	42	50	67	57	78	68	65	64
27	60	42	32	32	42	50	67	58	78	70	66	63
28	59	40	32	32	42	52	65	58	78	70	66	62
29	56	36	32	32	42	52	64	58	78	68	66	62
30	58	34	32	32	--	50	62	58	78	68	66	61
31	58	--	32	32	--	50	--	58	--	68	66	--
Average	60	46	32	32	36	41	55	59	67	71	65	65

## KANAWHA RIVER BASIN

## NEW RIVER AT HINTON, W. VA.

LOCATION.--At water plant, at Hinton, Summers County, 500 feet upstream from gaging station.

DRAINAGE AREA.--6,257 square miles.

RECORDS AVAILABLE.--October 1946 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 82° F. Aug. 29; minimum, 33° F. on many days in January and February.

EXTREMES, 1946-48.--Water temperatures: Maximum, 82° F. Aug. 11-12, 14-15, 21-22, 1947, Aug. 29, 1948; minimum, 33° F. on many days in winter months.

REMARKS.--Records furnished by West Virginia Water Service Co.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	61	58	39	35	33	45	50	61	71	76	79	77
2	59	55	37	37	33	45	52	60	69	74	77	75
3	60	55	37	36	33	45	52	60	68	74	77	75
4	61	56	37	36	34	45	53	59	67	74	77	74
5	62	55	38	35	34	43	53	57	67	76	73	76
6	62	56	39	34	34	42	54	57	69	79	71	75
7	64	54	40	34	34	42	55	56	70	79	69	75
8	65	53	41	34	33	41	56	55	70	79	67	73
9	66	51	40	35	33	42	54	55	69	78	67	75
10	66	50	39	36	33	43	54	57	68	77	70	74
11	65	49	38	35	34	44	54	60	89	78	73	72
12	64	49	38	36	34	43	55	63	83	77	73	72
13	65	48	38	35	35	41	57	65	71	79	75	72
14	65	47	38	35	35	41	58	65	72	79	76	73
15	66	46	37	33	38	42	57	64	73	79	75	73
16	67	45	36	33	37	44	54	65	75	77	74	73
17	69	45	36	33	39	45	55	64	74	77	73	73
18	69	44	35	33	40	46	56	64	73	77	73	73
19	68	43	35	33	41	48	56	64	73	78	73	74
20	68	43	35	33	43	51	58	64	75	79	73	73
21	66	44	36	33	43	52	60	65	75	80	74	73
22	66	45	35	33	42	54	60	68	78	81	75	74
23	65	47	35	34	41	56	61	68	80	81	75	73
24	65	47	34	33	40	55	62	66	80	81	77	70
25	63	47	35	33	40	53	64	69	80	79	77	67
26	62	45	34	33	41	52	65	69	80	78	78	64
27	62	42	35	33	42	53	67	69	80	79	79	64
28	64	41	34	33	43	52	67	70	80	78	79	65
29	63	40	34	33	46	50	63	71	81	79	82	65
30	62	40	34	33	--	49	61	71	79	80	81	64
31	59	--	34	33	--	48	--	71	--	81	80	--
Average	64	48	37	34	38	47	57	63	73	78	75	72

## KANAWHA RIVER BASIN--Continued

## GREENBRIER RIVER AT ALDERSON, W. VA.

LOCATION.--At city water plant, 500 feet upstream from gaging station, and 900 feet upstream from bridge on State Highway 3 at Alderson, Monroe County.

RECORDS AVAILABLE.--1,357 square miles.

EXTREMES, 1947-48.--October 1946 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 79° F. July 6-7, 21-24, Aug. 28-29; minimum, 34° F. Dec. 29-30, Jan. 7-8, 15, 19-20, 25-26.

EXTREMES, 1946-48.--Water temperatures: Maximum, 80° F. Sept. 16, 1947; minimum, 33° F. Dec. 2-5, 1946.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	68	58	44	35	35	51	53	62	66	75	--	75
2	68	55	42	40	38	51	53	59	62	74	76	74
3	68	54	42	38	38	51	53	57	62	74	76	74
4	68	56	39	35	35	52	55	55	64	78	71	--
5	--	56	38	35	35	52	55	55	64	78	71	--
6	67	54	42	35	35	52	55	54	--	79	68	74
7	--	53	--	34	--	--	55	54	66	79	63	74
8	67	53	42	34	--	50	55	53	66	78	--	73
9	65	--	44	35	40	50	55	55	68	75	66	73
10	65	48	45	35	40	50	55	58	68	74	68	73
11	65	--	44	--	40	50	--	60	68	--	70	72
12	--	46	44	38	40	48	55	60	--	76	72	--
13	--	46	43	38	40	48	58	60	--	76	73	71
14	--	44	--	35	40	--	58	62	69	77	74	70
15	--	46	42	34	44	48	58	62	70	76	--	71
16	--	45	42	35	44	50	58	--	71	74	70	71
17	--	45	38	35	44	54	55	64	71	75	70	71
18	--	44	35	35	46	53	--	64	70	--	72	71
19	--	45	--	34	48	55	55	63	70	78	74	--
20	68	45	35	34	50	55	54	63	--	78	72	72
21	45	35	35	35	50	--	58	64	74	79	72	73
22	45	35	35	35	--	55	58	64	77	79	--	73
23	65	35	35	35	50	55	60	--	77	79	73	73
24	49	35	35	35	50	55	63	66	77	79	74	68
25	64	46	35	34	51	55	--	68	77	--	74	--
26	64	46	35	34	51	--	64	68	77	74	76	--
27	46	--	--	35	51	56	62	68	--	79	78	62
28	45	--	--	35	51	--	62	68	76	77	79	62
29	--	34	--	35	--	52	62	68	--	74	--	62
30	60	--	34	35	--	52	62	62	75	78	79	64
31	--	35	35	35	--	53	--	68	--	78	78	--
Average	--	49	39	35	43	52	58	62	70	77	73	71

KANAWHA RIVER BASIN--Continued  
KNAPP CREEK AT MARLINTON, W. VA.

LOCATION--At city water plant, at Marlinton, Pocahontas County, 1 mile upstream from mouth and 2 miles downstream from gaging station.

DRAINAGE AREA--108 Square miles.

RECORDS AVAILABLE--October 1946 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 78° F. June 21-22, 1948; minimum, freezing point on several days in November, December, January and February. Record of water, water year October 1947 to September 1948.

EXTREMES, 1946-48.--Water temperatures: Maximum, 78° F. June 21-22, 1948; minimum, freezing point on many days in winter months.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	48	48	31	32	31	38	45	50	56	67	70	62
2	48	49	32	35	31	38	50	52	56	64	65	62
3	48	48	32	32	31	38	43	52	55	65	68	65
4	51	51	35	33	31	40	44	50	55	68	66	68
5	50	51	39	32	31	38	47	49	58	70	62	67
6	54	50	40	33	31	35	49	50	59	72	60	68
7	54	48	35	31	31	31	52	52	61	70	59	66
8	58	46	38	31	31	36	52	46	60	66	61	66
9	60	41	33	31	31	36	49	48	59	66	60	67
10	58	41	33	34	31	39	45	53	55	64	62	67
11	58	42	34	31	31	40	46	56	59	68	65	59
12	57	44	34	32	31	36	49	58	61	67	65	60
13	58	40	33	31	31	35	53	60	64	70	64	62
14	59	41	32	31	31	34	50	58	61	71	65	62
15	58	40	32	31	33	37	46	55	65	69	65	62
16	60	41	35	31	33	44	48	57	64	64	65	61
17	62	40	32	31	35	43	50	55	64	65	65	63
18	62	38	32	31	35	40	48	57	64	70	65	65
19	62	39	33	31	36	43	48	56	64	70	65	64
20	62	40	34	31	38	45	52	57	68	70	65	65
21	58	41	31	31	35	49	52	57	78	70	65	64
22	56	41	31	31	35	52	50	58	78	70	65	66
23	55	44	33	31	35	54	55	58	72	69	66	60
24	58	45	--	31	35	49	56	60	70	68	68	58
25	55	42	--	31	36	45	57	60	70	65	70	54
26	53	38	--	31	40	49	58	61	67	68	70	53
27	54	35	--	31	37	49	60	62	69	70	72	54
28	57	36	32	31	40	42	58	63	69	68	73	55
29	56	35	31	31	40	37	52	65	70	68	73	57
30	49	31	32	31	--	40	48	63	69	70	72	59
31	48	--	33	31	--	44	--	60	--	74	70	--
Average	56	42	33	31	34	41	50	56	64	68	66	62



## BIG SANDY RIVER BASIN

## TUG FORK AT KERMIT, W. VA.

LOCATION --At city water plant at Kermit, Mingo County, three-quarters of a mile downstream from Wolf Creek, and 3 miles downstream from drainage station.

DRAINAGE AREA --274 square miles above water plant (1,185 square miles at gaging station).

RECORDS AVAILABLE --Water temperatures: October 1946 to September 1948.

EXTREMES, 1947-48 --Water temperatures: Maximum, 82° F. June 26; Aug. 24-29; minimum, 33° F. Dec. 20.

EXTREMES, 1946-48 --Water temperatures: Maximum, 86° F. Aug. 1, 1947; minimum, freezing point Feb. 5, 1947.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	57	56	37	40	36	49	49	61	68	78	79	71
2	55	56	35	43	36	50	55	63	77	76	75	71
3	58	55	34	41	35	52	52	61	70	75	76	71
4	62	57	38	39	35	44	44	59	68	77	75	73
5	65	56	42	38	35	45	54	58	71	78	70	76
6	65	56	45	39	36	46	54	58	72	78	68	75
7	65	55	47	35	36	45	54	56	73	76	69	73
8	64	54	49	35	36	45	54	55	72	79	72	78
9	63	51	38	40	38	48	53	58	71	76	74	73
10	65	50	42	41	38	47	54	60	69	76	72	74
11	65	51	41	38	37	46	57	68	71	76	74	69
12	66	51	40	38	41	44	60	69	73	78	76	72
13	65	48	37	39	40	41	56	71	72	79	77	72
14	63	47	38	37	38	44	57	70	73	78	77	69
15	64	49	39	36	42	45	56	65	76	78	77	68
16	67	50	40	36	43	52	54	65	76	77	77	69
17	68	48	37	34	46	46	56	65	74	78	75	70
18	70	46	36	35	47	48	56	64	71	79	75	70
19	68	45	36	34	49	52	59	64	73	79	75	70
20	68	47	33	34	49	55	59	64	72	80	73	74
21	63	48	35	35	46	58	66	65	71	79	74	73
22	62	49	37	34	43	58	64	66	76	80	77	73
23	69	49	38	34	44	58	63	68	78	80	77	67
24	60	50	36	35	44	56	62	68	80	79	82	63
25	63	49	40	34	47	56	67	67	79	78	82	62
26	66	45	43	34	50	55	68	66	82	78	82	59
27	67	44	36	35	50	55	69	67	80	77	82	61
28	64	41	36	34	51	48	70	70	81	78	82	64
29	63	40	35	34	49	47	62	72	80	78	82	63
30	58	38	35	37	--	--	59	72	80	80	79	67
31	57	--	40	37	--	--	--	69	--	80	76	--
Average	64	49	39	37	42	50	58	65	74	78	76	70

## SCIOTO RIVER BASIN

## OLENTANGY RIVER AT DELAWARE, OHIO

LOCATION.--At Stone Mill Bridge, three-quarters of a mile north of Delaware, Delaware County, and 3 miles downstream from gaging station near Delaware.

RECORDS AVAILABLE.--Water temperatures: June 1946 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 88° F. Aug. 27; minimum, freezing point on many days in November, December, January, February, and March.

EXTREMES, 1946-48.--Water temperatures: Maximum, 88° F. Aug. 27; minimum, freezing point on many days in winter months.

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	54	32	32	--	37	50	58	68	73	80	78
2	55	53	33	34	31	38	49	60	69	70	81	79
3	57	52	34	33	32	37	50	63	70	70	84	79
4	56	53	35	34	--	36	52	65	75	79	71	70
5	64	53	37	34	--	35	53	62	70	80	72	72
6	65	52	36	34	32	33	55	60	67	79	72	74
7	66	49	37	33	32	35	55	56	69	78	67	75
8	66	47	38	33	32	35	58	55	67	78	71	74
9	63	46	36	33	--	36	53	61	77	77	76	72
10	64	45	33	32	--	35	48	64	75	76	72	73
11	80	45	32	33	32	34	51	65	72	79	77	73
12	67	44	33	33	32	32	56	65	72	81	79	71
13	66	40	32	33	32	32	51	51	73	80	75	71
14	66	36	32	32	32	34	47	59	70	81	72	74
15	66	39	32	32	32	34	52	58	71	77	76	72
16	67	39	32	32	32	42	54	60	72	76	76	72
17	64	39	32	32	34	45	50	61	70	80	77	73
18	65	38	32	--	36	46	54	60	69	82	77	69
19	66	38	32	--	40	47	59	61	70	81	72	78
20	67	38	32	32	37	46	62	64	69	81	76	72
21	65	38	32	32	33	59	56	60	69	80	72	67
22	63	40	--	32	32	56	58	62	74	80	76	65
23	64	41	--	--	32	50	57	65	76	76	83	63
24	63	41	--	--	36	47	57	68	77	74	84	61
25	59	37	32	31	38	51	68	67	76	75	86	58
26	63	35	--	--	42	52	73	69	79	74	87	60
27	63	34	--	--	40	51	71	70	82	77	88	61
28	60	32	32	32	41	45	63	70	83	80	81	63
29	57	33	--	32	39	43	63	71	80	77	86	63
30	55	32	32	32	--	47	63	67	79	79	82	64
31	55	--	32	--	--	47	--	64	--	73	78	--
Average	62	42	33	--	35	42	56	63	73	77	77	70

## SCIOTO RIVER BASIN--Continued

## OLENTANGY RIVER NEAR DELAWARE, OHIO

LOCATION --At Stone Mill Bridge, 4 miles downstream from gaging station and 1½ miles north of Delaware, Delaware County.

DRAINAGE AREA --387 square miles above gaging station.

RECORDS AVAILABLE --Water temperatures: October 1946 to September 1948.

EXTREMES 1947-48 --Water temperatures: Maximum, 88° F. Aug. 27; minimum, freezing point on many days in November, December, January, February and March.

EXTREMES 1946-48 --Water temperatures: Maximum, 88° F. Aug. 27, 1948; minimum, freezing point on many days in November, December, January, February and March.

REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	54	32	32	--	37	50	58	68	73	80	78
2	55	53	33	34	31	38	49	60	69	70	81	79
3	52	52	34	33	32	37	50	63	70	70	74	79
4	56	53	35	34	--	36	52	63	75	79	71	70
5	64	53	37	35	--	35	53	62	70	80	72	72
6	65	52	36	34	32	33	55	60	67	79	72	74
7	66	49	37	33	32	33	55	56	69	78	67	75
8	66	47	38	33	32	35	58	55	67	78	71	74
9	63	46	36	33	32	36	53	61	70	77	76	72
10	64	45	33	32	--	35	48	64	75	76	72	73
11	60	45	32	33	32	34	51	66	72	79	77	72
12	67	44	33	33	32	32	56	65	72	81	79	71
13	66	40	32	33	32	32	51	61	73	80	75	70
14	66	38	32	32	32	34	47	59	72	78	74	74
15	66	39	32	32	32	39	52	58	71	77	76	72
16	67	39	32	32	32	42	54	60	72	76	76	72
17	64	39	32	32	34	45	50	61	70	80	77	73
18	65	38	32	--	36	46	54	60	69	82	75	69
19	66	38	32	--	40	47	59	61	70	81	72	78
20	67	38	32	32	37	46	62	64	69	81	76	72
21	65	38	32	32	33	59	56	60	69	80	72	67
22	63	40	--	32	32	58	58	62	74	80	76	65
23	64	41	--	32	32	50	57	65	76	76	83	83
24	63	41	--	--	36	47	57	68	77	74	84	81
25	59	37	32	31	38	51	68	67	76	75	86	58
26	63	35	--	--	42	52	73	69	79	74	87	60
27	63	34	--	--	40	51	71	70	82	77	88	61
28	60	32	32	32	41	45	63	70	83	80	81	63
29	57	33	32	32	39	43	63	71	80	77	86	63
30	55	32	32	32	--	47	63	67	79	79	82	64
31	55	32	32	--	--	47	64	64	--	73	78	64
Average	62	42	33	--	35	42	56	63	73	77	77	72

LITTLE MIAMI RIVER BASIN  
LITTLE MIAMI RIVER AT MILFORD, OHIO

LOCATION --At bridge on U. S. Highway 50 in Milford, Clermont County, 500 feet upstream from gaging station, and 1½ miles upstream from East Fork.  
DRAINAGE AREA --1,195 square miles  
RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.  
EXTREMES 1947-48 --Dissolved solids: Maximum, 384 parts per million Jan. 21-31; minimum, 225 parts per million Apr. 11-20.  
Total hardness: Maximum, 366 parts per million Feb. 1-10; minimum, 132 parts per million Feb. 14-16.

Water temperatures: Maximum, 85° F. Aug. 27-29; minimum, freezing point on many days in December, January, and February.  
REMARKS --Increased turbidity at times due to extensive gravel operations 1½ to 2 miles above Milford. There is high sustained flow of ground water contribution from carbonate bearing gravel. Some of the analyses show the presence of carbonate which is reported and included as equivalent bicarbonate. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. Records of specific conductance of daily samples available in district office at Columbus, Ohio.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947	226	64	13	7.9	509	3.4	0.03	61	30	6.0	2.1	272	45	6.5	0.2	3.9	306	276	53
Oct. 11-20	212	63	12	8.0	520	3.4	.04	63	30	3.9	3.9	280	45	7.2	.2	3.2	314	281	51
Oct. 21-31	311	64	20	7.9	511	7.4	.04	66	27	4.9		280	42	7.0	.2	3.5	310	276	46
Nov. 1-10	269	53	6	8.1	535	6.2	.06	71	27	2.6		290	41	7.0	.2	3.9	311	288	50
Nov. 11-20	516	46	7	7.9	511	11	.11	65	26	5.5		269	45	7.0	.2	4.1	306	269	49
Nov. 21-30	435	41	5	8.1	558	4.8	.10	75	28	4.5		303	48	7.0	.2	3.9	329	302	54
Dec. 1-10	447	40	5	8.0	543	4.4	.04	70	29	3.0		285	51	7.0	.2	4.1	316	294	60
Dec. 11-20	455	35	6	8.2	541	4.2	.04	73	27	5.0		290	50	7.0	.2	4.7	320	293	69
Dec. 21-31	317	34	4	8.1	557	2.0	.04	72	29	6.2		302	49	7.0	.2	4.2	329	299	51
Jan. 1-10, 1948	3,154	38	12	7.9	481	13	.17	61	21	6.6	1.9	233	44	5.2	.2	8.1	281	239	48
Jan. 11-20	705	34	6	8.0	591	6.6	.01	81	29	3.3		312	52	6.8	.1	11	348	321	66
Jan. 21-31	411	32	5	7.8	655	4.6	.03	90	32			360	53	7.2	.1	8.0	384	356	61
Feb. 1-10	355	32	4	7.9	634	5.5	.06	94	32		1.1	362	52	8.0	.1	7.6	375	366	70
Feb. 11-13, 17-20	2,615	36	5	7.9	493	4.4	.06	70	23		6.2	252	57	7.0	.1	8.4	298	269	63
Feb. 14-16	16,960	34	13	7.8	487	13	.39	38	9.1	2.5		135	24	3.0	.1	7.4	132	30	30
Feb. 21-29	2,653	38	8	7.8	469	7.6	.06	65	21	2.3		231	45	6.5	.2	9.6	294	249	59
Mar. 1-10	1,487	43	4	7.9	515	7.2	.05	71	25	6.1		261	48	6.5	.1	10	320	280	66
Mar. 11-20	3,032	47	7	7.9	480	6.2	.08	66	22	2.6		245	43	6.0	.2	7.4	293	255	54
Mar. 21-31	5,919	54	8	7.9	387	6.2	.07	54	16	3.6		196	34	4.5	.2	6.8	246	201	40
Apr. 1-10	2,772	56	9	7.7	457	7.6	.08	62	21	5.7	.9	234	39	5.2	.2	6.2	267	241	49
Apr. 11-20	3,167	56	13	7.8	410	8.6	.18	56	18	2.3		211	33	4.0	.2	6.4	240	214	41
Apr. 21-30	902	64	4	8.0	544	6.2	.06	72	27	4.1		293	44	5.8	.1	6.2	310	291	50
May 1-10	1,385	60	4	7.9	484	4.4	.07	66	23	3.0		255	43	5.2	.2	4.9	278	259	50
May 11-20	1,730	85	6	7.8	448	5.0	.07	62	22	--	--	235	38	4.5	.2	8.2	262	245	53
May 21-31	508	70	4	7.9	506	3.2	.07	66	27	2.8		271	45	5.8	.2	4.7	289	276	53

June 1-10 -----	364	72	5	7.8	506	3.0	.07	60	28	5.2	264	44	6.5	.1	5.6	282	265	48
June 11-20 -----	294	76	5	7.7	487	3.8	.06	56	27	5.1	250	43	6.0	.1	4.3	273	251	46
June 21-30 -----	242	82	5	7.8	476	5.0	.08	53	27	6.6	247	42	6.0	.1	3.4	265	243	41
July 1-10 -----	218	81	6	7.9	462	5.8	.04	54	25	5.2	240	40	7.5	.1	3.6	239	238	41
July 11-20 -----	310	82	6	7.8	441	7.0	.06	52	24	4.5	228	38	5.8	.2	3.9	231	228	42
July 21-31 -----	626	79	12	7.7	384	8.8	.10	51	17	3.9	196	31	4.8	.2	6.8	225	197	37
Aug. 1-10 -----	259	76	9	7.8	433	7.6	.10	53	22	5.0	220	38	6.5	.2	5.0	251	223	42
Aug. 11-20 -----	142	79	6	7.8	420	2.8	.07	45	25	5.3	212	39	7.0	.2	2.4	238	215	41
Aug. 21-31 -----	101	81	5	7.8	439	2.8	.04	46	28	5.2	222	45	7.5	.2	1.6	249	230	48
Sept. 1-10 -----	85	75	6	7.8	448	2.8	.03	47	26	5.7	230	40	7.0	.1	1.8	251	224	36
Sept. 11-20 -----	78	76	6	7.8	455	2.6	.04	49	28	4.6	232	43	7.5	.2	1.8	260	237	47
Sept. 21-30 -----	167	67	11	7.8	429	5.8	.07	54	22	4.2	220	40	7.0	.2	2.4	251	225	45
Average -----	1,277	58	7	--	485	5.6	0.07	62	25	4.4	254	43	6.3	0.2	5.4	288	258	49

LITTLE MIAMI RIVER BASIN--Continued  
LITTLE MIAMI RIVER AT MILFORD, OHIO--Continued  
Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	57	36	43	32	44	53	58	70	80	82	76
2	59	55	38	40	32	45	53	60	71	78	81	76
3	62	50	40	38	33	43	53	--	72	81	80	72
4	65	55	40	37	32	43	54	60	75	82	71	76
5	66	55	42	37	32	42	58	57	75	82	71	77
6		55	40	38	33	38	56	60	74	83	73	75
7	67	55	42	36	34	40	58	58	73	81	70	77
8	67	50	44	37	32	40	60	58	71	81	76	78
9	66	48	40	38	32	42	58	62	70	--	78	74
10	66	48	38	39	32	44	55	68	72	82	80	73
11		50	37	38	32	39	56	70	75	82	77	74
12	70	48	37	37	33	40	53	70	77	82	80	76
13	69	46	35	36	34	40	50	66	75	83	80	77
14	69	45	35	33	33	42	51	63	76	82	79	76
15	66	46	35	33	32	44	52	62	74	81	80	74
16		45	35	33	37	52	57	66	76	82	78	75
17	67	44	34	33	40	52	57	61	76	82	79	74
18	69	42	35	33	42	52	58	64	76	82	78	76
19	69	44	34	33	42	55	62	64	77	81	78	78
20	68	45	32	33	42	57	64	67	76	81	78	78
21		44	34	33	39	61	59	68	79	77	74	75
22	66	45	34	32	37	60	61	68	82	76	80	68
23	66	44	34	32	36	55	64	70	82	78	82	67
24	65	44	35	32	40	53	65	68	82	76	83	64
25	66	42	32	32	40	55	65	69	82	78	84	64
26		40	34	32	45	54	70	70	84	76	84	65
27	65	38	34	32	45	55	68	70	83	80	85	66
28	60	38	34	32	46	57	64	69	84	81	85	64
29	58	38	34	32	46	47	60	73	80	82	85	67
30	--	36	34	32	--	50	59	72	80	83	78	67
31	--	--	36	32	--	54	--	70	--	82	76	--
Average	66	46	36	35	37	48	58	65	76	81	79	73

## LITTLE MIAMI RIVER BASIN--Continued

## LITTLE MIAMI RIVER NEAR OLDTOWN, OHIO

LOCATION --At bridge on U. S. Highway 68, 1.3 miles north of Oldtown, Greene County, and 1 mile upstream from Massies Creek.

RECORDS AVAILABLE.--Chemical analyses November 1947 to August 1948.

REMARKS.--This river has a high sustained flow of ground water contribution from carbonate bearing gravel. Some of the analyses show the presence of carbonate which is included as equivalent bicarbonate.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 4, 1947	607	53	8.1	607		0.08	79	35	4.1		337	58	6	0.1	5.1		341	64
Dec. 16	570	34	8.0	570		.02	68	35	4.7		308	56	5.5	.2	5.4		314	61
Jan. 26, 1948	648	33	8.1	648		.07	88	36	1.3		358	60	5.5	.1	7.6		368	74
Mar. 9	586	44	8.2	586		.06	80	33	2.9		321	60	6	.2	8.6		335	72
Apr. 20	561	63	8.2	561		.07	76	30	--		303	49	5	.3	8.4		313	64
June 2	571	67	8.1	571		.05	72	33	5.3		314	52	7	.2	6.0		315	58
July 17	536	74	7.8	536		--	64	31	6.2	-	279	58	5	--	5.8		287	59
Aug. 26	550	80	8.0	550		--	59	32	14		290	57	6	--	4.0		279	41

## LITTLE MIAMI RIVER BASIN--Continued

## EAST FORK LITTLE MIAMI RIVER NEAR MILFORD, OHIO

LOCATION.--At bridge at Country Club 2 miles south of Milford, Clermont County, 1 mile upstream from mouth, and 4 miles downstream from gaging station at Perintown, Clermont County.

DRAINAGE AREA.--477 square miles (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: November 1947 to August 1948.

REMARKS.--Discharge records reported are for gaging station at Perintown. No appreciable inflow between gaging station and sampling station except during periods of heavy local rains. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 3, 1947 -----	44	--	7.8	390		0.06	60	14		1.8	204	37	3	0.1	1.2		207	40
Dec. 15 -----	74	34	7.3	342		.14	49	13		2.9	155	40	7.2	.2	3.2		176	49
Jan. 26, 1948 -----	45	33	7.7	556		.04	84	21		6.8	275	63	10	.1	6.8		296	71
Mar. 9 -----	338	42	7.9	378		.14	57	14		4.9	167	55	8	.2	5.6		200	63
Apr. 20 -----	272	63	7.9	439		.12	68	15		3.1	227	36	7	.2	5.2		231	45
June 3 -----	31	69	7.6	486		.04	74	17		4.4	259	40	6	.1	2.0		255	42
July 17 -----	11	80	7.6	477		--	69	17		9.2	272	33	3	--	.6		242	19
Aug. 27 -----	2.0	78	7.6	416		--	65	14		2.1	228	30	4	--	.8		220	33



## LITTLE MIAMI RIVER BASIN--Continued

## MASSIES CREEK AT OLDTOWN, OHIO

LOCATION--At bridge on U. S. Highway 68, 0.3 mile north of Oldtown, Greene County, 0.2 mile upstream from mouth, and 2 miles downstream from Clark Run. RECORDS AVAILABLE--Chemical analyses: November 1947 to August 1948.

REMARKS--This creek has a high sustained flow of ground water contribution from carbonate bearing gravel. Some of the analyses show the presence of carbonate which is included as equivalent bicarbonate.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 4, 1947	-----	53	8.1	609		0.04	82	35	--	--	339	52	5	0.2	5.6		348	71
Dec. 16	-----	34	8.1	576		.02	76	33	1.2		323	46		.2	5.2		325	60
Jan. 26, 1948	-----	33	8.0	633		.05	86	35	1.8		334	55	5.8	.1	7.6		356	68
Mar. 9	-----	45	8.2	563		.07	75	31	5.2		307	55	6	.2	10		315	63
Apr. 20	-----	65	8.3	523		.08	70	28	2.7		287	44	4	.3	10		280	54
June 3	-----	68	8.1	512		.03	61	32	6.7		283	44	5	.2	5.9		284	44
July 17	-----	--	--	540		--	57	32	13		300	45	4	--	4.4		274	28
Aug. 26	-----	81	7.8	517		--	56	32	9.3		284	46	5	--	4.8		271	39

## MIAMI RIVER BASIN

## MIAMI RIVER ABOVE STILLWATER RIVER AT DAYTON, OHIO

LOCATION.--At bridge on U. S. Highway 25 at north edge of Dayton, Montgomery County, 1 mile upstream from Stillwater River, and 8½ miles downstream from gaging station at Taylorsville, Montgomery County.

DRAINAGE AREA.--1,155 square miles (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: July 1946, October 1946 to September 1947.

Water temperatures: July 1946, October 1946 to September 1947.

EXTREMES, 1946-47.--Dissolved solids: Maximum, 417 parts per million Dec. 1-10; minimum, 301 parts per million May 21-31.

Total hardness: Maximum, 354 parts per million Dec. 1-10; minimum, 250 parts per million Mar. 11-20.

Water temperatures: Maximum, 85° F. Aug. 14, 23; minimum, freezing point on many days in December, January, and February.

REMARKS.--Discharge records reported are for gaging station at Taylorsville. There is no appreciable inflow between gaging station and sampling station.

Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. Records of specific conductance of daily samples available in district office at Columbus Ohio.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 3, 1947	441	53	8.0	573		0.03	76	28	4.0		272	71	7	--	8.4		305	82
Dec. 15	378	34	8.1	615		.02	82	32	7.0		309	78	8	0.4	5.6		336	83
Jan. 26, 1948	380	32	7.9	655		.09	91	33	4.2		327	81	9.0	.3	7.7		363	95
Mar. 8	874	39	7.9	583		.04	76	27	3.7		270	63	8	.3	12		301	79
Apr. 19	2,180	59	7.9	484		.08	62	21	10		215	70	4.0	.2	9.4		241	65
June 3	368	74	7.7	571		.04	70	31	7.4		288	63	8	.3	5.6		302	66
July 17	391	80	7.6	382		--	50	19	4.5		190	43	6	--	4.7		203	47
Aug. 27	104	79	7.7	533		--	66	27	7.9		282	55	12	--	4.9		276	61

## MIAMI RIVER BASIN--Continued

## STILLWATER RIVER AT DAYTON, OHIO

LOCATION.--At Siebenthaler Street bridge in Dayton, Montgomery County, 1½ miles upstream from mouth, and 7 miles downstream from gaging station at Englewood, Montgomery County.

DRAINAGE AREA.--646 square miles (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: November 1947 to August 1948.

REMARKS.--Discharge records reported are for gaging station at Englewood. No appreciable inflow between gaging station and sampling station except during periods of heavy local rains. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. There is some ground water contribution from carbonate bearing gravel and some of the analyses show the presence of carbonate which is included as equivalent bicarbonate.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 3, 1947	119	54	7.9	611		0.08	76	35	4.6		314	66	9	0.2	5.4		334	76
Dec. 15	116	34	8.2	625		.01	78	36	6.3		309	84	8	.3	4.1		343	89
Jan. 26, 1948	160	33	8.0	719		.06	102	38	1.8		372	84	8.0	.1	13		411	106
Mar. 8	430	39	7.9	587		.18	82	30	1.1		296	64	6	.2	16		326	86
Apr. 19	940	59	8.1	539		.09	74	27	--		266	54	6	.3	15		296	78
June 3	153	72	7.8	563		.02	67	33	5.0		286	62	7	.3	4.8		303	68
July 17	114	80	7.8	501		--	60	29	3.1		252	59	4	--	2.7		269	62
Aug. 27	40	78	7.7	522		--	59	31	7.0		260	61	8	--	2.6		275	62

## MIAMI RIVER BASIN--Continued

## MAD RIVER NEAR DAYTON, OHIO

LOCATION.--At bridge on Harshmanville Road, 1½ miles downstream from gaging station and Huffman Dam, and 4½ miles northeast of Dayton, Montgomery County.  
DRAINAGE AREA.--632 square miles at gaging station.  
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 456 parts per million Feb. 1-10; minimum, 334 parts per million Mar. 21-31.  
Total hardness: Maximum, 406 parts per million Jan. 21-31; minimum, 126 parts per million Feb. 14-15.

TEMPERATURES.--Maximum, 77° F. Aug. 1, 28; minimum, freezing point on several days in January and February.

REMARKS.--Discharge records reported are for gaging station near Dayton. No appreciable inflow between gaging station and sampling point except during periods of heavy local rains. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. Records of specific conductance of daily samples available in district office at Columbus, Ohio. There is a sustained flow of ground water contribution from carbonate-bearing gravel and two of the analyses show the presence of carbonate which is reported as equivalent bicarbonate.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Oct. 1-10, 1947-----	370	60	15	8.0	694	7.6	0.07	91	37	7.2	1.6	351	85	11	0.2	9.0	453	379	92
Oct. 11-20-----	341	62	13	7.9	692	7.6	.02	94	36	4.2		348	84	8.2	.2	8.6	446	363	97
Oct. 21-31-----	355	59	18	8.0	692	7.3	.04	96	35	4.6		346	84	9.0	.2	9.5	448	363	98
Nov. 1-10-----	350	51	5	7.9	702	11	.06	95	37	4.0		355	83	8.8	.2	9.5	438	369	98
Nov. 11-20-----	366	46	5	8.0	691	9.0	.06	93	36	3.3		353	80	8.0	.2	9.0	426	360	91
Nov. 21-30-----	418	43	5	8.0	688	7.6	.06	93	36	3.4		350	79	7.5	.2	9.1	428	360	93
Dec. 1-10-----	417	44	4	7.9	703	8.2	.04	94	37	4.9		356	81	8.5	.2	11	435	387	95
Dec. 11-20-----	421	40	4	8.0	703	8.2	.04	95	37	4.0		356	82	8.2	.2	11	431	389	98
Dec. 21-30-----	374	38	7	7.5	711	7.0	.04	95	37	3.9	2.6	332	83	9.5	.2	11	432	389	101
Jan. 1-10, 1948-----	1, 374	40	4	7.5	616	10	.06	83	31	9.3		298	75	9.0	.2	12	379	335	90
Jan. 11-20-----	544	36	5	7.8	717	14	.05	98	37	3.9		354	88	8.8	.2	13	449	397	107
Jan. 21-31-----	372	34	4	7.9	734	6.2	.02	100	38			357	86	10	.1	12	433	406	105
Feb. 1-10-----	331	34	3	7.7	719	9.5	.04	97	36	6.7		356	88	9.8	.2	8.6	456	390	98
Feb. 11-13, 16-20-----	1, 306	41	5	7.7	598	8.0	.03	81	29	3.1		284	74	8.0	.1	8.3	372	321	89
Feb. 14-15-----	9, 200	35	18	7.3	241	--	.18	35	9.4	.9		110	26		--	6.3	126	36	
Feb. 21-29-----	1, 027	44	6	7.7	651	7.0	.02	89	32	2.9		308	85	8.0	.2	9.0	409	354	101
Mar. 1-10-----	774	43	4	7.9	680	6.5	.02	94	34	2.9		332	87	7.2	.1	9.6	429	374	102
Mar. 11-20-----	881	47	5	7.9	634	7.5	.03	89	32	5.6		321	80	8.0	.1	9.8	406	354	91
Mar. 21-31-----	2, 404	52	9	7.6	550	8.6	.06	76	26	--		264	65	4	.2	10	334	296	80
Apr. 1-10-----	1, 536	54	8	7.8	627	8.0	.06	86	31	6.1	1.0	304	77	6	.2	9.0	393	342	93
Apr. 11-20-----	2, 441	52	6	7.7	579	9.0	.06	80	28	1.3		282	70	4	.2	9.2	394	315	84
Apr. 21-30-----	901	59	6	7.8	663	8.4	.06	90	33	4.5		326	83	6	.2	9.2	410	360	93
May 1-10-----	1, 005	57	7	7.7	633	7.2	.07	89	32	--		318	75	5	.2	6.6	389	354	93
May 11-20-----	1, 102	61	8	7.8	622	7.8	.06	85	31	2.4		318	71	5	.2	6.4	378	340	81
May 21-31-----	604	62	6	8.0	692	6.8	.06	95	35	3.2		348	83	7	.2	7.0	424	381	96

June 1-10 -----	475	64	4	7.9	688	8.6	.06	94	34	1.6	337	82	7	.2	7.1	414	374	110
June 11-20 -----	391	66	5	7.9	685	9.2	.08	92	35	5.1	343	81	7.5	.2	10	419	373	92
June 21-30 -----	445	72	8	7.5	628	10	.18	83	32	2.9	308	72	7.5	.2	8.2	388	339	86
July 1-10 -----	405	70	5	8.0	673	10	.04	90	34	5.8	336	79	7.5	.2	8.4	416	364	89
July 11-20 -----	440	73	6	7.7	633	10	.06	83	33	5.2	317	73	7.8	.3	8.0	390	343	83
July 21-31 -----	437	71	7	7.9	642	10	.05	86	33	3.5	320	74	7.8	.3	8.4	399	350	88
Aug 1-10 -----	316	71	4	8.0	680	7.6	.06	90	36	3.0	338	80	8.2	.3	8.0	421	373	96
Aug 11-20 -----	306	71	5	7.9	652	6.0	.04	84	33	7.5	319	77	9.8	.3	6.7	396	345	84
Aug 21-31 -----	248	73	6	7.9	686	7.2	.04	91	35	5.0	338	82	10	.2	6.0	426	371	94
Sept. 1-10 -----	229	69	4	7.9	694	9.6	.04	89	36	10	348	83	12	.1	7.3	428	370	85
Sept. 11-20 -----	210	67	5	7.9	705	7.6	.04	90	36	9.5	346	83	12	.2	7.2	433	373	89
Sept. 21-30 -----	251	63	10	7.9	681	9.6	.04	88	35	8.4	356	81	11	.2	7.4	420	363	88
Average -----	714	55	7	--	657	8.5	0.06	88	33	4.8	325	78	8.0	0.2	8.8	414	355	89

MIAMI RIVER BASIN--Continued  
MAD RIVER NEAR DAYTON, OHIO--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	55	37	38	32	42	54	58	62	68	77	67
2	55	54	41	38	33	45	50	56	62	66	75	67
3	59	53	45	40	33	47	49	58	64	68	75	68
4	64	53	47	40	34	42	50	59	66	70	74	69
5	65	54	47	41	38	41	54	55	64	72	64	71
6	61	54	47	43	36	42	57	58	65	73	65	71
7	62	52	46	39	35	41	55	57	65	71	68	71
8	62	49	48	40	36	44	59	53	64	68	69	71
9	61	45	42	40	33	43	55	62	70	70	70	71
10	58	45	42	41	32	45	52	62	61	73	70	66
11	--	49	40	38	35	42	53	64	67	73	72	65
12	62	47	40	39	43	37	55	67	68	74	72	66
13	63	45	42	41	43	40	49	62	66	74	74	61
14	61	45	42	40	35	42	47	60	66	72	76	68
15	59	46	40	32	35	42	49	59	66	70	70	68
16	--	48	42	32	36	52	55	61	66	72	69	66
17	63	46	38	35	38	52	48	63	65	72	68	67
18	65	45	40	33	42	49	52	61	66	72	70	68
19	--	45	42	35	48	55	57	62	68	72	67	68
20	61	45	38	34	44	55	60	60	67	76	68	72
21	59	45	42	38	40	58	58	63	68	72	70	72
22	59	48	38	37	38	58	53	61	70	74	70	65
23	59	47	38	33	40	55	57	--	72	70	72	69
24	59	47	40	33	42	50	60	61	74	68	72	62
25	61	42	38	32	48	52	63	61	74	70	74	58
26	61	39	36	32	48	54	63	61	73	66	75	56
27	62	40	38	33	48	55	65	61	73	68	76	58
28	59	40	38	33	48	44	60	62	72	71	77	60
29	58	40	37	32	45	46	56	64	73	70	76	64
30	55	39	38	33	--	50	57	75	75	72	72	62
31	55	--	38	33	--	53	--	62	--	76	70	--
Average	60	47	41	36	39	48	55	60	67	71	72	66

## MIAMI RIVER BASIN--Continued

## MAD RIVER AT WEST LIBERTY, OHIO

LOCATION.--At bridge on U. S. Highway 68 on south edge of West Liberty, Logan County, 4½ miles upstream from Macocbee Creek, and approximately 11 miles upstream from gaging station near Urbana, Champaign County.

DRAINAGE AREA.--137 square miles (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: November 1947 to August 1948.

REMARKS.--Discharge records reported are for gaging station near Urbana. There is some inflow between sampling station at West Liberty and gaging station near Urbana. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1113. There is a sustained flow of ground water contribution from carbonate bearing gravel and some of the analyses show the presence of carbonate which is included as equivalent bicarbonate.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Nov. 4, 1947	108	--		8.1	659		0.06	93	37	--	--	358	67	2	0.2	6.9		384	91
Dec. 16	115	38		8.0	618		.05	84	34	2.9		344	59	4.5	.2	6.4		349	67
Jan. 27, 1948	95	34		8.1	645		.06	88	36	4.6		361	62	7	.2	8.3		366	72
Mar. 9	164	48		8.1	636		.03	87	35	--	--	348	61	4	.2	7.9		361	76
Apr. 20	341	61		8.0	618		.06	85	32	1.2		333	58	4.0	.3	8.2		344	71
June 2	161	64		8.0	622		.06	88	34	--	--	349	56	4	.2	6.9		359	73
July 17	155	70		7.9	615		--	88	33	--	--	348	58	3	--	5.5		355	70
Aug. 27	90	72		7.8	608		--	79	35	5.1		340	63	2	--	6.4		341	62

## MISCELLANEOUS ANALYSES OF STREAMS IN OHIO RIVER BASIN IN NORTH CAROLINA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	Sus- pended matter	Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Nitrate (NO <sub>3</sub> )	Dis- solved solids	Total hardness as CaCO <sub>3</sub>
SOUTH FORK NEW RIVER AT JEFFERSON																	
Aug. 30, 1948-----			6	6.7	9.3	0.06	2.5	0.9	2.2		14	1.2	1.1	0.1	0.3	29	10
FRENCH BROAD RIVER AT ROSMAN																	
Apr. 19, 1948-----	266		2	7.0	7.4	0.02	0.8	0.4	3.2		8	1.8	1.4	0.1	0.1	18	4
FRENCH BROAD RIVER AT BLANTYRE																	
Apr. 19, 1948-----	1,070		23	6.6	8.2	0.02	1.7	0.4	7.6		19	2.4	2.8	0.1	0.2	34	6
FRENCH BROAD RIVER AT ASHEVILLE																	
Apr. 19, 1948-----	3,020		11	6.3	9.6	0.03	2.2	1.1	12		19	15	3.0	0.2	0.7	56	10
DAVIDSON RIVER NEAR BREVARD																	
Apr. 19, 1948-----	138		3	6.8	7.0	0.01	0.7	0.4	1.7		6	1.2	0.5	0.1	0.1	14	3
LITTLE RIVER NEAR PENROSE																	
Apr. 19, 1948-----	161		2	6.7	7.4	0.02	0.6	0.2	2.6		7	0.9	0.6	0.1	0.1	16	2
BOYLSTON CREEK NEAR HORSESHOE																	
Apr. 19, 1948-----	35		4	6.9	6.3	0.01	1.2	0.6	2.2		9	1.2	0.9	0.1	0.1	18	5
MILLS RIVER AT MILLS RIVER																	
Apr. 19, 1948-----	186		4	6.8	6.7	0.03	0.5	0.4	1.9		6	0.8	0.6	0.1	0.1	14	3
MUD CREEK AT NAPLES																	
Apr. 19, 1948-----	206		3	6.7	11	0.01	1.6	0.6	3.7		13	1.4	1.4	0.1	0.3	27	6
CANE CREEK AT FLETCHER																	
Apr. 19, 1948-----	79		6	7.6	12	0.06	2.9	1.0	2.6		16	1.9	1.1	0.1	0.2	31	11



## HOMINY CREEK AT CANDLEY

Apr. 19, 1948-----	100		7	7.4	10	0.10	2.8	0.9	2.7	14	2.7	1.0	0.2	0.5	30	11
--------------------	-----	--	---	-----	----	------	-----	-----	-----	----	-----	-----	-----	-----	----	----

## SWANNAHOA RIVER AT BILTMORE

Apr. 19, 1948-----	157		4	7.3	9.8	0.06	3.3	1.1	7.6	23	4.1	4.0	0.1	0.3	43	13
--------------------	-----	--	---	-----	-----	------	-----	-----	-----	----	-----	-----	-----	-----	----	----

## NORTH FORK SWANNAHOA RIVER NEAR BLACK MOUNTAIN

Apr. 19, 1948-----	40		2	7.1	6.4	0.01	2.0	0.5	1.3	8	1.6	0.9	0.1	0.1	16	7
--------------------	----	--	---	-----	-----	------	-----	-----	-----	---	-----	-----	-----	-----	----	---

## IVY RIVER NEAR MARSHALL

Apr. 20, 1948-----	114		7	7.6	12	0.06	4.2	1.6	3.2	23	3.0	1.0	0.2	0.3	38	17
--------------------	-----	--	---	-----	----	------	-----	-----	-----	----	-----	-----	-----	-----	----	----

## BIG LAUREL CREEK NEAR STACKHOUSE

Apr. 20, 1948-----	145		7	7.5	11	0.02	3.3	1.1	2.5	16	2.9	0.8	0.2	0.4	33	13
--------------------	-----	--	---	-----	----	------	-----	-----	-----	----	-----	-----	-----	-----	----	----

## LITTLE TENNESSEE RIVER NEAR PRENTISS

May 13, 1948-----	288		2	6.7	7.7	0.05	1.6	0.7	1.1	9	0.8	0.6	0.0	0.2	19	7
-------------------	-----	--	---	-----	-----	------	-----	-----	-----	---	-----	-----	-----	-----	----	---

## FONTANA RESERVOIR AT FONTANA DAM 1/

May 14, 1948-----			7	7.1	7.1	0.02	1.8	0.4	2.3	8	3.3	0.6	0.1	0.2	23	6
-------------------	--	--	---	-----	-----	------	-----	-----	-----	---	-----	-----	-----	-----	----	---

## LITTLE TENNESSEE RIVER NEAR FONTANA

May 14, 1948-----	3,350		3	6.4	7.0	0.10	1.4	0.6	2.4	8	2.6	0.8	0.2	0.3	21	6
-------------------	-------	--	---	-----	-----	------	-----	-----	-----	---	-----	-----	-----	-----	----	---

## CULLASAJA CREEK AT CULLASAJA

May 13, 1948-----	154		4	7.1	7.5	0.06	1.5	0.6	1.7	9	1.2	0.9	0.0	0.2	22	6
-------------------	-----	--	---	-----	-----	------	-----	-----	-----	---	-----	-----	-----	-----	----	---

## GLENVILLE LAKE NEAR GLENVILLE 2/

May 13, 1948-----			6	6.5	4.7	0.07	1.6	0.3	2.0	8	1.4	0.8	0.1	0.4	17	5
-------------------	--	--	---	-----	-----	------	-----	-----	-----	---	-----	-----	-----	-----	----	---

1/Source: Little Tennessee River.

2/Source: Tuckasegee River.

MISCELLANEOUS ANALYSES OF STREAMS IN OHIO RIVER BASIN IN NORTH CAROLINA--Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Discharge (second feet)	Sus- pended matter	Color	pH	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Nitrate (NO <sub>3</sub> )	Dis- solved solids	Total hardness as CaCO <sub>3</sub>
TUCKASEGEE RIVER AT BRYSON CITY																	
May 13, 1948	1,270		22	6.4	7.7	0.08	1.4	0.5	4.5		12	4.0	0.6	0.1	0.2	29	6
OCONOLUPTY RIVER AT CHEROKEE																	
May 13, 1948	264		2	6.9	7.2	0.02	1.0	0.4	1.6		7	1.2	0.2	0.0	0.3	16	4
HAZEL CREEK AT PROCTOR																	
May 14, 1948	91		8	6.9	5.9	0.01	1.2	0.3	0.4		4	1.1	0.2	0.1	0.1	16	4
SNOEDIRD CREEK NEAR ROBBINSVILLE																	
May 14, 1948	113		7	7.0	4.7	0.01	1.3	0.3	0.9		6	0.9	0.4	0.0	0.0	15	4
SANTEEFLAH RESERVOIR NEAR ROBBINSVILLE 3/																	
May 14, 1948			4	6.7	4.7	0.07	0.7	0.5	2.3		7	1.5	0.6	0.2	0.1	14	4
CHEOAH RIVER AT TAPOCO																	
May 14, 1948			2	6.9	6.7	0.06	1.0	0.5	2.0		8	1.3	0.5	0.1	0.1	18	5
CHATTEE RESERVOIR NEAR HAYESVILLE 4/																	
June 22, 1948			3	6.2	6.7	0.02	1.9	0.7	1.8		10	1.5	1.1	0.0	0.4	20	8
HIWASSEE RIVER ABOVE MURPHY																	
June 22, 1948	440		3	6.1	7.6	0.02	2.2	1.0	1.2		9	2.4	1.0	0.1	0.9	25	10
HIWASSEE RESERVOIR AT HIWASSEE DAM 4/																	
June 22, 1948			2	6.3	5.7	0.03	1.8	0.5	1.7		8	1.8	1.1	0.0	0.3	18	7
VALLEY RIVER AT TOMOTLA																	
June 22, 1948	194		7	6.2	6.4	0.03	3.2	1.2	1.4		13	2.8	0.8	0.1	1.2	27	13
NOTTELY RIVER AT RANGER																	
June 22, 1948			3	6.1	8.4	0.02	2.2	1.0	2.1		10	3.3	1.0	0.1	1.1	25	10

3/Source: Cheoah River.

4/Source: Hiwassee River.

## PART 4. ST. LAWRENCE RIVER BASIN

## STREAMS TRIBUTARY TO LAKE ERIE--Continued

## AUGLAIZE RIVER AT WAPAKONETA, OHIO

LOCATION.--At bridge on U. S. Highway 25 at junction with State Highway 67, 1 mile northeast of Wapakoneta, Auglaize County.  
 RECORDS AVAILABLE.--Chemical analyses: November 1947 to August 1948.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 3, 1947-----		50	8.0	638		0.04	89	32	--	--	308	91	4	--	3.2		354	101
Dec. 15-----		33	8.0	698		.05	100	35	6.8		335	114	6.0	0.4	3.4		393	116
Jan. 25, 1948-----		33	7.8	790		.08	104	40	17		380	130	5.8	.4	5.4		424	113
Mar. 8-----		35	8.1	638		.06	92	31	4.0		301	99	6	.3	8.2		357	110
Apr. 19-----		59	7.9	596		.07	84	28	3.7		277	88	4.5	.3	8.8		325	93
June 4-----		69	8.0	680		.06	91	36	5.5		317	114	4	.4	2.2		375	110
July 18-----		79	7.8	611		--	86	29	6.7		278	102	8	--	3.9		334	106
Aug. 27-----		85	7.7	654		--	82	36	5.5		254	142	5	--	2.0		353	144

## STREAMS TRIBUTARY TO LAKE ERIE--Continued

## OTTAWA RIVER AT LIMA, OHIO

LOCATION.--At West Street bridge in Lima, Allen County. 3½ miles upstream from Little Ottawa River, and 8 miles upstream from gaging station at Allentown, Allen County.

DRAINAGE AREA.--168 square miles (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: November 1947 to August 1948.

REMARKS.--Water discharge records reported for gaging station at Allentown. There is some inflow between the sampling station at Lima and the gaging station, principally from the Little Ottawa River.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 3, 1947-----	24	50	7.7	958		0.06	114	49	25		292	251	25	--	4.6		486	247
Dec. 15 -----	43	33	7.9	658		.01	94	28	12		272	128	10	0.2	7.1		350	127
Jan. 25, 1948-----	20	33	7.3	806		.07	94	34	31		259	189	21	.4	2.4		374	182
Mar. 8 -----	69	33	7.6	624		.06	89	24	7.1		228	117	10	.2	16		321	134
Apr. 19 -----	130	58	7.6	539		.06	76	20	3.3		195	93	6.8	.3	15		272	112
June 4 -----	24	71	7.6	949		.26	94	45	61		373	186	34	.7	.0		420	114
July 19 -----	20	84	7.6	837		--	84	28	61		284	184	24	--	.2		325	92
Aug. 27 -----	20	86	7.6	781		--	65	34	60		248	180	29	--	.1		302	99

## STREAMS TRIBUTARY TO LAKE ERIE--Continued

## BLANCHARD RIVER AT FINDLEY, OHIO

LOCATION.--At Cory Street bridge in Findley, Hancock County, and 2½ miles upstream from gaging station near Findley. DRAINAGE AREA.--343 square miles (at gaging station).  
 RECORDS AVAILABLE.--Chemical analyses: November 1947 to August 1948.  
 REMARKS.--Water discharge records reported for gaging station near Findley. No appreciable inflow between sampling station and gaging station except during periods of heavy local rains. Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1114.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 3, 1947	120	53	7.7	521		0.10	74	23		--	184	104	6	0.2	16		279	128
Dec. 15	89	33	8.0	668		.04	96	30	7.2		262	138	9	.3	7.7		363	148
Jan. 25, 1948	47	33	7.9	808		.06	118	38	5.7		322	172	9.0	.3	8.2		451	187
Mar. 8	153	35	7.9	604		.06	86	26	12		223	121	19	.3	14		321	139
Apr. 19	222	56	8.0	545		.14	74	23	6.4		205	101	6.0	.4	13		279	111
June 4	30	73	7.7	674		.02	86	33	12		253	144	10	.4	4.2		350	143
July 18	25	78	7.6	434		--	60	17	3.9		160	80	6	--	6.5		220	88
Aug. 27	7.4	85	7.5	592		--	66	26	18		202	121	14	--	.4		272	106

## STREAMS TRIBUTARY TO LAKE ERIE--Continued

## TOUSSAINT RIVER NEAR GENOA, OHIO

LOCATION.--At bridge on State Highway 120, 2 miles southeast of Genoa, Ottawa County, and approximately 15 miles upstream from mouth.

RECORDS AVAILABLE.--Chemical analyses: November 1947 to October 1948.

REMARKS.--There is some ground water contribution from carbonate bearing gravel. Some of the analyses show the presence of carbonate which is included as equivalent bicarbonate.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
Nov. 5, 1947		52		8.1	748		0.05	102	38		3.3	318	131	10	0.2	7.3		411	150
Dec. 16		--		8.0	762		.01	102	38	11		319	142	13	.2	8.2		411	149
Jan. 27, 1948		33		7.9	893		.05	119	49		8.6	380	168	17	.1	8.0		498	187
Mar. 10		35		7.9	669		.05	95	29		5.5	276	112	11	.1	12		356	130
Apr. 21		55		8.0	667		.06	88	34		1.5	258	123	10	.1	11		359	148
June 2		72		8.1	756		.04	78	50		3.5	282	148	14	.2	2.8		400	169
July 16		76		7.8	744		--	98	37		2.2	294	125	16	--	9.7		397	156
Oct. 2		--		7.6	730		--	77	37		20	208	159	34	--	5.7		344	174

## STREAMS TRIBUTARY TO LAKE ERIE--Continued

## PORTAGE RIVER AT ELMORE, OHIO

LOCATION.--At bridge on State Highway 120 in Elmore, Ottawa County, and 4 miles downstream from gaging station at Woodville, Sandusky County. DRAINAGE AREA--433 square miles at gaging station.

RECORDS AVAILABLE.--Chemical analyses: November 1947 to October 1948.

REMARKS.--Discharge records reported are for gaging station at Woodville. No appreciable inflow between gaging station and sampling station except during periods of heavy local rains. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1114.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948						Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
						Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )					Total	Non-carbonate
Nov. 5, 1947	64	52		7.9	822		0.04	97	26	35		238	70	0.1	10		349	154
Dec. 16	98	--		8.1	854		.02	108	28	36		272	56	.3	15		385	161
Jan. 27, 1948	30	33		7.4	1,170		.06	142	38	53		365	72	.4	9.1		511	211
Mar. 10	110	35		7.7	683		.04	91	22	18		230	28	.1	13		318	129
Apr. 21	148	56		8.1	682		.07	90	23	18		228	32	.2	13		319	132
June 2	27	73		7.6	764		.06	70	31	41		164	64	.3	3.6		302	188
July 16	26	80		7.4	1,210		--	82	34	110		150	216	--	.5		344	227
Oct. 2	--	60		7.3	2,640		--	142	52	308		136	646	--	6.8		588	457

STREAMS TRIBUTARY TO LAKE ERIE  
SANDUSKY RIVER AT UPPER SANDUSKY, OHIO

LOCATION.--At bridge on U. S. Highway 30N on east edge of Upper Sandusky, Wyandot County, and 2 miles upstream from gaging station near Upper Sandusky. DRAINAGE AREA.--299 square miles (at gaging station). RECORDS AVAILABLE.--Chemical analyses: November 1947 to August 1948. There is no appreciable inflow between sampling point and gaging station REMARKS.--Discharge records reported are for gaging station near Upper Sandusky. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1114, except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Nov. 4, 1947	44	52	7.8	633		0.06	83	25	13		216	132	13	0.3	6.4		310	133
Dec. 16	100	33	8.0	591		.04	83	24	13		229	125	8	.4	5.5		306	118
Jan. 27, 1948	30	33	7.8	818		.07	116	36	18		328	176	13	.3	5.6		437	169
Mar. 10	143	35	7.9	581		.04	81	22	7.2		205	113	10	.2	9.9		293	125
Apr. 20	208	65	8.0	529		.06	76	20	3.6		196	98	6.0	.2	10		272	111
June 2	39	70	7.6	557		.07	72	27	7.5		192	129	9	.3	2.3		291	133
July 16	69	76	7.3	409		--	55	15	2.8		126	85	6	--	5.9		199	96
Aug. 26	11	79	7.6	570		--	71	24	15		182	138	10	--	1.2		276	127



## STREAMS TRIBUTARY TO LAKE ERIE

## SANDUSKY RIVER AT FREMONT, OHIO

LOCATION.--Raw water tap at Fremont Filtration Plant in Fremont, Sandusky County, 3½ miles downstream from gaging station, and 6 miles downstream from Wolf Creek.

DRAINAGE AREA.--1,248 square miles at gaging station.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 622 parts per million Feb. 1-10; minimum, 159 parts per million Feb. 11-20.

Total hardness: Maximum, 511 parts per million Feb. 1-10; minimum, 110 parts per million Feb. 11-20.

Water temperatures: Maximum, 86° F. Aug. 29; minimum, 34° F. on many days in winter months.

REMARKS.--Discharge records are for gaging station near Fremont. No appreciable inflow between gaging station and sampling point except during periods of heavy local rains. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1114. Records of specific conductance of daily samples available in district office at Columbus, Ohio.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analysis, water from October 1947 to September 1948										Hardness as CaCO <sub>3</sub>			
						Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total	Non-carbonate
Oct. 1-10, 1947-----	89.1	60	25	7.6	620	4.2	0.03	76	27	16	3.6	180	144	20	0.5	2.2	427	301	153
Oct. 11-20-----	71.3	65	25	7.7	613	2.2	.01	76	27	12		190	141	15	.5	1.6	421	301	145
Oct. 21-31-----	135	62	28	7.6	697	3.2	.02	87	30	18		229	149	24	.5	2.2	479	340	153
Nov. 1-10-----	468	52	15	7.7	712	8.8	.10	91	30	15		239	156	18	.4	8.6	476	350	163
Nov. 11-20-----	223	43	14	7.7	591	9.8	.10	79	23	11		200	120	11	.4	13	386	292	128
Nov. 21-30-----	297	39	7	7.9	699	8.4	.04	96	29	12		246	152	12	.4	7.7	467	359	157
Dec. 1-10-----	555	37	9	7.9	643	7.4	.07	88	26	11		217	141	12	.4	10	425	326	149
Dec. 11-20-----	445	35	9	7.9	631	7.6	.05	86	26	11	9.4	212	138	10	.3	12	416	321	148
Dec. 21-31-----	252	35	9	7.9	634	4.8	.10	87	26	11		221	139	11	.3	7.0	416	324	143
Jan. 1-10, 1948-----	2,936	35	22	7.7	448	7.5	.18	60	17	8.9	3.2	140	90	10	.3	15	288	220	105
Jan. 11-20-----	629	35	16	7.7	594	8.0	.12	82	23		9.1	195	124	10	.2	19	385	299	139
Jan. 21-31-----	149	35	7	7.8	808	9.0	.04	118	37		5.8	293	181	13	.4	14	546	447	206
Feb. 1-10-----	110	35	6	7.9	916	7.5	.04	134	40	8.0		338	209	17	.5	11	622	511	234
Feb. 11-20-----	4,883	35	14	7.7	237	3.4	.10	31	8.0	2.9		77	38	5.0	.2	7.7	159	110	47
Feb. 21-29-----	1,494	38	11	7.7	440	5.2	.04	61	15	4.4		136	86	7.0	.2	15	292	214	102
Mar. 1-10-----	1,775	37	10	7.8	460	6.0	.04	64	17	6.0		146	95	7.5	.2	16	305	230	110
Mar. 11-20-----	2,890	42	14	7.7	494	6.0	.05	68	19	4.9		163	97	8.5	.2	14	336	248	114
Mar. 21-31-----	5,943	51	26	7.3	346	5.2	.08	46	13	1.5		120	60	3.5	.3	6.0	240	168	70
Apr. 1-10-----	1,951	54	12	7.5	453	7.4	.12	62	18	7.6	1.6	158	85	6.0	.3	10	284	229	99
Apr. 11-20-----	3,585	52	18	7.5	403	8.2	.13	54	16	2.5		141	73	4.0	.3	10	249	201	85
Apr. 21-30-----	3,668	63	9	7.8	579	7.6	.06	82	23	4.2		212	112	7.0	.3	9.0	368	299	125
May 1-10-----	828	59	11	7.8	579	3.6	.06	79	23	9.0		201	124	10	.3	5.1	372	292	127
May 11-20-----	3,026	63	23	7.5	422	8.4	.22	58	16	4.0		150	78	5.0	.3	9.0	273	210	88
May 21-31-----	506	66	16	7.7	550	7.8	.08	78	22	3.8		204	104	8.0	.4	7.0	354	285	118

STREAMS TRIBUTARY TO LAKE ERIE--Continued  
SANDUSKY RIVER AT FREMONT, OHIO--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																		Total	Non-carbonate
June 1-10, 1948 ----	153	74	7	7.6	628	2.4	0.08	76	28	13		200	136	18	0.4	2.5	396	305	141
June 11-20 -----	535	71	10	7.6	572	4.0	.08	72	23	12		184	117	14	.4	9.6	361	274	123
June 21-30 -----	518	79	14	7.6	460	8.2	.08	62	17	8.6		158	88	6.5	.4	15	292	225	95
July 1-10 -----	342	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July 11-20 -----	230	79	16	7.7	463	6.0	.04	59	18	7.2	2.4	156	96	7.2	.3	5.8	296	221	93
July 21-31 -----	91.9	81	15	7.5	503	5.2	.06	65	20	11		164	111	10	.4	4.4	323	244	110
Aug. 1-10 -----	114	78	10	7.7	541	2.8	.07	64	24	13		156	134	12	.5	2.0	352	258	131
Aug. 11-20 -----	653	74	33	7.4	372	6.4	.20	47	14	5.1		114	75	7.2	.4	4.0	236	175	81
Aug. 21-31 -----	88.5	82	25	7.5	379	6.0	.07	52	14	3.1		125	76	6.2	.4	3.4	242	187	85
Sept. 1-10 -----	38.9	80	16	7.6	443	4.0	.03	56	17	7.1	3.4	142	95	8.2	.4	2.8	262	210	93
Sept. 11-20 -----	29.3	78	16	7.6	519	2.8	.04	66	21	2.6		135	121	12	.5	2.4	338	251	140
Sept. 21-30 -----	41.3	68	16	7.8	580	2.4	.04	71	25	11		168	136	16	.6	1.7	381	280	142
Average -----	1,011	56	15	--	544	5.9	0.08	72	22	8.6		180	115	11	0.4	8.2	357	270	123

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	61	55	35	34	35	39	--	--	--	--	81	81
2	55	55	37	35	36	39	--	--	74	--	--	81
3	57	54	37	34	36	37	--	--	79	--	75	82
4	57	54	37	36	34	--	50	--	79	--	79	82
5	63	54	37	36	--	34	54	--	--	--	79	79
6	63	54	39	--	--	34	55	--	--	--	75	79
7	63	52	39	36	--	36	55	--	69	--	75	79
8	64	--	--	--	36	36	--	--	77	--	77	79
9	61	46	--	36	34	39	57	59	70	--	75	75
10	59	45	--	--	--	38	54	--	72	--	81	77
11	59	46	--	35	--	37	54	64	--	--	75	75
12	59	45	--	36	--	39	54	--	70	--	77	77
13	68	45	35	36	--	37	50	61	--	--	75	79
14	68	43	--	36	--	39	48	61	72	--	72	--
15	68	43	34	35	--	38	48	--	72	--	72	79
16	66	41	35	--	34	43	52	--	--	79	73	79
17	41	41	35	34	36	45	54	63	--	72	77	77
18	41	41	34	34	--	46	54	63	--	82	72	73
19	64	41	35	34	--	46	57	63	--	82	75	79
20	66	41	35	36	36	50	--	64	--	82	75	77
21	63	41	34	36	--	54	59	64	--	82	77	72
22	63	43	35	36	--	57	59	--	--	82	82	68
23	63	43	34	34	35	54	59	63	--	79	79	70
24	61	41	36	34	--	52	59	64	79	82	81	70
25	63	41	34	34	--	52	64	--	79	84	81	70
26	64	37	35	35	--	52	66	--	--	--	81	66
27	--	36	34	36	--	52	--	66	--	77	84	66
28	61	36	34	36	--	48	70	70	--	82	84	66
29	61	34	--	36	41	46	--	64	--	--	86	66
30	61	34	36	36	--	46	--	--	--	--	79	70
31	59	--	36	37	--	--	--	66	--	--	84	--
Average	62	44	--	35	--	44	--	--	--	--	78	75

STREAMS TRIBUTARY TO LAKE ERIE  
CUYAHOGA RIVER AT BOTZUM, OHIO

**LOCATION** --At narrow gage track on bridge at Akron Sewage Treatment Plant at Botzum, Summit County, 2 miles downstream from gaging station at Old Portage, Summit County 31 miles downstream from Little Cuyahoga River, and 6 miles north of Akron, Summit County.

**DRAINAGE AREA** --405 square miles at gaging station.

**RECORDS AVAILABLE** --Chemical analyses: October 1946 to September 1948.

**Water temperatures:** October 1946 to September 1948.

**EXTREMES, 1946-48** --Water temperatures: Maximum, 89° F. July 17; minimum, 33° F. Feb. 15, 139 parts per million Apr. 1-10.

**Total hardness:** Maximum, 293 parts per million Oct. 1-10; minimum, 87 parts per million Apr. 1-10.

**Water temperatures:** Maximum, 83° F. Aug. 19, 21; minimum, 33° F. Jan. 21.

**REMARKS** --Discharge records reported are for gaging station at Old Portage. No appreciable inflow between gaging station and sampling point except during periods of heavy local rains. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1114. Records of specific conductance of daily samples available in district office at Columbus, Ohio.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Oxygen consumed		Color	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
			Unfiltered	Filtered																Total	Non-carbonate
Oct. 1-10, 1947	96.4	74			8	7.4	702	8.0	0.08	76	16		39	151	124	59	0.3	5.2	426	255	132
Oct. 11-20	87.7	74			25	7.5	802							178	144	78					
Oct. 21-31	96.9	73			25	7.5	737							168	120	72					
Nov. 1-10	203	63			25	7.3	599							153	95	50					
Nov. 11-20	126	59			25	7.3	585							132	104	48					
Nov. 21-30	136	54			25	7.4	541							137	102	38					
Dec. 1-10	181	52			6	7.4	516							131	91	34					
Dec. 11-20	202	47			8	7.4	435							122	87	24					
Dec. 21-31	150	44			8	7.3	463							128	83	24					
Jan. 1-10, 1948	396	43			16	7.3	423	6.4	17	51	12	14		107	82	20	.3	5.8	289	177	89
Jan. 11-20	141	42			13	7.4	467							144	94	26					
Jan. 21-31	68.6	44			9	7.2	596							129	103	46					
Feb. 1-10	63.2	45			10	7.3	688							157	110	64					
Feb. 11-13	164	49			6	7.3	737							146	135	76					
Feb. 14-20	1,138	40			11	7.3	369							82	58	30					
Feb. 21-29	763	42			8	7.1	352							59	57	35					
Mar. 1-10	413	44			9	7.2	416							73	73	41					
Mar. 11-20	546	49			16	7.1	446							85	83	38	.1	3.0			
Mar. 21-31	1,445	54			23	7.2	257							54	51	12	.2	3.8			
Apr. 1-10	341	60			9	7.4	364	4.4	10	45	9.4	13		88	67	24	.1	5.0	226	151	79
Apr. 11-20	900	58			23	7.3	334							76	62	20					
Apr. 21-30	405	68			17	7.2	427							90	72	38					
May 1-10	1,168	62			22	7.2	302							72	56	19					
May 11-20	871	67			23	7.4	297							76	53	16					
May 21-31	397	71			19	7.5	448							95	72	42					

[illegible]

STREAMS TRIBUTARY TO LAKE ERIE--Continued  
 CUYAHOGA RIVER AT BOTZUM, OHIO--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	72	68	48	47	37	42	57	63	73	82	83	73
2	74	65	53	44	50	--	58	61	78	80	81	77
3	74	64	55	43	48	43	56	67	82	86	81	79
4	74	68	54	40	47	43	--	63	80	78	78	81
5	71	68	54	41	46	43	60	61	76	81	78	78
6	77	64	53	43	55	44	63	62	72	82	78	74
7	78	63	52	42	40	42	64	60	74	82	78	74
8	75	60	50	44	43	42	67	57	73	82	76	74
9	73	54	48	44	42	50	57	59	79	82	81	80
10	79	59	49	44	39	48	58	66	81	81	79	79
11	70	54	48	42	47	44	58	70	80	84	78	77
12	74	61	48	41	50	47	59	68	79	83	83	81
13	70	62	47	43	51	47	58	68	73	87	80	78
14	78	64	47	42	42	48	56	67	79	87	80	75
15	75	59	46	40	33	49	56	66	80	88	79	75
16	78	57	45	45	42	53	58	64	81	86	78	77
17	74	57	46	44	40	50	56	66	80	89	76	79
18	76	59	46	34	39	52	55	68	81	83	78	80
19	75	60	48	38	42	51	62	67	72	88	79	76
20	67	60	47	46	39	50	64	68	72	87	--	76
21	73	61	43	47	36	52	62	69	--	85	82	75
22	77	58	42	46	36	54	69	68	81	85	82	69
23	75	57	44	46	39	54	69	66	84	86	81	67
24	70	56	46	45	38	55	68	70	84	79	84	69
25	73	55	46	44	43	56	70	70	84	79	86	68
26	69	54	41	41	47	56	72	74	83	77	88	68
27	73	52	43	44	47	57	73	75	85	85	88	68
28	73	48	43	48	46	49	67	70	85	83	88	73
29	70	48	43	39	45	51	66	79	84	89	88	76
30	30	48	43	49	--	56	69	68	84	85	77	77
31	70	--	46	35	--	57	--	67	--	85	--	--
Average	73	59	47	43	43	50	62	67	79	84	81	75

## PART 5. HUDSON RAY AND UPPER MISSISSIPPI RIVER BASINS

## RED RIVER OF THE NORTH BASIN

## RED RIVER OF THE NORTH AT FARGO, N. DAK.

LOCATION.--At city water plant, half a mile upstream from Sheyenne River, and 10 miles upstream from Island Park Dam in Fargo, Cass County, and 10 miles upstream from Sheyenne River.

DRAINAGE AREA.--6,800 square miles.

RECORDS AVAILABLE.--Water temperatures: October 1946 to September 1948. January 1932 to September 1946 (unpublished) in files of City of Fargo Water Works Department.

EXTREMES, 1947-48.--Water temperatures: Maximum, 82° F. July 7-12; minimum, freezing point on many days in November, December, January, February, March, and April.

EXTREMES, 1946-48.--Water temperatures: Maximum, 82° F. July 7-12, 1948; minimum, freezing point on many days in winter months.

REMARKS.--Records furnished by City of Fargo Water Works Department.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	54	50	33	33	--	33	33	33	61	68	72	75
2	52	--	33	33	33	33	33	--	--	70	73	75
3	54	50	33	33	33	33	33	59	73	75	72	77
4	54	50	33	33	33	33	--	57	73	--	73	75
5	--	48	33	33	33	33	33	59	73	77	37	--
6	55	48	33	33	33	33	33	57	--	81	72	73
7	57	46	33	33	33	33	33	57	73	82	76	72
8	55	43	33	33	33	33	33	57	73	82	--	72
9	55	--	33	33	33	33	33	--	73	82	70	70
10	57	39	33	33	33	33	33	57	75	82	70	68
11	59	39	33	--	33	33	--	57	73	--	70	68
12	56	36	33	33	33	33	37	59	70	82	72	--
13	57	36	33	33	33	33	39	61	70	81	72	68
14	57	36	33	33	33	33	41	61	72	81	72	68
15	59	36	33	33	--	33	43	61	72	81	--	68
16	59	--	33	33	33	33	45	--	72	77	73	68
17	61	36	33	33	33	33	46	61	70	75	73	70
18	59	33	33	33	33	33	33	64	68	75	75	68
19	59	33	33	33	33	33	52	64	68	75	75	--
20	59	33	33	33	33	33	52	66	--	75	75	68
21	59	33	--	33	33	33	--	66	68	75	75	66
22	59	33	33	33	33	33	54	66	68	72	--	66
23	57	33	33	33	33	33	57	68	68	72	77	64
24	54	33	33	33	33	33	57	68	68	73	77	64
25	54	33	33	--	33	33	--	68	66	--	77	64
26	--	33	33	33	33	33	59	70	66	73	77	--
27	52	33	33	33	33	33	59	70	--	73	77	63
28	52	33	--	33	33	33	59	68	72	73	75	63
29	50	33	33	33	33	33	59	68	72	75	--	63
30	50	--	33	33	--	33	59	--	72	72	75	63
31	50	33	33	33	--	33	--	68	--	72	75	--
Average	56	38	33	33	33	33	45	63	71	76	74	68

RED RIVER OF THE NORTH BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER OF THE NORTH BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium
																Parts per mil- lion	Tons per acre- foot	Tons per per day	Total	Non- carbon- ate	
SOURIS RIVER NEAR VERENDRYE																					
May 5, 1948 -----	1,780	7.3	551	17	0.03	42	21	40	240	64	64	8.0	0.2	3.1	0.11	381	0.52	191	0	31	
Aug. 24 -----	105	7.4	903	15	.06	57	23	144	422	150	150	32	.5	2.3	.23	648	.88	237	0	57	
DES LACS RIVER AT FOXHOLM																					
May 8, 1948 -----	1,99	7.5	733	20	0.08	36	19	112	312	126	126	14	0.3	3.8	0.09	522	0.71	168	0	59	
July 30 -----	31	7.4	908	25	.05	43	23	165	438	168	168	17	.5	2.6	.30	678	.92	202	0	64	
Aug. 31 -----	25	7.4	1,020	22	.06	49	24	186	480	190	190	20	.5	4.9	.23	776	1.06	221	0	65	

1/Mean daily discharge.



IOWA RIVER BASIN  
IOWA RIVER AT IOWA CITY, IOWA

LOCATION.--At gaging station at Benton Street bridge, Iowa City, Johnson County.  
DRAINAGE AREA.--3,230 square miles.  
RECORDS AVAILABLE.--Chemical analyses: September 1906 to September 1907, January to September 1944, September 1946 to September 1948.  
Water temperatures: January to September 1944, October 1946 to September 1948.

Sediment records: October 1943 to September 1947.  
EXTREMES, 1947-48.--Dissolved solids: Maximum, 436 parts per million Jan. 26-Feb. 17; minimum, 126 parts per million Feb. 19.  
Total hardness: Maximum, 340 parts per million Jan. 26-Feb. 17; minimum, 73 parts per million Mar. 16-19, 21-24.  
Water temperatures: Maximum, 88° F. Aug. 26; minimum, freezing point on many days in December, January, February, and March.  
EXTREMES, 1906-7, 1944, 1946-48.--Dissolved solids: Maximum, 436 parts per million Jan. 26-Feb. 17, 1948; minimum, 126 parts per million Feb. 19, 1948.  
Total hardness: Maximum, 340 parts per million Jan. 26-Feb. 17, 1948; minimum, 73 parts per million Mar. 16-19, 21-24, 1948.  
Water temperatures (1944, 1946-48): Maximum, 88° F. Aug. 26, 1948; minimum, freezing point on many days in winter months.  
Sediment loads, 1943-46: Maximum, 177,000 tons per day May 23, 1944; minimum, 3 tons per day Jan. 24, 1945.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1115. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	pH	Specific conductance (microhm-cm at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>	
																Parts per million	Tons per acre-foot	Total	Non-carbonate
Oct. 1-7, 1947----	254	8.2	494	11	0.10	66	25	3.0	2.8	254	48	9.0	0.3	0.5	0.09	304	0.41	267	59
Oct. 8-22 -----	236	8.4	464	6.8	.06	60	24	2.8	.0	1/232	49	9.5	.3	.5	.07	287	.39	183	58
Oct. 23-30 -----	241	8.3	488	10	0.10	62	25	2.1	1.2	2/250	49	9.0	.3	.7	.09	302	.41	197	53
Oct. 31 -----	522	7.5	465	16	.00	49	22	21		208	70	8.0	.4	2.4	--	280	.38	395	43
Nov. 1 -----	522	7.4	467	12	.00	50	22	20		199	76	10	.4	.3	--	280	.38	215	52
Nov. 2-9 -----	615	8.3	419	16	.06	54	20	2.8	.8	2/195	49	8.5	.3	6.0	.07	268	.36	445	57
Nov. 10-12 -----	528	8.4	467	18	.20	62	23	3.3	1.6	1/224	49	7.0	.6	9.0	--	306	.42	436	65
Nov. 13-19 -----	478	8.4	499	19	.12	68	25	3.9	1.6	1/255	56	8.0	.2	7.4	.00	326	.44	421	63
Nov. 20-Dec. 5 ---	488	8.1	422	20	.04	73	22	12	2.8	271	57	9.6	.3	7.2	.01	344	.47	453	51
Dec. 6-17 -----	642	8.2	469	19	.06	64	19	12	6.0	230	56	7.9	.2	12	.01	312	.42	541	49
Dec. 18-Jan. 25 ---	539	8.1	481	18	.03	63	20	8.8	3.6	224	47	11	.1	14	--	312	.42	454	55
1948-----	394	8.0	521	21	.06	78	26	13	.4	291	64	11	.2	10	.00	372	.51	396	63
Jan. 5 3/-----	350	8.0	554	20	.02	78	24	8.8	1.6	292	56	10	.2	8.0	--	366	.50	346	54
Jan. 26-Feb. 17 ---	185	8.0	634	23	.04	90	28	19	14	348	76	15	.2	7.1	.05	436	.59	218	55
Feb. 18 3/-----	1,990	8.2	290	11	.46	40	11	4.4	2.8	134	30	6.0	.5	1.0	.01	192	.26	1,030	35
Feb. 18, 20, 22-27	1,998	7.5	242	9.5	.20	32	10	4.3	3.2	90	39	9.0	.3	10	.00	186	.25	501	47
Feb. 19-----	2,190	6.6	198	7.5	.02	27	6.5	1.0		60	26	4.0	.0	12	.00	126	.17	745	45
Feb. 21-----	600	6.5	187	6.8	.06	23	6.3	1.8		56	24	3.6	.0	14	--	132	.18	214	37
Feb. 28-Mar. 4----	6,750	7.1	154	10	.30	20	6.6	6.1	2.4	57	30	5.8	.3	11	.14	170	.23	3,100	30

1/Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

2/Includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>).

3/Not included in weighted average. Cross-section sampling stations are measured, in feet, from the end of bridge on right bank.

IOWA RIVER BASIN--Continued  
IOWA RIVER AT IOWA CITY, IOWA--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent non-carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Mar. 5-15, 1948 ---	3,280	7.4	278	11	.06	35	11	9.2		111	40	4.7	0.2	16	0.02	214	0.29	1,900	133	42	13
Mar. 16-19, 21-24 -	12,200	7.3	159	8.5	.30	20	5.5	9.5		60	33	1.8	.2	8.0	.00	156	.21	5,140	73	24	22
Mar. 20 -	14,600	6.6	134	8.5	.20	25	5.5	8.1	.5	49	35	.2	.0	10	--	138	.19	5,440	85	45	1
Mar. 25-31 -	6,320	7.8	280	12	.04	38	11		.8	125	33	32	.3	13	.00	210	.29	3,580	140	38	11
Apr. 1-30 -	1,870	8.0	454	21	.02	67	17	5.4	2.4	216	46	6.0	.5	18	.00	312	.42	1,580	237	60	5
Apr. 2 (255') 3/4 -	5,070	7.2	348	18	.00	44	17	4.6		156	42	2.0	--	19	--	238	.32	3,260	180	52	5
Apr. 2 (320') 3/4 -	5,070	7.4	329	16	.00	50	13	.6		158	34	.2	.1	18	--	240	.33	3,290	178	48	1
Apr. 2 (365') 3/4 -	5,070	7.1	323	15	.10	51	14	5.0		161	34	.2	.1	19	--	236	.32	3,230	185	53	0
Apr. 2 (375') 3/4 -	5,070	7.2	345	16	.00	50	14	4.4		158	41	2.6	--	20	--	242	.33	3,310	182	52	5
Apr. 2 (440') 3/4 -	5,070	7.4	346	16	.00	42	14	8.6		158	30	3.0	--	20	--	238	.32	3,260	162	32	10
May 1-31 -	1,860	7.9	480	23	.02	67	20	10	1.2	230	51	7.0	.1	18	.23	304	.41	1,530	249	60	8
June 1-30 -	1,695	7.8	435	14	.03	54	21	10	1.6	210	50	8.0	.1	4.8	.08	252	.34	473	221	49	9
July 1-31 -	923	8.0	309	18	.04	41	13	5.5	2.0	146	34	5.0	.1	8.7	.11	184	.25	458	156	36	7
Aug. 1-31 -	284	8.1	448	11	.02	58	23	13	4.4	237	53	8.0	.2	1.8	.04	282	.38	216	239	45	10
Sept. 1-30 -	190	8.0	443	11	.02	58	20	13	3.6	230	52	8.6	.2	2.3	.15	272	.37	140	227	38	11
Weighted Average-	1,298	--	321	14	0.12	44	13	7.9	1.7	149	41	7.9	0.2	12	0.06	233	0.32	818	164	42	11

3/Not included in weighted average. Cross-section sampling stations are measured, in feet, from the end of bridge on right bank.

Temperature (° F.) of water, year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	54	33	32	32	32	43	59	69	70	75	78
2	60	54	34	32	32	32	44	58	58	70	74	74
3	59	54	34	32	32	32	44	55	72	70	73	74
4	60	53	34	32	32	32	48	57	72	72	72	74
5	64	53	34	32	32	32	50	58	74	72	71	79
6	63	50	33	32	32	32	50	58	76	74	72	77
7	65	47	34	32	32	32	49	57	69	76	71	75
8	65	43	33	32	32	32	51	57	66	76	72	75
9	64	42	33	32	32	32	50	58	69	78	72	76
10	62	40	34	32	32	32	52	55	70	78	75	76
11	62	38	33	32	32	32	54	57	73	78	76	69
12	66	35	32	32	32	32	54	54	73	82	77	79
13	62	35	33	32	32	32	49	53	75	81	78	74
14	62	35	33	32	32	33	50	55	72	78	77	74
15	63	35	33	32	32	33	54	56	70	72	81	73
16	64	35	32	32	32	33	54	60	70	75	80	77
17	64	35	32	32	32	32	54	60	69	77	79	74
18	64	35	34	32	33	33	57	63	66	78	80	75
19	65	35	33	32	32	38	58	65	68	77	81	79
20	63	37	32	32	32	42	57	67	68	78	82	78
21	63	37	32	32	32	--	57	70	68	75	82	76
22	64	37	32	32	32	41	57	69	69	76	83	72
23	63	37	32	32	32	44	57	71	71	74	82	68
24	61	36	32	32	33	--	59	68	75	74	84	68
25	61	34	33	32	33	48	65	68	75	76	87	67
26	62	34	32	32	33	48	66	68	77	74	88	67
27	61	33	32	32	34	52	65	69	75	75	84	64
28	59	32	33	32	33	48	64	70	72	77	84	64
29	57	32	32	32	--	47	62	70	71	77	84	64
30	56	32	32	32	--	45	62	72	71	76	81	64
31	54	--	32	32	--	47	--	70	--	74	78	--
Average	62	39	33	32	32	37	55	62	71	75	79	73

IOWA RIVER BASIN--Continued  
CEDAR RIVER AT CEDAR RAPIDS, IOWA

LOCATION.--At Eighth Avenue bridge in Cedar Rapids, 500 feet downstream from gaging station, and 2.6 miles upstream from Prairie Creek. DRAINAGE AREA.--6,640 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1906 to September 1907, January to September 1944, September 1946 to September 1948. Water temperatures: January to September 1944, September 1946 to September 1948.

Sediment records: October 1943 to September 1947.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 388 parts per million Jan. 17-Feb. 1; minimum, 148 parts per million Mar. 19-24.

Total hardness: Maximum, 334 parts per million Jan. 17-Feb. 1; minimum, 86 parts per million Mar. 19-24.

Water temperatures: Maximum, 85° F. July 6-7, 9-10, Aug. 24; minimum, freezing point Nov. 15, Mar. 12.

EXTREMES, 1906-7, 1944, 1946-48.--Dissolved solids: Maximum, 388 parts per million Jan. 17-Feb. 1, 1948; minimum, 121 parts per million June 14-16, 1947.

Total hardness: Maximum, 334 parts per million Jan. 17-Feb. 1, 1948; minimum, 74 parts per million June 14-16, 1947.

Water temperatures: Maximum, 87° F. Aug. 22-23, 1947; minimum, freezing point on several days in winter months of 1944, 1947, and 1948.

Sediment loads, 1943-46: Maximum, 78,700 tons per day June 17, 1944; minimum, 1.6 tons per day Jan. 21, 1944.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 115. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-19, 1947----	1,110	7.2	366	6.0	0.05	37	19	9.8	158	183	35	16	0.2	3.4	0.05	203	0.28	608	170	40	11
Oct. 20-24-----	984	8.2	397	7.0	0.05	36	21	17	183	33	33	18	2	3.1	--	229	0.31	608	176	26	17
Oct. 26 1/2-----	1,220	7.6	481	11	0.04	58	17	24	222	49	21	4	4	5.0	--	284	0.39	936	215	33	20
Oct. 27 1/2-----	1,140	7.9	481	10	0.04	65	20	10	228	48	20	2	2	2.1	--	282	0.38	868	244	57	9
Oct. 25-Nov. 2----	1,530	8.2	420	12	0.05	50	18	15	204	35	16	2	2	6.1	--	256	0.35	1,060	199	32	14
Nov. 3-7-----	1,700	8.2	452	14	0.05	56	19	16	222	39	16	2	2	9.4	--	282	0.38	1,290	218	36	14
Nov. 8-10-----	1,510	8.2	485	15	0.05	62	21	16	244	41	18	2	2	9.4	--	304	0.41	1,240	241	41	13
Nov. 11-28-----	1,390	7.9	512	14	0.00	70	20	16	0.8	250	45	20	2	9.0	0.1	316	0.43	1,190	287	82	12
Nov. 29-Dec. 3----	1,949	8.0	555	16	0.00	81	21	12	268	49	23	1	11	11	--	344	0.47	882	288	68	8
Dec. 4-16-----	1,540	7.7	470	18	0.02	72	19	14	3.2	243	49	22	1	10	0.05	336	0.46	1,400	278	79	10
Dec. 17-Jan. 9, 1948	1,060	7.8	510	16	0.02	78	21	18	0.8	268	49	20	1	12	--	356	0.48	1,020	308	88	12
Jan. 10-16-----	924	7.8	485	12	0.05	78	20	13	265	46	23	1	1	10	--	346	0.47	863	282	65	9
Jan. 17-Feb. 1-----	681	7.5	631	15	0.05	84	23	22	2.4	201	50	32	1	12	0.06	388	0.53	716	334	87	14
Feb. 2-20-----	676	8.1	597	21	0.03	70	21	22	1.2	264	39	30	1	6.6	--	334	0.45	610	261	45	15
Feb. 21-23-----	2,030	7.7	528	14	0.03	75	18	21	2.4	228	47	30	2	10	--	314	0.43	1,720	249	62	15
Feb. 24-27-----	2,130	7.4	342	11	0.04	46	11	5.1	138	32	16	2	8	8.0	--	208	0.28	1,210	165	52	6
Feb. 28-Mar. 3, 6-9	13,000	7.8	262	12	0.06	35	7.7	2.6	100	100	22	9.0	2	8.0	0.02	178	0.24	6,250	119	37	4
Mar. 4-----	29,400	7.8	204	10	0.04	27	6.2	9.8	84	84	30	5.0	4	7.4	--	156	0.21	12,400	93	26	19
Mar. 5-----	18,500	7.6	196	9.5	0.04	30	5.5	1.7	76	76	22	5.0	5	9.4	--	152	0.21	7,580	97	35	4
Mar. 10-12-----	3,350	7.8	365	15	0.02	46	13	3.5	130	26	10	2	14	14	--	246	0.34	2,630	168	45	4
Mar. 13-15-----	3,610	8.1	415	14	0.02	53	14	9.7	2.4	178	30	14	1	14	--	278	0.36	2,710	190	41	10
Mar. 16-18-----	13,300	7.8	248	8.5	0.03	32	7.5	4.8	2.8	112	19	6.0	1	8.4	--	170	0.23	6,100	111	19	8
Mar. 19-24-----	25,700	7.7	196	7.9	0.04	25	5.8	3.6	2.0	77	21	2	10	10	0.01	148	0.20	10,300	86	23	8
Mar. 25-31-----	8,190	8.1	323	15	0.01	43	11	1.8	1.6	136	30	6.0	2	13	0.09	222	0.30	4,910	153	41	2

1/ Not included in weighted average. Cross-section sampling stations are measured, in feet, from the end of bridge on right bank.

Apr. 1-8 -----	4,460	7.8	463	15	.01	64	17	5.2	.0	216	34	10	.2	12	.03	304	.41	3,660	230	53	5
Apr. 9-30 -----	3,180	8.2	435	29	.03	61	15	9.9	2.8	202	46	11	.1	6.8	.01	258	.35	2,220	214	48	9
May 1-31 -----	3,820	8.0	426	16	.02	58	15	11	2.0	198	41	9.5	.2	11	.20	250	.34	2,580	206	44	10
May 20 (500') 1/	3,800	7.4	413	14	.00	50	18		12	204	37	6.0	--	13	--	274	.37	2,810	199	32	12
May 20 (420') 1/	3,800	7.5	412	16	.00	58	17	4.8		205	36	6.4	--	13	--	280	.38	2,870	215	47	5
May 20 (300') 1/	3,800	7.4	418	14	.00	65	13	10		208	47	6.0	--	13	--	280	.38	2,870	216	45	10
May 20 (230') 1/	3,800	7.5	398	14	.00	44	17	20		202	35	6.6	--	15	--	270	.37	2,770	180	14	20
May 20 (325') 1/	3,800	7.5	403	13	.00	54	17	13		209	38	7.0	--	14	--	274	.37	2,810	205	34	12
May 20 (120') 1/	3,800	7.5	408	15	.00	58	18	2.3		202	37	6.0	--	14	--	278	.38	2,850	219	53	2
May 20 (300') 1/	3,800	7.7	417	18	.00	67	18	8.0		248	35	6.0	--	13	--	282	.38	2,890	241	38	7
June 1-30 -----	1,870	8.1	399	25	.02	46	17	11	2.4	179	38	14	.1	6.6	.04	218	.30	1,100	185	38	11
July 1-31 -----	1,480	7.9	380	16	.05	39	16	13	2.4	175	23	16	.1	1.9	.09	222	.30	837	192	48	14
Aug. 1-5 -----	834	7.9	410	13	.05	36	19	18	1.6	180	34	20	.5	.9	.00	218	.30	491	168	20	19
Aug. 6 (120') 1/	821	7.3	366	7.0	.06	41	16		7.3	164	24	16	.3	1.5	--	236	.32	523	168	34	9
Aug. 6 (230') 1/	821	7.5	364	7.2	.06	39	17		9.1	166	26	16	.5	.1	--	230	.31	510	167	31	11
Aug. 6 (300') 1/	821	7.5	367	6.6	.04	38	17	14		174	26	16	.6	.6	--	226	.31	501	165	22	15
Aug. 6 (420') 1/	821	7.5	367	4.8	.10	44	19		6.5	160	42	18	.6	.4	--	230	.31	510	188	57	7
Aug. 6 (500') 1/	821	7.4	366	7.7	.04	41	17	13		172	32	18	.4	.4	--	234	.32	519	172	31	14
Aug. 6-31 -----	769	7.6	376	5.3	.03	36	19	16	2.8	172	31	24	.4	.5	.00	268	.36	556	168	27	17
Sept. 1-30 -----	700	7.6	375	6.0	.03	37	20	15	3.2	186	27	28	.2	.5	.00	234	.32	442	175	22	15
Weighted average	2,686	--	351	14	0.03	46	13		8.7	158	32	11	0.2	8.6	--	225	0.31	1,630	169	39	9

1/ Not included in weighted average. Cross-section sampling stations are measured, in feet, from the end of bridge on right bank.

IOWA RIVER BASIN--Continued  
CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	57	54	35	35	34	35	48	58	72	74	78	75
2	57	54	35	35	34	35	46	56	74	77	78	76
3	60	54	34	34	35	35	51	58	78	78	75	77
4	63	55	33	34	35	34	52	62	74	78	74	78
5	65	53	33	35	35	34	55	63	65	81	75	78
6	68	51	34	34	34	35	58	60	64	85	74	76
7	71	48	34	35	34	35	55	61	70	85	75	78
8	68	42	34	36	34	35	53	59	68	84	72	75
9	65	40	35	35	35	34	51	55	72	85	75	72
10	68	38	35	35	35	35	55	55	72	85	79	72
11	63	37	35	34	35	34	55	54	77	84	80	73
12	62	36	34	34	34	31	53	53	75	83	83	72
13	65	36	35	34	34	37	53	55	74	81	83	75
14	66	36	35	34	34	35	55	55	74	78	81	75
15	68	31	34	34	35	36	56	60	73	75	77	75
16	68	34	35	33	35	34	58	63	72	79	81	75
17	68	39	35	33	35	35	50	67	71	80	80	76
18	68	38	35	34	36	36	60	67	70	80	81	77
19	65	40	35	34	34	39	60	68	69	80	80	76
20	64	41	35	34	35	40	60	70	67	81	80	77
21	64	43	35	33	35	44	61	72	68	82	81	74
22	65	41	35	33	35	44	59	69	72	82	81	71
23	65	38	35	33	35	45	64	71	75	79	83	68
24	62	37	35	33	36	45	66	69	77	78	85	66
25	60	32	35	33	35	51	69	71	77	74	84	66
26	60	34	35	33	37	52	67	72	78	77	83	65
27	59	34	35	33	36	50	67	74	76	80	81	65
28	58	34	33	34	35	48	65	74	75	81	83	68
29	55	34	35	34	35	48	64	69	75	80	80	66
30	55	34	35	34	35	48	61	67	75	80	82	66
31	55	--	35	34	--	48	--	70	--	79	77	--
Average	63	41	35	34	35	40	58	64	73	80	79	73

## MARIAS RIVER BASIN

## MISCELLANEOUS ANALYSES OF STREAMS IN MARIAS RIVER BASIN IN MONTANA

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
MARIAS RIVER NEAR SHELBY			
Nov. 3, 1947 -----	621	6	10
Dec. 9-----	200	19	10
Jan. 7, 1948 -----	235	35	22
Feb. 3-----	158	25	11
Mar. 2 -----	186	54	27

## YELLOWSTONE RIVER BASIN

## WIND RIVER NEAR DUBOIS, WYO.

LOCATION.--At gaging station 7 miles northwest of Dubois, Fremont County, on U. S. Highway 287, 1½ miles upstream from mouth of Warm Springs Creek, and 1 mile downstream from mouth of Bench Creek.

DRAINAGE AREA.--233 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1948.

Water temperatures: April 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 253 parts per million Sept. 1-30; minimum, 117 parts per million June 1-30.

Total hardness: Maximum, 182 parts per million Sept. 1-30; minimum, 66 parts per million May 1-June 30.

Water temperatures: Maximum, 67° F. Aug. 6, 18; minimum, freezing point on many days in November, December, January, and March.

EXTREMES, April 1947-September 1948.--Dissolved solids: Maximum, 253 parts per million Sept. 1-30, 1948; minimum, 94 parts per million July 1-Aug. 1, 1947.

Total hardness: Maximum, 182 parts per million Sept. 1-30, 1948; minimum, 58 parts per million May 5-June 30, 1947.

Water temperatures: Maximum, 67° F. Aug. 6, 18, 1948; minimum, freezing point on many days in November and December 1947, January and March 1948.

REMARKS.--No samples taken from Jan. 5 to Feb. 4 and Feb. 6 to Feb. 29, 1948. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1-31, 1947----	95	8.0	179	28	0.05	21	11	6.0		96	29	0.9	0.1	0.3	0.00	123	0.17	31	98	19
Nov. 1-30-----	79	8.0	194	23	.05	22	4.5	16	8.4	112	20	.2	.0	.1	.09	134	.18	29	73	0
Dec. 1-31-----	82	8.1	201	25	.00	23	5.3	13	4.8	118	16	.6	.0	.0	.09	150	.20	33	79	0
Jan. 1-4, 1948----	76	8.2	207	27	.00	26	5.5	13	7.2	126	10	3.3	.0	.2	--	146	.20	30	87	0
Feb. 5-----	64	7.5	207	29	.05	25	6.3	13		111	12	9.0	.1	.0	.00	141	.19	24	88	0
Mar. 1-31-----	60	8.1	210	23	.05	24	7.0	16	8.0	127	16	2.2	.0	.2	.11	150	.20	24	89	0
Mar. 4 1/2-----	60	8.0	212	30	.02	30	6.0	4.2		116	13	2.2	.0	.0	.01	131	.18	21	124	29
Apr. 5-30-----	100	8.3	358	27	.02	48	10	15	4.0	196	35	6.3	.2	.5	.08	244	.33	66	164	3
May 1-31-----	441	7.8	165	19	.02	21	3.4	10	2.0	94	7.2	1.2	.3	1.0	.00	122	.17	145	66	0
June 1-30-----	710	7.9	154	23	.05	20	3.8	7.2	2.0	88	9.6	1.5	.2	.4	.01	117	.16	224	66	0
July 1-31-----	240	8.2	262	24	.05	36	8.4	10	6.0	142	21	4.5	.3	.3	--	190	.26	123	124	8
Aug. 1-31-----	119	8.2	381	33	.02	49	11	19	3.6	201	37	6.4	.4	.3	.02	247	.34	79	168	3
Sept. 1-30-----	89	8.2	399	30	.02	53	12	18	2.0	209	40	6.7	.4	.3	.01	253	.34	61	182	11
Weighted average 2/	178	--	209	24	0.04	27	5.9	10	3.3	116	15	2.4	0.2	0.5	0.02	150	0.20	81	92	0
																				20

1/Not included in weighted average.

2/Weighted average for period sampled only.



Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	49	46	37	32		34	35	42	48	59	64	65
2	51	42	39	34		35	40	49	49	59	62	63
3	53	41	31	35		33	38	45	49	57	64	62
4	51	35	33	34		32	35	42	47	59	65	59
5	51	35	31	--		34	36	44	50	60	63	58
6	59	33	33	--		34	38	44	52	59	67	59
7	51	34	34	--		34	38	45	45	--	64	59
8	49	33	31	--		33	38	43	48	58	65	57
9	49	34	31	--		32	36	41	49	60	64	57
10	51	34	31	--		33	36	46	51	61	61	57
11	50	33	31	--		35	38	47	54	62	63	59
12	51	34	31	--		33	38	49	54	64	65	59
13	49	32	34	--		32	38	46	54	62	64	61
14	50	31	31	--		33	38	41	51	61	66	62
15	48	32	33	--		34	35	44	54	58	64	63
16												
17	49	34	31	--		33	37	41	46	59	66	61
18	47	31	34	--		36	36	44	49	60	65	59
19	48	31	35	--		34	38	44	47	59	67	61
20	49	31	31	--		34	38	42	47	58	64	61
21	47	33	31	--		35	36	40	47	60	61	59
22	47	31	32	--		35	35	--	46	62	62	63
23	46	33	33	--		35	39	--	46	62	64	61
24	47	33	34	--		34	41	41	50	61	60	64
25	49	37	34	--		35	44	40	52	62	64	58
26	46	36	31	--		34	40	45	52	61	64	59
27	49	42	34	--		34	39	44	54	64	65	61
28	46	36	31	--		--	38	43	58	62	64	59
29	49	36	34	--		34	40	44	56	60	61	59
30	47	34	31	--		35	41	46	57	62	64	58
31	49	--	31	--		34	40	44	59	63	64	60
Average	49	35	33	--		34	38	44	51	61	63	60

## YELLOWSTONE RIVER BASIN--Continued

## WIND RIVER AT RIVERTON, WYO.

LOCATION.--At gaging station at bridge on State Highway 320 three-quarters of a mile southeast of Riverton, Fremont County, three-quarters of a mile upstream from confluence with Popo Agie River.

DRAINAGE AREA.--2,320 square miles.

RECORDS AVAILABLE.--Chemical analyses: March 1947 to September 1948.

Water temperatures: March 1947 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 312 parts per million Oct. 10; minimum, 110 parts per million July 1-31.

Total hardness: Maximum, 199 parts per million Oct. 10; minimum, 69 parts per million June 1-30.

Water temperatures: Maximum, 73° F. Aug. 31; minimum, freezing point on many days in November, December, and March.

EXTREMES March 1947-September 1948.--Dissolved solids: Maximum, 358 parts per million Apr. 29-29, 1947; minimum, 106 parts per million July 1-31, 1947.

Total hardness: Maximum, 216 parts per million Mar. 31-Apr. 10, 1947; minimum, 69 parts per million June 1-30, 1948.

Water temperatures: Maximum, 73° F. Aug. 31, 1948; minimum, freezing point on many days in November and December 1947, and March 1948.

REMARKS.--No samples taken from Dec. 31, 1947 to Mar. 17, 1948. Records of discharge for water year October 1947 to September 1948 given in Water-Supply paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium	
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non-carbon- ate		
Oct. 1-8, 1947	942	8.0	340	18	0.01	44	10	20		146	61	6.6	0.2	1.5	--		242	0.33	615	151	31	22
Oct. 9-31	659	7.9	352	18	.01	53	12	19		157	80	6.4	.2	.5	0.05		274	.37	487	182	53	18
Oct. 10 1/2	380	8.1	486	20	.05	65	9.0	26		170	98	8.0	.2	1.6	--		312	.42	303	199	60	22
Nov. 1-30	570	8.2	419	22	.03	46	14	26	4.4	167	94	7.5	.2	1.6	.07		258	.35	397	172	35	24
Dec. 1-30	374	8.3	442	24	.05	50	13	22	5.2	175	74	8.5	.2	1.9	.06		278	.38	281	178	34	23
Mar. 17-29, 1948	441	8.2	435	20	.03	48	13	22	3.6	160	84	7.5	.4	1.2	.04		266	.36	317	173	42	21
Apr. 2-30	562	8.4	388	20	.03	46	12	23	3.6	154	75	7.5	.1	1.4	.10		258	.35	391	164	38	23
May 1-31	1,330	8.0	235	21	.03	32	5.8	8.7	3.2	113	28	2.5	.2	2.6	.02		154	.21	553	104	11	15
June 1-30	4,430	8.2	197	20	.04	20	4.6	7.8	2.8	91	14	2.0	.2	1.6	.07		118	.16	1,410	69	0	19
July 1-31	1,650	7.8	198	17	.05	23	5.6	10	2.4	79	30	2.5	.0	.6	.02		110	.15	490	80	15	21
Aug. 1-31	280	7.9	370	18	.02	34	7.0	30	1.2	126	70	5.4	.3	1.1	.05		231	.31	175	114	11	36
Sept. 1-30	668	7.9	340	19	.02	33	7.0	26	4.0	126	60	6.5	.3	.8	.01		216	.29	390	111	8	33
Weighted average 2/	983	--	259	20	0.04	29	6.9	13	3.1	110	37	3.7	0.2	1.4	0.05		162	0.22	501	101	11	21

1/ Not included in weighted average.

2/ Weighted average for period sampled only.

Temperature (° F ) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	55	47	34			--	--	50	62	64	64	69
2	52	46	35			--	47	--	--	60	60	60
3	60	41	32			--	--	--	58	60	63	62
4	62	43	32			--	44	59	53	65	65	60
5	58	40	32			--	45	56	60	64	64	57
6	52	38	32			--	45	62	60	64	63	64
7	57	35	32			--	44	--	56	63	63	62
8	57	38				--	--	--	60	64	61	65
9	55	37	--			--	44	64	60	65	60	68
10	54	34	31			--	44	60	60	67	61	69
11	50	34	32			--	46	59	60	67	61	61
12	58	35	32			--	46	62	65	65	64	60
13	59	34	32			--	49	68	65	65	64	67
14	57	34	32			--	50	65	60	65	62	57
15	57	33	32			--	50	62	60	64	64	58
16	51	34	--			--	55	64	60	71	65	64
17	37	32	32			32	--	66	62	62	62	64
18	53	32	32			36	48	48	56	64	66	59
19	54	33	32			41	51	60	55	64	66	60
20	59	34	32			36	52	60	55	--	67	58
21	55	32	32			32	54	60	58	65	62	56
22	45	32	32			43	53	58	55	65	62	60
23	46	32	32			42	47	60	58	68	71	59
24	47	32	32			44	52	60	60	68	68	53
25	45	32	32			40	--	62	56	70	56	55
26	47	32	32			40	58	58	68	64	52	55
27	46	34	32			42	--	58	58	65	65	56
28	48	33	32			47	62	58	64	63	61	52
29	48	32	32			40	--	60	61	60	62	52
30	48	32	32			--	58	58	63	65	60	59
31	46	--	--			--	--	60	--	70	73	--
Average	53	35	32			--	--	60	60	65	63	60

YELLOWSTONE RIVER BASIN--Continued  
BIGHORN RIVER AT THERMOPOLIS, WYO.

LOCATION.--At Broadway Street bridge at Thermopolis, Hot Springs County, half a mile upstream from gaging station, and 3½ miles below mouth of Buffalo Creek.

DRAINAGE AREA.--8,080 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1948.

Water temperatures: April 1947 to September 1948.

Sediment records: March 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 728 parts per million Aug. 1-31; minimum, 260 parts per million June 1-30.

Total hardness: Maximum, 328 parts per million Dec. 1-31; minimum, 130 parts per million June 1-30.

Water temperatures: Maximum, 72° F. July 10-11, 24; minimum, freezing point on many days in November, December, January, February, and March.

Sediment loads: Maximum, 250,000 tons per day June 23; minimum, 96 tons per day Dec. 12.

EXTREMES, April 1947-September 1948.--Dissolved solids: Maximum, 728 parts per million Aug. 1-31, 1948; minimum, 176 parts per million July 7-15, 1947.

Total hardness: Maximum, 326 parts per million Apr. 1-20, 1947; minimum, 107 parts per million July 7-15, 1947.

Water temperatures: Maximum, 72° F. July 10-11, 24, 1948; minimum, freezing point on many days in November and December 1947, January, February, and March, 1948.

Sediment loads (1946-48): Maximum, 250,000 tons per day June 23, 1948; minimum, 33 tons per day Jan. 2, 1947.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean dis- charge (second- feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Car- bo- nate (CO <sub>3</sub> )	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium
																	Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate	
Oct. 1-9, 1947-----	1,620	8.3	600	14	0.06	54	18	54	6.8	0	153	188	9.0	0.4	1.5	0.07	418	0.57	1,830	209	84	35
Oct. 10-Nov. 5-----	1,210	8.4	710	15	.02	66	25	71	6.8	7	164	246	14	.3	1.2	.05	526	.72	1,720	267	121	36
Nov. 6-30-----	1,070	8.0	759	12	.03	72	25	63	2.8	0	187	243	13	.3	1.6	.08	322	.71	1,510	282	129	32
Dec. 1-31-----	756	8.2	898	16	--	82	30	89	2.4	0	216	296	17	.4	2.2	.17	660	.90	1,350	328	151	37
Jan. 1-31, 1948-----	818	8.2	809	18	.00	76	26	79	2.8	0	199	254	16	.4	1.9	.07	591	.80	1,310	286	133	36
Feb. 1-29-----	989	8.3	780	18	.00	75	24	73	2.0	8	178	232	16	.4	2.3	.11	576	.78	1,540	286	128	35
Mar. 1-31-----	1,170	8.4	829	17	.00	77	26	82	2.4	6	176	282	15	.4	2.5	.15	624	.65	1,970	289	145	37
Apr. 1-30-----	1,210	8.3	771	15	.00	70	26	67	3.2	6	173	238	14	.4	1.3	.10	569	.77	1,860	282	130	34
May 1-31-----	2,670	8.2	497	26	.08	52	13	38	3.6	0	155	117	5.0	.3	1.6	.02	358	.49	2,350	183	56	31
June 1-30-----	5,640	8.1	354	24	.02	41	6.8	26	1.6	0	124	85	3.0	.1	1.3	.06	260	.35	3,960	130	28	30
June 24 1/2-----	5,360	7.7	632	16	.00	52	12	59		0	124	186	7.0	.2	2.6	.06	415	.96	6,010	179	77	42
July 1-31-----	2,130	8.0	455	25	.02	39	10	44	5.2	0	127	132	7.0	.3	1.4	.07	350	.48	2,010	138	34	40
Aug. 1-31-----	1,800	8.1	918	24	.04	77	22	120	11	0	188	341	18	.5	2.9	.00	728	.99	1,970	283	129	47
Sept. 1-30-----	1,020	8.2	754	19	.03	63	18	98	6.0	0	173	278	18	.4	1.8	.00	582	.79	1,600	231	89	47
Weighted average --	1,633	--	590	21	0.03	57	16	55	3.6	151	179	9.5	9.5	0.3	1.7	0.07	437	0.59	1,920	208	79	35

1/Not included in weighted average.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	57	44	34	32	32	33	38	53	61	69	67	66
2	58	45	34	32	32	34	42	50	63	68	65	65
3	55	44	32	34	33	33	45	48	61	66	64	64
4	56	41	33	33	33	33	45	52	59	67	61	64
5	58	41	33	34	33	33	45	51	58	68	67	62
6	59	32	33	34	33	33	44	52	61	68	67	61
7	55	36	33	34	33	35	43	54	63	70	67	61
8	55	35	34	35	32	34	42	56	65	69	67	60
9	53	37	33	34	32	34	45	56	65	71	67	59
10	53	34	32	33	32	33	47	53	65	72	65	60
11	53	33	33	34	32	32	45	53	65	72	65	60
12	49	33	32	33	32	32	46	53	63	70	65	61
13	59	32	32	32	32	35	45	56	65	71	65	61
14	53	33	33	33	33	35	47	58	65	69	65	62
15	53	33	33	33	33	35	48	54	65	68	66	62
16	53	32	33	32	34	34	51	56	65	66	67	61
17	53	32	33	33	35	35	54	61	66	66	68	60
18	50	32	33	33	35	34	55	61	63	66	68	61
19	53	33	33	32	34	35	48	62	62	68	68	62
20	53	34	33	33	34	35	50	62	61	69	66	60
21	53	33	33	33	33	34	52	62	62	68	68	60
22	47	31	33	34	34	35	53	61	61	68	66	59
23	42	32	33	34	34	36	55	62	56	69	65	59
24	42	33	33	33	34	35	52	53	60	72	65	58
25	42	33	34	33	34	35	53	60	61	70	63	56
26	43	34	33	32	34	34	43	61	62	68	62	55
27	41	33	33	32	34	35	52	62	63	68	64	58
28	44	33	33	32	33	36	54	60	64	69	64	56
29	46	33	34	32	33	37	58	58	66	64	65	56
30	43	33	33	32	33	37	54	54	62	62	66	57
31	45	--	32	33	--	35	--	53	--	61	66	--
Average	51	35	33	33	33	34	48	56	63	68	66	60

## MISSOURI RIVER BASIN

## YELLOWSTONE RIVER BASIN--Continued

## BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,520	1,650	6,780	1,200	608	1,970	1,010	550	1,490
2-----	1,970	3,810	20,300	1,160	542	1,700	1,110	1,300	3,900
3-----	2,120	3,030	17,500	1,170	558	1,760	1,010	2,260	6,160
4-----	1,570	1,800	7,650	1,160	550	1,720	964	850	2,220
5-----	1,520	1,360	5,580	1,190	624	2,000	894	1,850	4,460
6-----	1,540	1,150	4,800	1,130	485	1,480	880	410	975
7-----	1,490	945	3,800	1,130	640	1,950	915	530	1,310
8-----	1,410	833	3,190	1,010	595	1,620	915	790	1,950
9-----	1,340	756	2,740	1,040	706	1,990	768	400	830
10-----	1,260	650	2,200	1,180	945	3,010	699	150	282
11-----	1,040	814	2,280	1,100	385	1,140	622	140	236
12-----	1,130	2,290	7,000	1,030	330	916	593	60	96
13-----	1,230	1,020	3,400	1,100	950	2,820	610	90	148
14-----	1,190	725	2,320	1,040	840	2,360	610	180	296
15-----	1,180	642	2,040	1,180	810	2,580	660	150	268
16-----	1,190	594	1,900	1,060	1,820	5,200	653	120	212
17-----	1,200	573	1,860	1,100	1,000	2,970	699	120	226
18-----	1,150	532	1,650	1,110	850	2,550	733	710	1,410
19-----	1,140	468	1,440	1,180	850	2,720	726	490	962
20-----	1,140	592	1,820	1,170	520	1,640	726	300	590
21-----	1,120	558	1,690	1,110	700	2,100	713	345	663
22-----	1,150	720	2,240	1,040	285	800	653	255	449
23-----	1,360	886	3,260	831	200	450	679	105	192
24-----	1,410	1,230	4,690	686	150	278	672	80	145
25-----	1,350	845	3,080	908	420	1,030	641	85	147
26-----	1,300	651	2,290	1,120	775	2,340	679	95	174
27-----	1,260	636	2,160	1,280	850	2,940	726	460	904
28-----	1,280	698	2,420	1,210	1,220	4,000	733	860	1,700
29-----	1,290	716	2,500	1,080	1,060	3,090	699	195	368
30-----	1,270	669	2,290	985	730	1,940	713	220	424
31-----	1,230	612	2,020	--	--	--	733	300	594
Total -	41,350	--	128,900	32,690	--	63,060	23,438	--	32,880
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	535	180	261	768	1,060	2,200	1,090	355	1,040
2-----	498	290	390	852	1,700	3,910	999	380	1,020
3-----	530	430	615	845	1,950	4,430	929	305	764
4-----	660	350	625	852	1,250	2,880	873	162	382
5-----	782	940	1,990	810	1,700	3,720	831	135	302
6-----	901	3,300	8,040	761	300	616	775	108	226
7-----	1,040	3,700	10,400	761	480	987	782	118	251
8-----	1,020	2,100	5,780	740	150	300	838	185	418
9-----	1,050	650	1,840	754	135	274	866	146	342
10-----	1,050	3,300	9,360	780	100	210	713	100	193
11-----	915	2,700	6,680	730	180	356	653	75	132
12-----	845	2,100	4,800	700	145	274	653	128	226
13-----	824	1,600	3,560	710	75	144	706	205	392
14-----	747	1,380	2,780	725	100	196	838	448	1,000
15-----	726	510	1,000	740	155	310	950	620	1,590
16-----	796	650	1,390	775	160	336	1,380	1,990	7,430
17-----	859	930	2,150	1,060	1,760	1/6,800	1,450	1,820	7,130
18-----	775	960	2,010	1,160	2,280	1/7,290	1,380	1,370	5,110
19-----	810	1,400	3,060	1,560	4,080	1/17,300	1,450	1,620	6,350
20-----	782	550	1,160	1,590	2,500	10,700	1,440	2,150	8,360
21-----	789	150	319	1,460	1,220	4,800	1,240	1,300	4,350
22-----	894	300	725	1,500	1,040	4,210	1,240	1,600	5,350
23-----	929	800	2,000	1,220	623	1/2,110	1,300	2,520	8,840
24-----	1,010	3,350	9,140	1,230	406	1,350	1,570	3,900	16,500
25-----	985	3,650	9,720	1,140	425	1,310	2,070	7,150	40,000
26-----	957	2,150	5,560	1,120	510	1,540	1,860	6,200	31,200
27-----	845	1,100	2,510	1,140	585	1,800	1,560	4,010	16,900
28-----	726	580	1,140	1,140	421	1,300	1,600	3,290	14,200
29-----	672	200	362	1,070	378	1,090	1,550	3,500	14,600
30-----	699	260	490	--	--	--	1,380	3,060	11,400
31-----	699	2,050	3,860	--	--	--	1,260	1,850	6,300
Total -	25,351	--	103,700	28,693	--	82,740	36,226	--	212,300

1/Sediment discharge computed by subdividing day.

## YELLOWSTONE RIVER BASIN--Continued

## BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,280	1,750	6,050	1,480	2,460	9,830	6,210	3,900	65,500
2-----	1,180	1,700	5,420	1,580	2,220	9,460	6,990	4,270	80,700
3-----	1,100	1,700	5,050	1,340	1,410	5,100	6,920	3,560	66,600
4-----	1,160	2,200	6,900	1,080	1,090	3,180	8,030	3,890	84,400
5-----	1,320	2,950	10,500	880	864	2,050	6,830	3,440	1/64,000
6-----	1,410	2,800	10,600	831	615	1,380	6,040	2,880	47,000
7-----	1,230	2,250	7,460	775	964	2,030	5,990	2,850	46,000
8-----	1,110	1,873	5,610	699	964	1,830	6,170	3,220	53,700
9-----	1,090	1,700	5,010	796	1,070	2,300	6,590	3,100	55,300
10-----	1,040	1,480	4,150	1,060	1,500	4,300	6,900	2,880	53,700
11-----	1,060	1,580	4,530	866	952	2,220	7,110	2,590	49,700
12-----	1,180	1,600	5,100	761	866	1,780	7,100	2,690	51,600
13-----	1,120	1,300	3,940	647	757	1,320	6,930	3,070	57,400
14-----	1,020	1,100	3,030	593	690	1,100	6,380	2,820	48,600
15-----	978	1,090	2,880	587	800	1,270	5,510	2,190	32,600
16-----	999	1,120	3,020	616	725	1,200	4,800	1,820	23,600
17-----	1,120	1,300	3,940	726	682	1,340	4,520	1,620	19,700
18-----	1,380	1,680	6,260	1,190	1,840	5,910	4,520	1,850	22,600
19-----	1,630	2,110	9,270	2,090	4,540	25,600	3,940	1,520	16,100
20-----	1,710	2,450	11,300	2,790	5,830	1/44,700	3,870	1,480	15,500
21-----	1,470	1,710	6,800	4,370	7,200	1/85,200	3,770	2,740	28,000
22-----	1,260	1,450	4,940	5,090	6,710	1/92,000	4,370	7,000	1/91,200
23-----	1,220	1,460	4,830	5,500	5,360	79,600	5,860	15,800	250,000
24-----	1,390	1,780	6,670	4,880	4,280	56,500	5,360	6,960	101,000
25-----	1,450	1,870	7,330	4,770	3,570	46,000	5,390	5,340	77,600
26-----	1,340	1,310	4,740	5,040	3,750	51,000	5,090	3,700	50,900
27-----	1,180	1,220	3,880	5,480	3,860	57,100	4,870	2,890	38,000
28-----	964	960	2,500	5,720	3,520	54,400	4,680	1,980	25,000
29-----	971	1,170	3,080	6,170	4,190	1/69,800	4,260	1,670	19,200
30-----	1,060	1,470	4,200	7,640	9,000	186,000	4,240	1,450	16,600
31-----	--	--	--	6,810	5,250	1/97,500	--	--	--
Total--	36,422	--	169,000	82,857	--	1,003,000	169,240	--	1,652,000
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4,300	1,450	16,800	805	1,980	4,300	740	1,910	3,820
2-----	4,320	1,560	18,200	760	2,300	4,720	796	1,900	4,100
3-----	4,520	1,560	19,000	710	2,900	5,560	866	1,880	4,400
4-----	4,580	1,570	19,400	666	3,440	6,200	901	1,890	4,600
5-----	4,370	1,660	19,600	922	4,100	10,200	908	1,770	4,340
6-----	4,000	1,430	15,400	1,280	8,810	1/37,800	922	1,490	3,700
7-----	3,340	1,400	12,600	1,280	17,400	60,100	957	1,500	3,880
8-----	2,950	1,420	11,300	1,140	5,300	16,300	1,010	1,740	4,750
9-----	2,610	1,830	12,900	1,090	3,000	8,850	1,010	1,710	4,670
10-----	2,210	2,000	11,900	1,140	2,500	7,700	789	1,200	2,560
11-----	1,830	2,140	10,600	1,050	2,000	5,670	929	1,550	3,880
12-----	1,640	2,360	10,400	838	1,600	3,620	873	1,270	3,000
13-----	1,540	2,440	10,100	733	1,650	3,260	866	1,120	2,620
14-----	2,260	12,100	1/98,400	699	1,800	3,400	866	1,070	2,500
15-----	1,980	25,600	1/152,000	692	1,800	3,360	887	1,150	2,760
16-----	1,790	5,400	26,100	720	2,040	3,960	880	1,250	2,970
17-----	1,550	2,900	12,100	720	2,130	4,150	880	1,060	2,520
18-----	1,530	2,300	9,510	647	2,100	3,670	824	900	2,000
19-----	1,480	2,590	10,400	622	2,220	3,730	906	5,680	1/14,000
20-----	1,460	2,480	9,780	647	2,210	3,860	2,060	30,800	1/188,000
21-----	1,330	2,400	8,630	706	1,870	3,570	1,680	17,600	1/84,300
22-----	1,220	1,800	5,950	740	1,600	3,200	1,260	6,900	23,400
23-----	1,160	1,690	5,300	706	1,400	2,670	1,200	3,460	11,200
24-----	1,100	1,550	4,610	706	1,390	2,650	1,170	2,260	7,150
25-----	1,090	1,700	5,000	653	1,220	2,150	1,160	2,000	6,270
26-----	1,090	1,750	5,150	629	1,250	2,120	1,160	1,910	5,980
27-----	1,080	1,880	5,780	653	1,400	2,470	1,210	1,840	6,010
28-----	1,000	2,050	5,540	686	1,870	3,460	1,190	1,660	5,340
29-----	950	1,950	5,000	679	1,870	3,420	992	1,320	3,540
30-----	900	1,800	4,610	713	1,820	3,240	616	1,260	2,100
31-----	850	2,000	4,600	726	1,650	3,240	--	--	--
Total--	66,030	--	566,700	24,758	--	232,900	30,508	--	420,400

Total discharge for year (second-foot-days) ----- 597,563

Total load for year (tons) ----- 4,668,000

1/Sediment discharge computed by subdividing day.

## YELLOWSTONE RIVER BASIN--Continued

## BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 4, 1947-----		--	--	3,090		37	41	--	--	--	93	96	99	100	--	BN
Mar. 18, 1948-----	1:21 p.m.	1,420	1,380	--	--	--	--	--	--	--	72	80	89	99	100	B
Mar. 26-----	1:30 p.m.	1,740	5,690	--	--	4	6	--	--	--	86	90	94	98	100	BN
Mar. 26-----	4:49 p.m.	1,740	5,690	--	--	61	74	82	86	90	94	98	100	--	--	BW
Mar. 29-----	3:44 p.m.	1,460	3,770	5,460	7	13	13	--	87	89	91	96	99	100	BN	
May 17-----	3:30 p.m.	713	663	1,860	8	29	29	64	72	82	86	92	94	96	--	BN
May 21-----	3:43 p.m.	4,800	5,990	6,000	9	17	17	27	40	61	78	96	99	100	BN	
May 31-----	10:57 a.m.	7,060	3,830	5,150	16	24	24	32	40	54	71	99	100	--	BN	
June 19-----	10:50 a.m.	5,550	1,900	6,250	9	17	17	24	32	47	66	93	99	100	BN	
Aug. 9-----	3:05 p.m.	1,100	2,860	3,180	7	18	--	--	--	98	99	100	BN	BN	BN	
Aug. 9-----	3:05 p.m.	1,100	2,860	3,270	58	71	85	88	96	96	98	100	--	--	BW	
Aug. 16-----		713	2,130	2,720		4	10	--	--	--	--	98	99	100	BN	
Aug. 16-----	4:18 p.m.	713	2,130	2,870	62	73	88	94	98	98	99	99	99	100	BW	
Aug. 23-----	12:38 p.m.	699	1,430	1,610	14	42	--	--	98	99	100	--	--	--	BN	
Aug. 23-----	12:38 p.m.	699	1,430	1,640	58	74	92	98	100	--	--	--	--	--	BW	
Sept. 24-----	10:08 a.m.	1,160	2,270	3,710	6	24	--	70	85	94	100	--	--	--	BN	
Sept. 24-----	10:08 a.m.	1,160	2,270	3,150	30	42	55	68	85	96	100	--	--	--	BW	





## YELLOWSTONE RIVER BASIN--Continued

## BIGHORN RIVER AT MANDERSON, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,310	2,380	8,420	1,390	880	3,300	1,240	7,600	25,400
2-----	1,450	2,150	8,420	1,350	870	3,170	1,320	7,800	27,800
3-----	2,320	4,150	28,000	1,400	940	3,560	1,370	4,600	17,000
4-----	2,180	2,800	16,500	1,360	1,400	5,140	1,230	5,680	18,900
5-----	1,690	1,700	7,760	1,340	1,250	4,560	1,180	3,200	10,200
6-----	1,610	1,280	5,560	1,340	1,050	3,800	1,100	3,960	11,800
7-----	1,570	1,330	5,650	1,300	950	3,330	1,150	3,960	12,300
8-----	1,500	1,140	4,620	1,330	1,200	4,310	1,170	3,360	10,600
9-----	1,360	1,150	4,220	1,250	1,000	3,380	1,160	2,720	8,540
10-----	1,280	1,040	3,590	1,270	2,200	7,550	1,060	2,400	6,860
11-----	1,500	2,750	1/16,700	1,360	4,100	15,100	930	655	1,650
12-----	1,890	24,600	1/141,000	1,210	3,200	10,500	827	385	860
13-----	1,230	5,220	17,300	1,180	4,000	12,700	778	190	400
14-----	1,330	2,100	7,550	1,210	3,760	12,300	800	265	572
15-----	1,220	1,260	4,150	1,190	4,060	13,000	800	125	270
16-----	1,210	1,220	3,990	1,260	4,520	15,400	860	180	418
17-----	1,230	950	3,160	1,160	3,560	11,100	840	1,470	3,340
18-----	1,180	910	2,900	1,200	4,900	15,900	900	580	1,410
19-----	1,140	900	2,770	1,260	5,940	20,200	940	2,400	6,100
20-----	1,170	880	2,780	1,390	5,340	20,000	920	4,550	11,300
21-----	1,340	1,270	4,600	1,310	3,600	12,700	920	--	2/3,000
22-----	1,410	1,140	4,340	1,260	1,160	3,950	920	--	2/1,000
23-----	1,630	4,820	21,200	1,220	2,800	9,240	840	--	2/2,000
24-----	1,720	5,180	24,100	922	1,800	4,480	880	2,050	4,860
25-----	1,650	2,660	11,900	827	2,560	5,720	860	500	1,160
26-----	1,590	1,700	7,300	1,100	4,220	12,500	840	210	476
27-----	1,490	1,200	4,800	1,320	4,800	17,100	880	740	1,760
28-----	1,450	1,050	4,110	1,550	4,840	20,200	940	1,480	3,760
29-----	1,460	1,130	4,450	1,420	5,440	20,900	960	1,480	3,840
30-----	1,450	1,100	4,310	1,320	3,400	12,100	900	2,480	6,040
31-----	1,460	1,000	3,940	--	--	--	920	980	2,440
Total -	46,010	--	388,100	37,999	--	307,200	30,435	--	206,100
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	940	1,200	3,040	620	--	--	1,100	900	2,670
2-----	680	850	1,560	670	--	--	1,120	1,020	3,080
3-----	640	600	1,040	700	--	--	1,000	580	1,570
4-----	700	1,950	3,680	680	--	--	900	330	801
5-----	850	2,650	6,090	690	--	--	840	220	500
6-----	1,000	1,450	3,920	660	--	--	760	150	308
7-----	1,100	1,000	2,870	620	--	--	760	200	410
8-----	1,150	2,250	6,990	620	--	--	800	300	648
9-----	1,100	1,600	4,750	600	--	--	840	190	431
10-----	1,130	820	2,500	600	--	--	880	200	475
11-----	1,120	1,760	5,320	620	--	--	700	160	302
12-----	1,030	1,100	3,060	570	--	--	660	200	356
13-----	940	720	1,630	555	166	249	720	180	350
14-----	880	2,300	5,460	600	--	--	800	620	1,340
15-----	800	1,000	2,160	600	--	--	1,000	3,280	8,860
16-----	780	405	854	750	--	--	1,300	4,600	16,100
17-----	860	460	1,070	1,000	--	--	2,000	4,600	24,800
18-----	900	700	1,700	2,500	--	--	2,500	9,710	65,500
19-----	840	--	--	6,000	2,020	32,800	2,360	10,100	64,400
20-----	870	--	--	3,000	1,100	8,910	2,450	11,300	74,700
21-----	840	--	--	1,700	505	2,320	1,740	6,600	31,000
22-----	860	--	--	1,600	510	2,200	1,460	3,400	13,400
23-----	970	--	--	1,650	550	2,450	1,800	4,700	1/27,300
24-----	1,000	--	--	1,300	475	1,670	2,780	14,400	108,000
25-----	1,030	--	--	1,350	500	1,820	3,040	13,700	112,000
26-----	980	--	--	1,200	590	2,240	2,970	10,600	85,000
27-----	940	--	--	1,150	1,720	5,340	2,200	7,450	44,300
28-----	780	--	--	1,200	1,670	5,400	1,730	5,250	24,500
29-----	640	--	--	1,150	980	3,040	1,810	4,700	23,000
30-----	620	72	121	--	--	--	1,800	5,300	25,800
31-----	640	--	--	--	--	--	1,600	5,100	22,000
Total -	27,610	--	3/71,000	35,015	--	3/111,000	46,420	--	783,900

1/Sediment discharge computed by subdividing day.

3/Includes estimated load for missing days.

2/Estimated.

YELLOWSTONE RIVER BASIN--Continued  
 BIGHORN RIVER AT MANDERSON, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,450	3,560	13,900	1,300	3,200	11,200	6,130	6,350	105,000
2-----	1,330	2,600	9,350	1,500	4,600	18,600	6,370	5,580	96,000
3-----	1,560	3,200	13,500	1,350	3,420	12,500	7,090	5,200	99,500
4-----	1,820	8,220	40,400	1,150	2,450	7,610	7,280	4,720	92,800
5-----	1,660	8,250	37,000	938	1,670	4,230	7,910	4,700	100,000
6-----	1,630	4,350	19,200	732	1,350	2,660	5,870	4,800	76,000
7-----	1,640	3,980	17,600	595	1,100	1,770	5,530	8,570	128,000
8-----	1,450	3,550	13,900	510	1,080	1,490	5,570	5,720	86,000
9-----	1,500	3,180	12,900	464	1,000	1,250	5,810	4,500	70,600
10-----	1,420	2,800	10,700	468	1,080	1,360	7,190	9,650	187,000
11-----	1,420	3,350	12,800	615	1,650	2,740	6,570	6,400	114,000
12-----	1,370	3,300	12,000	515	940	1,310	6,800	4,000	73,500
13-----	1,370	2,700	9,990	448	660	798	6,500	3,870	67,900
14-----	1,220	2,200	7,250	352	491	467	6,350	5,210	89,300
15-----	1,190	2,550	8,190	248	483	322	5,830	3,980	62,600
16-----	1,270	3,800	13,000	222	400	240	3,930	4,530	49,100
17-----	1,370	3,880	14,400	208	350	196	3,200	3,540	30,600
18-----	1,548	4,180	17,400	230	420	261	3,270	6,940	61,300
19-----	3,450	32,000	1342,000	368	1,450	1,440	3,220	4,950	43,000
20-----	2,850	27,200	209,000	1,460	5,700	22,500	3,000	4,140	33,500
21-----	1,890	9,080	46,300	3,120	10,400	87,600	2,980	5,760	46,300
22-----	1,590	4,680	20,100	4,700	12,500	159,000	4,470	18,200	1256,000
23-----	1,470	3,200	12,700	5,170	10,300	144,000	7,460	30,900	622,000
24-----	1,350	2,850	10,400	5,210	8,400	118,000	7,330	23,100	457,000
25-----	1,450	3,500	13,700	4,570	5,650	69,700	7,090	14,400	275,000
26-----	1,350	3,100	11,300	4,060	5,800	73,000	6,130	10,000	166,000
27-----	1,270	2,750	9,430	5,110	5,740	79,200	6,050	8,840	144,000
28-----	1,210	2,480	8,100	5,670	6,320	96,800	5,270	6,420	91,400
29-----	1,100	1,980	5,880	6,730	16,000	290,000	4,650	5,160	64,800
30-----	1,190	2,400	7,710	7,590	15,400	316,000	4,170	3,840	43,200
31-----	--	--	--	7,590	9,750	200,000	--	--	--
Total -	46,380	--	980,300	73,793	--	1,726,000	169,020	--	3,831,000
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3,980	3,400	36,500	254	773	530	233	378	238
2-----	3,610	3,120	30,400	235	1,060	675	254	420	288
3-----	3,930	3,940	41,800	460	19,000	1/29,900	305	578	476
4-----	4,030	3,230	35,100	368	21,100	21,000	404	1,900	2,070
5-----	3,770	3,120	31,800	340	5,400	4,960	505	3,450	4,700
6-----	3,380	2,440	22,300	360	33,000	1/86,200	575	3,050	4,730
7-----	2,900	2,350	18,400	738	18,000	35,900	590	2,780	4,430
8-----	2,360	2,120	13,500	834	9,000	20,300	630	2,900	4,930
9-----	2,040	1,790	9,860	876	13,000	30,700	702	4,400	8,340
10-----	1,760	1,840	8,740	702	10,000	19,000	744	4,750	9,540
11-----	1,410	1,700	6,470	660	4,430	7,890	620	2,840	4,750
12-----	1,160	1,630	5,110	615	3,280	5,450	620	2,500	4,180
13-----	1,050	1,780	5,050	432	2,800	2,680	684	3,570	6,590
14-----	954	1,630	4,200	348	1,300	1,220	642	2,210	3,830
15-----	1,700	10,500	48,200	278	940	706	615	2,760	4,580
16-----	1,240	23,700	79,300	260	755	530	630	2,120	3,610
17-----	1,210	11,200	36,600	230	650	404	672	2,020	3,660
18-----	1,190	5,390	17,300	236	600	382	672	2,440	4,430
19-----	1,050	5,800	16,400	225	540	328	672	2,440	4,430
20-----	1,030	4,200	11,700	195	440	232	2,670	54,000	404,000
21-----	1,030	10,100	28,100	198	380	203	2,210	36,000	223,000
22-----	820	4,280	9,480	200	380	205	1,600	26,000	112,000
23-----	684	3,420	6,320	230	380	236	1,250	11,000	37,100
24-----	720	2,670	5,190	205	390	216	1,130	11,000	33,600
25-----	708	9,320	17,800	200	230	124	1,050	8,000	22,700
26-----	585	8,050	12,700	222	240	144	1,070	6,700	19,400
27-----	525	2,730	3,870	180	130	63	1,030	6,550	18,200
28-----	505	1,960	2,670	182	129	63	1,050	8,470	24,300
29-----	440	2,170	2,580	198	160	86	986	8,200	21,800
30-----	348	1,460	1,370	228	380	234	869	7,300	17,100
31-----	266	975	700	225	325	197	--	--	--
Total -	50,385	--	569,500	11,215	--	270,700	25,684	--	1,013,000
Total discharge for year (second-foot-days)									589,886
Total load for year (tons)									10,260,000

1/Sediment discharge computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued  
BIGHORN RIVER AT MANDESON, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment												Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Oct. 9, 1947-----	12:47 p.m.	1,340	912	--	11	14	54	68	72	77	88	95	97		BN
Mar. 17, 1948-----	3:37 p.m.	2,000	4,750	5,000	4	14	--	94	98	99	100	--	--		BN
Mar. 17-----	3:37 p.m.	2,000	4,350	2,860	34	56	74	90	97	99	100	--	--		BW
Apr. 8-----	3:40 p.m.	1,300	2,980	2,440	7	27	56	60	73	84	94	97	99		BN
Apr. 20-----	2:50 p.m.	2,790	28,000	5,290	5	12	68	70	80	87	96	99	--		BN
May 13-----	11:55 a.m.	452	707	488	--	--	--	73	81	88	94	96	98		BN
May 17-----	3:15 p.m.	212	344	385	17	51	85	88	92	94	97	99	100		BN
May 21-----	10:20 a.m.	2,850	9,270	6,470	6	17	28	46	72	88	100	--	--		BN
May 30-----	11:00 a.m.	6,970	14,300	5,280	10	35	47	55	71	84	99	100	--		BN
June 15-----	3:00 p.m.	4,470	3,040	5,160	8	19	24	31	42	59	87	97	99		BN
June 18-----	11:40 a.m.	3,340	8,340	8,040	5	13	70	80	84	90	97	99	100		BN
June 18-----	11:40 a.m.	3,340	8,340	8,020	49	61	72	79	84	90	98	99	100		BW
June 22-----	3:410	3,410	24,800	6,380	5	11	68	74	82	87	98	100	--		BN
June 22-----	3:37 p.m.	3,410	24,800	6,330	37	47	60	72	78	83	93	98	100		BW
July 22-----	3:00 p.m.	810	3,370	4,090	7	11	76	76	79	84	98	100	--		BN
July 22-----	3:00 p.m.	810	3,370	4,370	53	65	72	77	82	84	100	--	--		BW
Aug. 2-----	4:58 p.m.	230	1,210	2,420	5	14	73	99	99	99	99	99	100		BN
Aug. 3-----	2:00 p.m.	1,100	32,000	6,790	6	12	81	90	91	92	98	99	100		BN
Aug. 3-----	2:00 p.m.	1,100	32,000	6,710	48	65	80	91	94	95	99	100	--		BW
Aug. 16-----	10:35 a.m.	234	673	764	29	71	84	87	88	94	99	100	--		BN
Aug. 16-----	10:35 a.m.	234	673	730	68	80	88	92	95	96	98	99	100		BW
Aug. 25-----	12:01 p.m.	202	201	578	44	64	86	92	94	100	--	--	--		BN
Aug. 25-----	12:01 p.m.	202	201	276	56	60	75	87	93	96	99	100	--		BW
Sept. 14-----	4:22 p.m.	636	1,320	1,830	10	38	--	58	71	80	96	99	100		BN
Sept. 14-----	4:22 p.m.	636	1,320	2,060	33	43	52	59	70	78	93	98	99		BW
Sept. 23-----	2:45 p.m.	1,210	8,130	13,400	--	21	63	86	91	92	100	--	--		BN
Sept. 23-----	2:45 p.m.	1,210	8,130	12,100	43	58	68	78	88	93	98	100	--		BW

## YELLOWSTONE RIVER BASIN--Continued

## BIGHORN RIVER AT KANE, WYO.

LOCATION.--At gaging station at bridge on State Highway 14, half a mile upstream from Shoshone River, and half a mile east of Kane, Big Horn County.  
 DRAINAGE AREA.--15,900 square miles.  
 RECORDS AVAILABLE.--Sediment records: March 1946 to September 1948.  
 EXTREMES, 1947-48.--Sediment loads: Maximum, 470,000 tons per day June 24; minimum, 146 tons per day Dec. 26, Jan. 28.  
 EXTREMES, 1946-48.--Sediment loads: Maximum, 972,000 tons per day June 25, 1946; minimum, 146 tons per day Dec. 26, 1947, Jan. 28, 1948.  
 REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1, 1948-----	9,920	7.8	426	13	0.02	47	13	34		113	140	4.0	0.3	1.0	302	0.41	--	171	78	30
June 25-----	8,830	7.7	729	18	.00	61	16	72		162	220	7.4	.4	1.6	496	.67	--	218	85	42
Aug. 17-----	868	7.6	1,350	16	.00	125	34	129		245	474	24	.6	3.0	928	1.26	--	452	251	38

YELLOWSTONE RIVER BASIN--Continued  
BIGHORN RIVER AT KANE, WYO.--Continued  
Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,030	1,100	6,030	2,060	674	3,750	1,830	760	3,760
2-----	2,210	1,630	9,730	1,990	900	4,840	1,730	1,300	6,070
3-----	2,470	2,820	18,800	1,960	850	4,500	1,780	2,100	10,100
4-----	2,970	3,800	30,500	1,940	800	4,190	1,530	2,230	9,210
5-----	2,490	2,140	14,400	1,920	990	5,130	1,350	2,900	10,600
6-----	2,210	2,060	12,300	1,920	--	1/4,300	1,300	1,550	5,440
7-----	2,200	1,760	10,500	1,920	750	3,890	1,320	960	3,420
8-----	2,160	1,210	7,060	1,910	--	1/3,700	1,350	250	911
9-----	2,080	1,260	7,080	1,920	--	1/3,500	1,340	--	2,500
10-----	2,020	932	5,080	1,940	--	1/7,600	1,300	2,100	7,370
11-----	2,080	1,190	6,680	1,930	2,050	10,700	1,200	760	2,460
12-----	2,850	7,930	2/64,500	1,960	700	3,700	1,050	100	284
13-----	2,090	10,900	61,500	1,860	--	1/1,100	960	120	311
14-----	1,940	4,960	26,000	1,780	220	1,060	880	--	1/249
15-----	2,040	2,210	12,200	1,690	500	2,280	900	80	194
16-----	1,980	1,310	7,000	1,710	340	1,570	920	240	596
17-----	2,020	1,180	6,440	1,800	--	1/4,000	980	445	1,180
18-----	2,040	975	5,370	1,680	--	1/7,980	960	445	1,150
19-----	1,990	975	5,240	1,730	3,850	18,000	1,020	--	1/800
20-----	1,940	97	5,110	1,910	4,800	24,800	1,070	--	1/550
21-----	1,940	1,290	6,760	1,980	3,450	18,400	1,060	--	1/401
22-----	1,980	1,170	6,250	1,690	3,470	15,800	1,050	100	284
23-----	2,230	1,100	6,620	1,590	4,180	17,900	1,050	210	595
24-----	2,400	2,020	13,100	1,500	8,160	33,000	960	143	371
25-----	2,370	3,180	20,400	1,440	4,500	17,500	1,000	--	1/200
26-----	2,290	2,140	13,200	1,490	6,800	27,400	980	55	146
27-----	2,180	1,690	9,940	1,730	--	1/16,000	960	347	899
28-----	2,110	1,480	8,430	2,000	2,000	10,800	1,000	--	1/400
29-----	2,080	1,080	6,070	--	--	1/6,990	1,070	60	173
30-----	2,150	1,140	6,620	1,840	1,000	4,970	1,070	60	173
31-----	2,160	789	4,600	--	--	--	1,030	165	459
Total -	67,700		423,500	54,680		289,400	36,010		71,260
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,040	--	1/500	800			2,800	--	--
2-----	1,060	--	1/301	850			2,500	--	--
3-----	780	--	1/150	900			2,450	1,200	7,940
4-----	740	100	200	880			2,400	725	4,700
5-----	800	130	281	900			2,350	1,590	10,100
6-----	940	230	584	860			2,300	2,160	13,400
7-----	1,100	1,090	3,240	820			2,300	3,350	20,800
8-----	1,250	2,270	7,660	820			2,350	1,020	6,470
9-----	1,300	1,050	3,690	800			2,400	490	3,180
10-----	1,250	1,180	3,980	800			2,500	280	1,890
11-----	1,260	800	2,720	820			2,200	2,150	12,800
12-----	1,270	380	1,300	760			2,000	--	1/5,000
13-----	1,160	640	2,000	720			2,200	--	1/9,030
14-----	1,100	900	2,670	800			2,400	2,250	14,600
15-----	1,040	750	2,100	950			2,700	2,040	14,900
16-----	1,000	380	1,030	1,150			3,000	3,220	26,100
17-----	960	410	1,060	1,500			3,400	4,350	39,900
18-----	1,000	260	702	2,000			3,700	4,200	42,000
19-----	1,100	120	356	3,500			3,600	6,400	62,200
20-----	1,050	180	510	5,000			3,700	7,850	78,400
21-----	1,100	520	1,540	7,000			2,600	7,940	55,700
22-----	1,170	600	1,900	3,500			2,300	7,000	43,500
23-----	1,180	--	1/1,660	3,300			3,000	7,560	61,200
24-----	1,200	450	1,460	3,100			4,210	13,500	153,000
25-----	1,150	420	1,300	2,900			4,620	15,600	195,000
26-----	1,050	640	1,810	2,800			4,120	12,700	141,000
27-----	950	310	795	2,700			3,160	9,400	80,200
28-----	900	60	146	2,600			2,790	8,020	60,400
29-----	800	90	194	2,500			2,540	4,810	33,000
30-----	780	--	--	--			2,610	4,200	29,600
31-----	800	--	--	--			2,290	3,500	21,600
Total -	32,280		3/47,340	56,030		1/134,000	87,290		3/1,266,000

1/ Estimated.

3/ Includes estimated load for missing days.

2/ Sediment discharge computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued  
BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,020	4,300	23,500	2,170	--	1/20,000	10,000	7,210	197,000
2-----	2,000	3,480	18,800	2,410	4,360	28,400	9,410	4,660	118,000
3-----	2,020	2,600	14,200	2,440	3,100	20,400	10,100	8,470	176,000
4-----	2,540	3,890	26,700	1,860	2,260	11,300	11,000	3,750	111,000
5-----	2,290	5,740	35,500	1,810	--	1/8,010	10,700	--	1/120,000
6-----	2,050	5,700	31,500	1,480	1,390	5,560	9,480	3,800	97,300
7-----	2,030	3,200	17,500	1,360	1,300	4,770	8,130	3,900	85,600
8-----	1,960	2,650	14,000	1,370	--	1/3,990	8,060	5,600	122,000
9-----	1,770	2,550	12,200	1,410	2,740	10,400	8,260	4,070	90,800
10-----	1,770	2,600	12,400	1,480	2,100	8,390	9,140	5,550	137,000
11-----	1,830	2,420	12,000	1,460	1,580	6,230	10,100	7,000	191,000
12-----	1,820	2,230	11,000	1,470	1,730	6,870	9,310	4,350	109,000
13-----	1,770	2,340	11,200	1,310	1,230	4,350	9,310	4,200	106,000
14-----	1,780	2,100	10,100	1,120	1,150	3,480	9,340	3,750	94,600
15-----	1,730	2,100	9,810	1,030	--	1/3,000	8,100	4,270	93,400
16-----	1,690	1,900	8,670	980	1,010	2,670	6,450	3,700	64,400
17-----	1,780	2,200	10,600	1,020	959	2,640	4,960	3,600	48,200
18-----	1,890	2,380	12,100	1,310	1,630	5,770	4,910	4,110	54,500
19-----	3,060	11,900	2/134,000	2,150	3,760	21,800	4,800	6,050	78,400
20-----	4,730	33,000	421,000	3,900	10,400	2/116,000	4,430	4,000	47,800
21-----	3,040	19,400	159,000	6,660	10,200	2/184,000	4,470	4,540	54,800
22-----	2,450	8,500	56,200	8,740	9,750	230,000	4,690	5,910	2/78,000
23-----	2,270	4,700	28,800	9,790	9,400	248,000	8,510	17,100	2/389,000
24-----	2,120	2,840	16,300	8,190	6,600	146,000	10,300	16,900	470,000
25-----	2,060	2,900	16,100	6,870	4,920	91,300	9,110	11,300	278,000
26-----	2,170	2,500	14,600	6,300	4,700	79,900	8,940	10,400	251,000
27-----	2,030	2,100	11,500	6,480	4,900	85,700	8,480	7,250	166,000
28-----	1,860	1,560	7,630	7,330	5,240	104,000	7,330	6,400	127,000
29-----	1,720	2,160	10,000	8,190	5,800	128,000	6,540	4,200	74,100
30-----	1,760	--	1/14,000	11,200	12,400	375,000	6,050	3,500	57,200
31-----	--	--	--	11,200	8,200	248,000	--	--	--
Total -	84,010	--	1,181,000	124,490	--	2,214,000	240,510	--	4,087,000
Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5,660	3,400	52,000	948	--	1/9,980	545	300	441
2-----	5,460	2,940	43,300	1,100	8,920	26,500	578	600	936
3-----	5,430	2,860	41,900	1,210	3,070	10,000	620	345	578
4-----	5,360	4,300	62,200	1,690	4,750	21,700	662	500	894
5-----	5,200	2,600	36,500	1,200	--	1/8,000	785	680	1,440
6-----	4,690	2,500	31,700	1,080	7,100	20,700	884	780	1,860
7-----	4,040	2,300	25,100	1,540	6,600	27,400	1,020	1,060	2,920
8-----	3,370	1,800	16,400	1,480	12,300	49,100	1,080	--	1/3,790
9-----	2,860	1,830	14,100	1,430	7,200	27,800	1,100	1,240	3,680
10-----	2,530	1,830	12,500	1,650	6,100	27,200	1,180	1,560	4,970
11-----	2,200	1,820	10,800	1,410	7,300	27,800	1,230	1,590	5,280
12-----	1,880	1,720	8,730	1,360	4,700	17,300	1,080	2,000	5,830
13-----	1,940	2,200	11,500	1,300	3,200	11,200	1,020	1,550	4,270
14-----	1,610	7,980	34,700	972	2,000	5,250	1,050	1,100	3,120
15-----	3,060	10,800	89,200	715	1,000	1,930	989	1,500	4,000
16-----	3,180	15,500	133,000	750	1,340	2,710	1,010	1,300	3,540
17-----	2,580	13,100	91,200	701	780	1,480	1,050	1,200	3,400
18-----	2,640	8,600	61,300	687	--	1/1,000	1,150	1,000	3,100
19-----	2,450	5,900	39,000	743	360	722	1,410	3,000	11,400
20-----	2,260	4,400	26,800	560	580	877	3,150	23,100	196,000
21-----	2,240	3,500	21,200	535	450	650	3,330	33,000	297,000
22-----	2,010	7,000	38,000	560	470	711	2,550	--	1/150,000
23-----	1,850	3,800	19,000	560	500	756	2,160	--	1/90,400
24-----	1,790	--	1/10,000	572	445	687	2,000	9,600	51,800
25-----	1,600	2,900	12,500	555	340	509	1,890	--	1/30,000
26-----	1,420	2,600	9,970	555	320	480	1,840	4,270	21,200
27-----	1,290	7,320	25,500	590	360	573	1,800	3,140	15,200
28-----	1,180	--	1/12,000	535	308	445	1,780	--	1/10,000
29-----	1,120	1,940	5,870	520	215	302	1,780	1,440	6,920
30-----	1,030	1,200	3,340	525	265	376	1,760	1,270	6,030
31-----	932	1,520	3,820	550	295	438	--	--	--
Total	84,862	--	1,003,000	28,583	--	304,600	42,483	--	940,000

Total discharge for year (second-foot-days) ----- 918,928

Total load for year (tons) ----- 11,960,000

1/ Estimated.

2/ Sediment discharge computed by subdividing day.

## YELLOWSTONE RIVER BASIN--Continued

## BIG HORN RIVER AT KANE, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Mar. 17, 1948	10:30 a.m.	3,400	5,040	3,240	42	53	60	64	68	79	96	98	100		BW
Mar. 17	10:30 a.m.	3,400	5,040	6,520	3	11	--	65	70	77	100	--	--		BN
Apr. 7	12:11 p.m.	2,100	3,130	3,100	6	16	--	66	71	76	87	94	100		BN
Apr. 21	12:00 p.m.	3,020	18,600	7,280	2	6	--	93	94	95	99	100	--		BN
May 17	12:18 p.m.	1,000	738	623	13	39	55	63	74	85	94	97	100		BN
May 22	10:55 a.m.	8,800	9,040	6,265	6	20	34	47	75	89	97	99	100		BN
June 1	3:00 p.m.	9,920	7,780	7,780	25	34	42	54	68	86	95	98	99		BW
June 1	3:00 p.m.	9,920	6,840	5,590	9	21	42	52	76	91	99	100	--		BN
June 18	3:22 p.m.	4,890	4,370	6,645	4	11	36	50	60	86	98	99	100		BN
June 25	12:13 p.m.	9,000	11,800	8,400	2	7	57	72	81	93	99	100	--		BN
July 22	9:30 a.m.	1,990	7,020	5,030	5	14	82	86	87	93	100	--	--		BN
July 22	9:30 a.m.	1,990	7,020	4,835	58	72	82	86	90	93	99	100	--		BW
Aug. 2	2:30 p.m.	1,120	11,900	4,240	6	11	--	--	95	98	99	100	--		BN
Aug. 2	2:30 p.m.	1,120	3,950	3,950	46	69	85	93	96	97	99	100	--		BW
Aug. 11	3:20 p.m.	1,360	7,070	4,620	6	12	87	92	93	95	100	--	--		BN
Aug. 11	3:20 p.m.	1,360	7,070	4,540	52	74	86	90	94	96	100	--	--		BW
Aug. 17	3:17 p.m.	668	794	886	17	52	76	77	82	88	96	98	100		BN
Aug. 17	3:17 p.m.	668	794	1,070	46	60	68	72	77	82	94	100	--		BW



## YELLOWSTONE RIVER BASIN--Continued

## BIGHORN RIVER NEAR CUSTER, MONT.

STATION.--At bridge on U. S. Highways 10 and 12, three-quarters of a mile upstream from mouth, 1 mile southwest of Bighorn, Treasure County, and 3½ miles downstream from gaging station near Custer, Yellowstone County.

RECORDS AVAILABLE.--Sediment records: July 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 539,000 tons per day June 4; minimum, 323 tons per day Sept. 4.

EXTREMES, July 1947-September 1948.--Sediment loads: Maximum, 539,000 tons per day June 4, 1948; minimum, 323 tons per day Sept. 4, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. No appreciable inflow between gaging station and sampling point except small amounts of irrigation waste water.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Aug. 27, 1948 ----	1,550	7.6	1,230	13	0.02	90	36	142		185	484	16	0.6	1.1	0.12	918	1.25		373	221	45
Aug. 30 -----	1,550	7.6	1,220	14	.00	90	38	114		190	428	17	.6	2.0	.09	920	1.25		381	225	39

## YELLOWSTONE RIVER BASIN--Continued

## BIGHORN RIVER NEAR CUSTER, MONT.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3,010	559	4,540	3,050	480	3,950	3,170	520	4,450
2-----	3,130	456	3,850	3,030	425	3,480	3,200	430	3,720
3-----	3,310	634	5,660	3,240	370	3,240	3,090	770	6,430
4-----	3,420	573	5,290	3,260	380	3,340	2,800	730	5,520
5-----	4,000	1,390	15,000	3,330	325	2,920	2,700	350	2,350
6-----	3,840	1,250	13,000	3,330	475	4,270	2,500	520	3,510
7-----	3,440	1,020	9,470	3,280	375	3,320	2,400	320	2,070
8-----	3,350	752	6,800	3,240	450	3,940	2,250	240	1,460
9-----	3,330	570	5,120	3,330	450	4,040	2,250	500	3,400
10-----	3,260	470	4,140	3,350	370	3,350	2,250	850	5,160
11-----	3,240	529	4,630	3,330	450	4,040	2,200	1,050	6,240
12-----	3,200	396	3,820	3,260	375	3,300	2,200	800	4,750
13-----	4,040	1,020	11,100	3,350	375	3,390	2,200	670	3,980
14-----	3,720	3,080	31,000	3,280	350	3,100	2,250	350	2,120
15-----	3,200	5,220	45,100	3,200	300	2,590	2,300	--	1/1,900
16-----	3,130	6,770	57,200	3,200	225	1,940	2,300	--	1/1,650
17-----	3,070	2,800	23,200	2,950	350	2,790	2,400	220	1,420
18-----	3,030	1,260	10,300	3,110	325	2,730	2,400	800	5,180
19-----	2,990	700	5,650	3,030	430	3,520	2,500	700	4,730
20-----	2,970	570	4,570	2,900	750	5,870	2,600	300	2,100
21-----	2,950	620	4,940	2,900	975	7,640	2,700	160	1,170
22-----	2,950	350	2,790	2,900	975	7,640	2,600	170	1,200
23-----	3,090	1,170	9,760	2,900	670	5,240	2,900	200	1,570
24-----	3,280	650	5,760	3,000	600	4,860	2,950	450	3,580
25-----	3,510	650	6,160	3,070	525	4,350	2,800	220	1,660
26-----	3,630	690	6,760	2,970	400	3,210	2,700	200	1,460
27-----	3,330	1,500	13,500	2,930	550	4,350	2,600	250	1,750
28-----	3,310	1,700	15,200	3,240	600	5,250	2,500	230	1,550
29-----	3,170	1,100	9,410	3,260	600	5,280	2,400	420	2,720
30-----	3,150	660	5,610	3,200	670	5,790	2,300	300	1,860
31-----	3,070	500	4,140	--	--	--	2,300	100	620
Total -	102,120	--	353,100	94,420	--	122,700	78,910	--	91,210
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,300	100	620	1,350			6,900	822	15,300
2-----	2,300	200	1,240	1,350			7,200	796	15,500
3-----	2,300	220	1,370	1,400			6,800	553	10,200
4-----	2,300	70	435	1,400			5,400	301	4,390
5-----	2,300	400	2,480	1,400			4,900	291	3,850
6-----	2,400	560	3,630	1,400			4,500	163	1,980
7-----	2,500	390	2,630	1,450			4,100	154	1,700
8-----	2,600	420	2,950	1,500			3,800	116	1,190
9-----	2,750	660	4,900	1,550			3,600	83	806
10-----	2,800	592	4,480	1,600			3,400	76	698
11-----	2,900	417	3,270	1,650			3,250	69	605
12-----	3,000	545	4,410	1,700			3,200	95	920
13-----	2,900	365	2,860	1,800			3,250	108	948
14-----	2,800	180	1,360	1,900			3,400	215	1,970
15-----	2,700	218	1,590	2,050			3,700	240	2,400
16-----	2,600	180	1,260	2,200			4,300	472	5,480
17-----	2,500	210	1,420	2,350			5,000	1,100	14,800
18-----	2,500	140	945	2,600			6,200	2,000	33,500
19-----	2,500	118	796	3,300			8,200	1,900	42,000
20-----	2,600	110	772	5,100			7,900	3,000	64,000
21-----	2,600	300	2,100	7,600			7,700	3,800	79,000
22-----	2,600	420	2,950	8,200			7,400	6,250	125,000
23-----	2,700	520	3,790	8,200			6,700	8,650	156,000
24-----	2,800	409	3,090	8,000			6,300	8,800	150,000
25-----	2,400	130	842	7,500			6,300	7,400	126,000
26-----	2,050	--	--	6,500			6,500	8,200	144,000
27-----	1,850	--	--	6,150			6,600	8,800	157,000
28-----	1,650	--	--	6,150			5,500	6,850	102,000
29-----	1,500	--	--	6,250			4,850	5,100	66,800
30-----	1,400	--	--	--			4,850	3,500	45,800
31-----	1,400	--	--	--			5,140	3,200	44,400
Total -	74,500	--	3/58,600	103,600	--	1/150,000	166,840	--	1,418,000

1/Estimated.

3/Includes estimated loads for missing days.

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	Suspended sediment, water year October 1897 to September 1915—Continued								
	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
Mean concentration (ppm)		Tons per day	Mean concentration (ppm)		Tons per day	Mean concentration (ppm)		Tons per day	
1-----	4,660	2,400	30,200	3,030	1,230	10,100	14,000	8,600	325,000
2-----	3,820	2,200	22,700	3,350	1,130	10,200	12,800	6,000	207,000
3-----	3,630	2,020	19,800	3,800	1,300	13,300	12,800	4,700	162,000
4-----	4,000	1,900	20,500	4,040	1,530	16,700	17,500	11,400	539,000
5-----	4,440	1,900	22,800	3,680	1,630	16,200	17,800	7,600	365,000
6-----	4,200	1,990	22,600	3,170	1,380	11,800	18,100	5,350	261,000
7-----	3,800	1,970	20,200	3,070	1,120	9,280	17,300	4,450	208,000
8-----	3,600	2,750	26,800	2,850	1,100	8,460	17,000	3,850	177,000
9-----	3,460	2,350	22,000	2,670	930	6,700	17,100	3,830	177,000
10-----	3,310	1,500	13,400	2,950	810	6,450	18,400	3,650	181,000
11-----	3,260	1,300	11,400	3,060	900	7,440	19,100	3,690	190,000
12-----	3,350	1,300	11,800	2,950	860	6,850	19,100	5,080	262,000
13-----	3,330	1,100	9,890	2,930	760	6,010	18,400	3,700	184,000
14-----	3,130	1,080	9,130	2,780	530	6,230	18,300	3,400	168,000
15-----	3,090	1,050	8,760	2,360	840	5,350	17,700	2,900	139,000
16-----	3,030	1,050	8,590	2,230	755	4,540	15,900	4,270	183,000
17-----	3,080	1,000	8,340	2,150	760	4,410	15,400	4,320	180,000
18-----	3,280	800	7,090	2,150	655	3,800	13,100	3,300	117,000
19-----	4,300	1,620	18,800	2,300	615	3,820	11,500	2,770	86,000
20-----	8,330	10,500	236,000	3,010	1,030	5,370	11,600	2,800	87,700
21-----	8,440	18,700	426,000	6,460	5,620	2/108,000	11,200	3,900	118,000
22-----	5,320	19,000	273,000	9,620	7,000	182,000	10,600	3,200	91,600
23-----	4,330	12,500	146,000	11,200	6,980	211,000	11,000	3,340	99,100
24-----	4,000	6,400	69,100	12,000	6,270	203,000	13,800	6,720	250,000
25-----	3,800	3,050	31,300	11,600	4,500	141,000	17,000	11,400	523,000
26-----	3,720	1,950	19,600	9,740	3,510	92,300	16,400	9,390	416,000
27-----	3,680	1,380	13,700	8,970	2,700	65,400	15,400	6,500	270,000
28-----	3,600	1,230	12,000	9,350	2,550	64,400	14,200	4,900	188,000
29-----	3,400	1,200	11,000	10,300	3,500	97,400	11,600	3,920	123,000
30-----	3,110	1,180	9,900	11,500	3,830	119,000	11,300	3,560	109,000
31-----	--	--	--	13,800	7,800	291,000	--	--	--
Total--	120,510	--	1,562,000	173,070	--	1,741,000	455,400	--	6,386,000

YELLOWSTONE RIVER BASIN--Continued  
BIGHORN RIVER NEAR CUSTER, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis		
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Apr. 5, 1948	3:24 p. m.	4,280	1,860	2,420	7	22	63	64	68	77	88	92	95	95	95	BN
Apr. 17	4:35 p. m.	3,110	876	572	27	53	62	69	74	80	89	94	96	96	96	BN
May 10	3:52 p. m.	2,700	763	1,140	12	42	63	67	71	78	88	93	96	96	96	BN
June 7	4:38 p. m.	17,300	4,150	4,020	10	20	29	46	73	91	98	100	--	--	--	BN
July 1	5:34 p. m.	10,300	2,360	7,530	5	14	36	47	66	80	93	98	100	100	100	BN
Sept. 21	3:28 p. m.	3,690	2,560	3,880	6	6	35	61	74	89	100	--	--	--	--	BN
Sept. 21	3:28 p. m.	3,690	2,560	3,980	21	34	47	62	78	90	100	--	--	--	--	BW
Sept. 30	3:55 p. m.	2,740	1,240	1,870	10	32	--	76	77	85	94	99	100	100	100	BW
Sept. 30	3:55 p. m.	2,740	1,240	1,820	43	56	68	74	79	84	96	99	100	100	100	BW

## YELLOWSTONE RIVER BASIN--Continued

## BADWATER CREEK AT BONNEVILLE, WYO.

LOCATION.--At gaging station at Bonneville, Fremont County,  $5\frac{1}{2}$  miles upstream from mouth.  
DRAINAGE AREA.--790 square miles.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 35,000 tons per day July 14; minimum, 0 tons per day on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December					
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment				
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day			
1-----	0	--	0	6.8	3,900	72	5	--	$\frac{1}{3}$			
2-----	0	--	0	6.8	2,870	53						
3-----	0	--	0	7.0	3,500	66						
4-----	0	--	0	7.5	2,430	49						
5-----	0	--	0	8.1	--	$\frac{1}{38}$						
6-----	0	--	0	8.4	--	$\frac{1}{26}$						
7-----	0	--	0	7.8	--	$\frac{1}{13}$						
8-----	0	--	0	8.1	280	6						
9-----	0	--	0	10	--	$\frac{1}{54}$						
10-----	0	--	0	9.3	--	$\frac{1}{38}$						
11-----	1.7	--	$\frac{1}{32}$	9.3	--	$\frac{1}{38}$	2	--	$\frac{1}{--}$			
12-----	4.0	22,000	238	9.3	--	$\frac{1}{38}$						
13-----	4.0	18,000	194	9	--	$\frac{1}{12}$						
14-----	3.8	9,800	101									
15-----	3.8	7,800	80									
16-----	4.1	4,910	54									
17-----	4.0	--	$\frac{1}{34}$			7				--	$\frac{1}{5}$	77
18-----	4.0	--										
19-----	4.2	--										
20-----	4.2	--										
21-----	4.1	--										
22-----	4.8	--	7	--	$\frac{1}{5}$	77						
23-----	6.0	7,430					120					
24-----	5.5	6,750					100					
25-----	5.8	5,200					81					
26-----	5.2	4,270					60					
27-----	5.5	5,180	77	--	--	--	--	--	$\frac{2}{40}$			
28-----	6.5	5,650	99									
29-----	6.5	4,420	78									
30-----	6.5	4,390	77									
31-----	6.5	4,250	75									
Total -	100.7	--	1,670	240.4	--	637	92.0	--	$\frac{2}{40}$			

1/Estimated.

2/Includes sediment discharge for days of less than 1.0 ton.

YELLOWSTONE RIVER BASIN--Continued  
 BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Suspended sediment, water year				October 1947 to September 1948--Continued						
Day	January			February			March			
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day	
1-----	0.9	--	1/--	0.2	--	1/--	45	1,130	137	
2-----								--	1/65	
3-----								--	1/30	
4-----								230	28	
5-----								400	49	
6-----										
7-----								390	47	
8-----								300	36	
9-----								--	1/175	
10-----								--	1/125	
								--	1/20	
11-----									--	1/16
12-----								165	20	
13-----								260	32	
14-----								460	56	
15-----				2,580	314					
16-----										
17-----										
18-----										
19-----										
20-----										
21-----										
22-----										
23-----										
24-----										
25-----										
26-----										
27-----										
28-----										
29-----										
30-----										
31-----										
Total--	27.9	--	2/6	283.0	--	2/300	3,846	--	67,440	
April				May			June			
1-----	122	8,000	2,640	45	8,250	1,000	4	5,600	60	
2-----	109	6,580	1,940	34	5,780	531	3	3,520	29	
3-----	117	8,260	2,610	24	5,390	350	1.6	3,000	13	
4-----	128	12,200	4,220	18	4,210	205	0	--	0	
5-----	132	15,300	5,450	18	4,050	197	0	--	0	
6-----	117	7,750	2,450	12	2,990	97	0	--	0	
7-----	109	--	1/2,000	11	2,960	88	0	--	0	
8-----	113	6,400	1,950	9.0	3,240	79	0	--	0	
9-----	109	5,200	1,530	8.4	3,400	77	0	--	0	
10-----	107	7,680	2,220	4.8	2,980	39	0	--	0	
11-----	128	9,580	3,310	3.6	2,820	27	2.2	--	1/76	
12-----	119	5,180	1,660	2.4	2,550	17	0	--	0	
13-----	88	4,900	1,160	4.7	2,150	27	13	23,700	3/1,420	
14-----	90	4,480	1,090	6.2	2,150	36	18	7,400	360	
15-----	90	4,050	985	9.9	1,910	51	0	--	0	
16-----	88	5,350	1,270	11	1,560	46	30	27,800	2,250	
17-----	96	5,200	1,350	17	3,930	135	0	--	0	
18-----	92	8,320	2,060	17	1,870	86	0	--	0	
19-----	88	7,950	1,890	15	2,130	86	0	--	0	
20-----	79	7,300	1,560	14	1,610	61	0	--	0	
21-----				12	990	32	25	--	1/1,200	
22-----	68	6,900	1,270	11	640	19	165	44,500	19,800	
23-----	68	6,400	1,170	11	1,000	30	115	35,200	10,900	
24-----	72	--	1/1,300	11	850	25	113	--	1/11,000	
25-----	61	--	1/1,100	12	485	16	120	25,500	8,270	
26-----	50	--	1/850	13	620	22	117	25,100	7,930	
27-----	44	4,500	535	11	400	12	92	16,000	3,980	
28-----	35	3,850	364	10	--	1/550	74	15,000	3,000	
29-----	36	6,090	591	9.0	25,200	613	20	8,000	432	
30-----	50	9,660	1,300	6.5	--	1/250	5	4,000	54	
31-----	--	--	--	4.7	9,400	119	--	--	--	
Total--	2,668	--	52,790	396.2	--	4,920	917.8	--	70,770	

## YELLOWSTONE RIVER BASIN--Continued

## BADWATER CREEK AT BONNEVILLE, WYO.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0	--	0				0	--	0
2-----	0	--	0				0	--	0
3-----	0	--	0				0	--	0
4-----	0	--	0				0	--	0
5-----	0	--	0				0	--	0
6-----	0	--	0				0	--	0
7-----	0	--	0				0	--	0
8-----	0	--	0				0	--	0
9-----	0	--	0				0	--	0
10-----	0	--	0				0	--	0
11-----	0	--	0				0	--	0
12-----	0	--	0				0	--	0
13-----	0	--	0				0	--	0
14-----	128	--	1/35,000				0	--	0
15-----	14	19,500	737				0	--	0
16-----	10	6,920	187				0	--	0
17-----	8	3,780	82				0	--	0
18-----	8	3,110	67				0	--	0
19-----	7.0	--	1/95				0	--	0
20-----	9.6	18,400	477				3	--	1/150
21-----	5	--	1/110				74	76,000	15,200
22-----	2	--	1/24				15	--	1/1,500
23-----	1	--	1/5				3	--	1/70
24-----	0	--	0				0	--	0
25-----	0	--	0				0	--	0
26-----	0	--	0				0	--	0
27-----	0	--	0				0	--	0
28-----	0	--	0				0	--	0
29-----	0	--	0				0	--	0
30-----	0	--	0				0	--	0
31-----	0	--	0				--	--	--
Total -	192.6	--	36,780				95	--	16,920
Total discharge for year (second-foot-days)-----									8,859.6
Total load for year (tons)-----									252,300

1/Estimated.

## YELLOWSTONE RIVER BASIN--Continued

## BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 25, 1948-----	3:10 p. m.	340	17,200	6,500		3	15	44	46	56	71	95	100		EN	
Mar. 26 - -----	2:50 p. m.	335	16,500	5,420		4	16	32	37	52	67	95	99		EN	
Apr. 17 -----	3:45 p. m.	102	6,470	6,875		3	7	45	74	86	94	97	99		EN	
Apr. 22 -----	11:10 a. m.	61	5,520	9,500		2	4	47	75	87	95	98	99		EN	



YELLOWSTONE RIVER BASIN--Continued

LOCATION.--At gaging station at bridge on U. S. Highway 20, 3½ miles west of Cody, Park County, and 3 miles downstream from Buffalo Bill Reservoir.

DRAINAGE AREA.--1,520 square miles.

RECORDS AVAILABLE. --Chemical analyses: April 1947 to September 1948.

Water temperatures; April 1947 to September 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum 184 parts per million Feb. 21-29; minimum, 93 parts per million June 1-30. Total hardness: Maximum 91 parts per million Feb. 21-29; minimum 39 parts per million June 1-30.

Total herd:	Maximum, 91
Total harnesses:	Maximum, 39 parts per million June 1-30.
Water temperatures:	Maximum freezing point Jan. 18 Feb. 11-13 21
Frost:	July 5-6 minimum freezing point Jan. 18 Feb. 11-13 21

EXTREMES	April 1947-Sentember 1948.	Maximum, 196 parts per million.	Minimum, 81 parts per million.	1947: Aug. 1-10, 1947.
water temperatures:	Maximum, 62° F. July 3-6; minimum, 41° F. July 13-15, 1947.	Maximum 196 parts per million.	Minimum, 81 parts per million.	Aug. 1-10, 1947.
freezing point:	Maximum, 32° F. July 13-15, 1947.	Maximum 196 parts per million.	Minimum, 81 parts per million.	Aug. 1-10, 1947.

Total hardness: Maximum, 108 parts per million Apr. 1-10, 1947; minimum, 39 parts per million June 1-30, 1948.

Water temperatures: Maximum, 64° F. July 31-Aug. 1, 1947; minimum, freezing point Jan. 13, Feb. 11-13, 21, 1947.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- tron (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium	
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non-carbon- ate		
Oct. 1-7, 1947-----	795	7.4	157	18	0.05	12	3.6	9.8	6.0	60	22	1.0	0.2	0.1	0.05		97	0.13	208	45	0	29
Oct. 8-25-----	617	7.5	169	17	.08	13	4.5	13	5.2	68	25	.5	.2	.3	.03		105	.14	175	51	0	33
Oct. 26-Nov.-----	582	7.4	186	15	.08	15	4.6	14	6.0	76	31	.5	.2	.2	.02		116	.16	182	56	0	32
Oct. 26-Nov. 19-----	589	7.5	182	18	.08	15	4.0	15	4.0	76	29	.5	.1	.0	.10		117	.16	186	54	0	37
Nov. 20-Dec. 19-----	592	7.5	197	16	.04	16	4.5	14	3.2	72	31	1.0	.1	.0	.07		124	.17	198	58	0	33
Dec. 20-30-----	589	7.3	212	16	.05	17	4.8	18	3.6	82	34	1.3	.2	.0	.00		135	.18	215	62	0	37
Dec. 31-Jan. 3, 1948-----	592	7.7	236	15	.05	20	5.4	17	4.0	91	36	1.7	.2	.3	--		144	.20	230	72	0	32
Jan. 4-28-----	593	7.3	256	15	.05	21	5.9	21	4.4	92	43	2.0	.1	.0	.03		160	.22	256	70	0	36
Jan. 29-Feb. 20-----	593	7.3	275	16	.05	21	6.3	19	7.2	100	49	2.5	.1	.0	.00		177	.24	283	78	0	32
Feb. 21-29-----	586	8.0	275	18	.03	26	6.4	18	5.6	100	51	3.5	.2	.8	.00		184	.25	291	91	9	28
Mar. 1-31-----	558	7.6	258	17	.04	26	5.9	21	2.0	103	49	4.0	.1	.3	.06		178	.24	268	89	5	33
Apr. 1-30-----	499	7.9	244	17	.03	24	5.4	21	4.0	96	47	3.6	.1	.2	.04		166	.23	224	82	3	34
May 1-31-----	1,216	8.3	207	19	.03	19	4.1	23	4.4	85	37	3.1	.2	1.4	--		143	.19	469	64	0	42
June 1-30-----	5,383	7.7	128	17	.12	12	2.3	11	4.8	57	21	1.3	.1	.9	.00		99	.13	1,440	39	0	34
July 1-31-----	2,287	7.2	123	23	.10	13	3.5	13	1.2	60	18	1.9	.2	.4	.00		93	.13	1,365	47	0	37
Aug. 1-31-----	1,258	8.2	132	22	.10	11	3.5	14	1.6	65	16	2.2	.2	.4	.00		97	.13	330	42	0	39
Sept. 1-30-----	1,998	7.5	147	23	.10	16	3.5	14	2.4	65	24	1.7	.2	.5	.00		109	.15	282	54	1	35
Weighted average-----	1,259	--	162	19	0.09	15	3.6	14	3.6	69	26	1.8	0.1	0.6	--		115	0.15	390	52	0	35

## YELLOWSTONE RIVER BASIN--Continued

## SHOSHONE RIVER BELOW BUFFALO BILL RESERVOIR, WYO.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	50	38	34	34	35	36	44	49	56	52	--
2	54	50	35	36	34	34	37	43	49	58	54	--
3	54	45	36	--	33	34	37	44	52	60	51	53
4	55	46	35	--	33	33	38	43	53	60	51	54
5	--	44	35	--	33	35	40	45	--	62	51	--
6	54	43	35	--	33	35	41	46	53	62	50	56
7	52	44	34	--	33	33	38	46	55	61	55	55
8	52	44	34	--	33	33	39	43	53	61	54	55
9	52	44	34	--	33	33	38	43	--	61	52	55
10	51	52	33	--	33	33	38	44	54	61	52	55
11	51	41	33	34	32	33	40	43	55	58	52	55
12	--	42	34	34	32	34	41	44	55	60	52	58
13	--	42	33	31	32	36	41	--	56	59	52	58
14	--	42	34	36	33	37	40	--	55	--	55	56
15	--	42	--	35	37	37	40	--	56	--	--	56
16	52	39	33	35	36	34	41	49	56	59	--	57
17	52	38	33	35	37	34	40	50	55	59	56	57
18	52	37	34	34	37	35	42	49	53	59	55	58
19	53	37	--	37	37	35	42	48	52	59	--	58
20	53	37	36	36	37	34	44	48	54	59	55	58
21	--	37	37	35	35	36	44	49	54	59	56	59
22	49	37	36	37	36	37	42	49	54	59	55	59
23	48	--	37	37	36	37	42	51	53	58	57	59
24	48	--	38	38	37	37	44	49	53	56	55	56
25	49	38	37	35	37	36	42	50	54	--	55	56
26	--	--	--	--	--	--	--	--	--	--	--	--
27	50	39	34	34	37	36	43	49	53	53	55	58
28	51	35	35	35	35	36	46	--	55	53	57	58
29	51	35	35	35	35	41	46	--	55	55	52	59
30	49	38	35	34	35	39	47	--	--	54	52	58
31	49	--	36	35	--	36	43	47	--	51	52	54
	--	--	36	35	--	34	--	48	--	51	52	--
Average	51	42	35	--	35	35	41	47	54	58	54	57

## YELLOWSTONE RIVER BASIN--Continued

## SHOSHONE RIVER AT BYRON, WYO.

LOCATION.--At bridge on State Highway 14 at Byron, Big Horn County, 750 feet upstream from gaging station.

DRAINAGE AREA.--2 300 square miles.

RECORDS AVAILABLE.--Chemical analyses: March 1947 to September 1948.

Water temperatures: March 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 671 parts per million Apr. 1-30; minimum, 200 parts per million June 1-30.

TOTALS, 1947-48.--Dissolved solids: Maximum, 102 parts per million June 1-30.

Water temperatures: Maximum, 75° F. July 23, 27; minimum, freezing point on several days during November, December, January, and February.

EXTREMES, March 1947-September 1948.--Dissolved solids: Maximum, 678 parts per million May 8-10, 1947; minimum, 165 parts per million July 1-10, 1947.

TOTALS, March 1947-September 1948.--Dissolved solids: Maximum, 82 parts per million July 1-10, 1947.

Water hardness: Maximum, 294 parts per million Apr. 20-30, 1947; minimum, 82 parts per million July 1-10, 1947.

Water temperatures: Maximum, 75° F. July 23, 27, 1948; minimum, freezing point on several days during November and December 1947, January and February 1948.

REMARKS.--Records of discharge for water year 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO <sub>3</sub> )	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1-10, 1947-----	508	8.6	867	17	0.00	59	18	65	1.2	15	169	185	8.0	0.4	3.4	0.09	464	0.69	697	221	58
Oct. 11-25, 27-31----	427	8.4	803	16	.00	67	20	98	7.6	11	209	256	4.0	.6	5.2	.10	592	.81	683	249	60
Oct. 26-----	398	8.2	897	15	.13	64	20	80	92	0	190	258	9.0	.5	5.1	--	572	.78	615	242	86
Nov. 8-30-----	692	8.6	796	18	.00	72	20	80	8.4	20	188	228	8.0	.5	4.2	.10	563	.77	1,050	262	66
Dec. 1-31-----	695	8.5	734	18	.02	76	20	65	1.6	12	204	209	9.0	.8	3.3	.10	510	.69	957	272	84
Jan. 1-31, 1948-----	700	8.2	706	14	.05	75	22	56	4.0	0	232	196	11	.3	2.6	.19	523	.71	988	278	86
Feb. 1-29-----	737	7.9	722	12	.03	76	23	57	4.0	0	238	194	10	.4	3.7	.25	543	.74	1,080	284	89
Mar. 1-31-----	705	8.2	743	11	.03	74	22	68	6.4	0	234	210	12	.4	4.9	.21	584	.79	1,110	275	83
Apr. 1-30-----	635	7.9	829	11	.03	70	23	97	2.8	0	248	248	14	.4	8.4	.27	671	.91	1,150	269	66
May 1-31-----	438	8.3	732	20	.02	58	16	90	5.2	0	200	212	9.0	.4	5.6	.24	514	.70	608	210	46
June 1-30-----	5,400	8.3	291	19	.02	31	6.0	25	2.4	0	106	57	3.0	.3	2.0	.12	200	.27	2,920	102	15
July 1-31-----	1,540	8.3	453	18	.02	40	10	36	3.6	0	136	110	5.2	.4	3.6	.34	314	.43	1,310	141	29
Aug. 1-31-----	645	8.0	726	25	.05	52	16	91	2.8	0	199	212	8.2	.7	5.8	.00	513	.70	894	195	32
Sept. 1-30-----	624	8.1	771	27	.05	56	17	89	1.6	0	208	220	9.2	.7	4.7	.09	544	.74	917	210	39
Weighted average 1/	1,099	--	529	18	0.02	50	13	52	3.3	166	138	6.5	6.5	0.4	3.5	0.16	380	0.52	1,140	177	41
																					37

YELLOWSTONE RIVER BASIN--Continued  
SHOSHONE RIVER AT BYRON, WYO.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	58	--	38	31	34	--	54	51	66	67	66	70
2	58	--	34	34	32	--	58	56	66	68	67	71
3	57	--	36	31	--	--	59	55	68	68	68	69
4	58	--	34	31	33	33	45	53	64	68	72	65
5	57	--	36	--	34	36	49	58	65	70	65	62
6	59	--	34	--	33	34	45	58	65	73	70	63
7	58	--	31	--	33	40	59	61	65	73	71	64
8	55	--	31	--	34	40	59	--	67	71	66	63
9	56	39	34	36	32	38	56	63	63	72	63	64
10	56	34	32	36	34	38	55	--	62	71	68	66
11	--	36	--	34	32	36	49	51	58	70	69	66
12	--	36	37	36	33	40	53	58	60	73	68	65
13	--	34	33	36	34	38	50	57	62	66	70	65
14	--	38	35	34	34	31	54	57	61	68	68	69
15	--	39	36	35	33	43	54	63	64	69	70	67
16	56	35	38	34	33	40	56	67	62	67	70	65
17	56	31	34	33	34	34	52	70	59	65	71	66
18	55	--	34	34	32	36	49	70	58	68	70	64
19	55	35	36	36	34	39	53	70	60	70	68	56
20	54	36	36	34	34	40	60	74	60	71	68	64
21	53	34	34	33	35	42	64	72	61	72	66	62
22	53	33	37	36	34	42	58	64	59	73	66	64
23	44	38	38	36	40	44	60	72	62	75	65	66
24	41	34	36	34	40	45	58	67	63	70	64	59
25	37	41	36	34	40	45	58	73	65	74	68	55
26	39	42	38	35	40	45	--	70	61	74	68	62
27	39	38	37	32	40	48	59	70	65	75	68	63
28	34	34	34	32	40	46	59	65	65	67	68	61
29	49	36	39	--	40	46	64	62	68	67	70	64
30	50	40	37	34	--	43	58	66	69	71	68	59
31	49	--	34	33	--	46	--	68	--	73	64	--
Average	52	--	35	34	35	40	55	63	63	70	68	64

## YELLOWSTONE RIVER BASIN--Continued

## TONGUE RIVER AT MILES CITY, MONT.

LOCATION.--At gaging station 4 miles south of Miles City, Custer County, and 8 miles upstream from mouth.

RECORDS AVAILABLE.--Sediment records: June 1946 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 122,000 tons per day June 5; minimum, 1 ton per day Oct. 9-10, Sept. 22, 24.

EXTREMES, 1946-48.--Sediment loads: Maximum, 122,000 tons per day June 5, 1948; minimum, 0.1 ton per day Aug. 14-15, 1947.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	158	6	3	440	60	71	430	13	15
2-----	158	5	2	445	50	60	412	--	1/19
3-----	152	6	2	450	53	64	403	--	1/19
4-----	150	5	2	450	52	63	349	24	23
5-----	150	4	2	450	70	85	288	14	11
6-----	150	8	3	455	20	25	250	--	1/10
7-----	150	6	2	450	40	49	110	--	1/2
8-----	148	6	2	465	55	69	140	8	3
9-----	148	3	1	500	--	1/88	145	--	1/2
10-----	148	3	1	480	--	1/84	185	--	1/2
11-----	195	6	3	475	59	76	190	--	1/2
12-----	284	18	14	490	40	53	195	4	2
13-----	288	30	23	470	40	51	240	--	1/3
14-----	300	35	28	480	40	52	245	--	1/4
15-----	308	36	30	500	25	34	345	--	1/5
16-----	304	24	20	475	20	26	375	--	1/8
17-----	296	27	22	470	65	82	375	8	8
18-----	304	28	23	470	20	25	355	6	6
19-----	296	25	20	475	25	32	300	8	6
20-----	304	16	13	495	29	39	345	--	1/10
21-----	312	34	29	426	45	52	340	--	1/10
22-----	340	39	36	336	--	1/31	330	16	14
23-----	362	38	37	222	--	1/9	335	--	1/16
24-----	376	31	32	340	--	1/18	300	21	17
25-----	358	43	42	515	22	31	275	--	1/16
26-----	367	48	48	536	--	1/65	310	--	1/16
27-----	421	90	102	688	172	319	305	18	15
28-----	440	110	130	510	--	1/75	330	--	1/15
29-----	435	60	70	495	40	54	295	19	15
30-----	440	50	60	470	--	1/39	290	--	1/12
31-----	440	46	55	--	--	--	270	10	7
Total -	8,682	--	857	13,923	--	1,820	9,057	--	313

1/Estimated.

YELLOWSTONE RIVER BASIN--Continued  
TONGUE RIVER AT MILES CITY, MONT.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	260	--	1/9	200	--	1/14	510	--	--
2-----	250	--	1/11	200	25	14	505	--	--
3-----	240	20	13	200	18	10	500	--	--
4-----	225	--	1/17	200	24	13	505	84	115
5-----	250	31	21	200	--	1/12	510	--	1/92
6-----	295	--	1/20	195	--	1/12	515	60	84
7-----	260	22	15	195	20	11	515	--	1/92
8-----	240	20	13	195	--	1/10	505	66	90
9-----	290	--	1/16	190	--	1/10	495	--	1/83
10-----	290	21	16	175	--	1/10	505	52	71
11-----	270	12	9	170	22	10	490	--	1/52
12-----	245	--	1/7	195	--	1/10	455	36	44
13-----	270	--	1/9	195	--	1/10	445	--	1/70
14-----	225	10	6	180	18	9	475	--	1/150
15-----	240	--	1/9	205	--	1/10	555	--	1/250
16-----	250	15	10	240	18	12	630	159	270
17-----	230	--	1/11	260	--	1/175	840	250	567
18-----	220	--	1/11	300	414	335	925	--	1/600
19-----	215	20	12	360	--	--	1,100	--	1/720
20-----	210	--	1/14	390	--	--	890	315	758
21-----	210	24	14	400	--	--	710	205	393
22-----	210	80	45	380	--	--	695	185	347
23-----	210	--	1/74	360	--	--	1,420	--	1/1,800
24-----	210	181	103	400	--	--	1,140	--	1/1,200
25-----	210	--	1/85	450	--	--	1,560	555	2,340
26-----	210	--	1/65	500	--	--	1,600	310	1,340
27-----	205	--	1/45	540	--	--	1,260	218	742
28-----	205	47	26	535	--	--	1,180	--	1/2,200
29-----	205	--	1/20	520	--	--	960	1,540	3,990
30-----	200	--	1/20	--	--	--	802	1,090	2,360
31-----	200	26	14	--	--	--	766	1,240	2,560
Total--	7,250	--	760	8,530	--	2/3,160	23,963	--	2/24,060
Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	558	670	1,010	730	237	467	1,830	700	3,460
2-----	536	530	768	742	224	450	1,780	650	3,120
3-----	640	610	1,050	742	192	385	2,390	9,040	3/61,100
4-----	827	1,060	2,360	742	145	291	3,780	11,100	3/120,000
5-----	883	1,060	2,520	748	120	242	4,600	8,210	3/122,000
6-----	883	734	1,750	748	127	256	2,720	6,210	3/47,500
7-----	890	490	1,180	748	167	337	1,740	2,820	13,300
8-----	890	440	1,060	742	94	188	1,510	900	3,680
9-----	883	435	1,040	760	110	226	1,380	545	2,030
10-----	883	--	1/763	766	117	242	1,100	490	1,460
11-----	883	190	452	784	147	311	754	225	458
12-----	876	175	414	808	208	455	646	240	420
13-----	869	210	492	848	263	602	585	310	490
14-----	862	200	465	827	116	259	748	1,530	3/3,640
15-----	848	200	458	772	116	242	1,010	10,200	27,800
16-----	820	180	398	748	152	306	688	3,600	6,700
17-----	820	175	388	607	71	116	682	2,000	3,690
18-----	820	243	538	658	160	284	2,160	10,500	61,300
19-----	1,060	4,480	12,800	670	73	132	1,060	7,500	21,500
20-----	1,030	5,600	15,600	694	150	281	827	4,100	9,150
21-----	790	1,580	3,370	706	314	598	724	2,050	4,000
22-----	563	1,160	1,760	682	475	875	670	1,600	2,900
23-----	500	390	526	1,470	2,630	3/11,600	796	1,300	2,800
24-----	430	125	145	2,340	3,210	20,200	925	1,900	4,750
25-----	372	55	55	2,610	2,350	16,600	995	6,350	17,000
26-----	344	74	69	2,340	1,500	9,480	1,260	7,130	24,200
27-----	324	88	77	2,340	1,370	8,650	1,830	3,990	19,700
28-----	408	100	110	2,180	1,120	6,600	2,280	3,500	21,600
29-----	558	220	332	1,880	900	4,570	2,260	2,150	13,100
30-----	688	377	700	1,880	775	3,940	2,250	1,650	10,000
31-----	--	--	--	1,830	680	3,360	--	--	--
Total--	21,738	--	52,650	35,142	--	92,540	45,980	--	632,800

1/Estimated.

2/Includes estimated load for missing days.

3/Sediment discharge computed by subdividing day.

## YELLOWSTONE RIVER BASIN--Continued

## TONGUE RIVER AT MILES CITY, MONT.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,240	1,510	9,150	426	71	82	72	26	5
2-----	2,230	1,130	6,810	380	59	61	85	24	6
3-----	2,610	2,400	16,900	300	51	41	78	27	6
4-----	2,440	2,900	19,100	200	25	14	120	30	10
5-----	1,780	1,300	6,250	165	23	10	120	24	8
6-----	1,560	910	3,840	160	40	17	114	--	1/6
7-----	1,460	800	3,160	155	120	50	118	20	6
8-----	1,260	610	2,080	152	35	14	122	22	7
9-----	1,100	847	2,520	170	12,200	5,600	127	30	10
10-----	890	500	1,200	189	8,750	4,460	131	30	11
11-----	995	6,600	17,700	189	1,950	995	131	32	11
12-----	2,730	11,000	81,000	226	361	220	122	--	1/10
13-----	925	6,360	3/16,800	264	226	161	118	22	7
14-----	1,420	6,320	3/25,800	237	166	106	127	17	6
15-----	946	4,800	3/13,300	210	120	68	127	14	5
16-----	890	2,400	5,770	203	85	47	112	17	5
17-----	552	2,800	4,170	196	118	62	116	15	5
18-----	536	850	1,230	189	80	41	116	19	6
19-----	1,380	850	3,170	182	170	84	120	20	6
20-----	2,230	11,800	71,000	175	215	103	85	--	1/4
21-----	814	3,800	8,350	168	113	51	85	10	2
22-----	925	2,400	6,000	152	155	64	74	6	1
23-----	694	1,580	2,960	152	170	70	66	12	2
24-----	640	2,440	4,220	152	215	88	64	--	1/1
25-----	890	3,300	7,930	142	115	44	67	12	2
26-----	670	1,200	2,170	116	108	34	64	15	3
27-----	624	411	692	112	56	17	64	12	2
28-----	590	450	716	108	41	12	66	16	3
29-----	545	290	426	104	33	9	66	20	4
30-----	505	229	312	104	33	9	66	9	2
31-----	465	167	210	74	34	7	--	--	--
Total--	37,536	--	344,800	5,752	--	12,640	2,943	--	162

Total discharge for year (second-foot-days)----- 220,496

Total load for year (tons)-----1,167,000

1/Estimated.

3/Sediment discharge computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued  
TONGUE RIVER AT MILES CITY, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Apr. 6, 1948	9:00 a. m.	--	--	389	22	29	44	60	69	79	89	96	97	99		BN
Apr. 6	9:00 a. m.	841	700	983	6	19	34	52	66	78	88	93	96	98		BNW
Apr. 16	9:15 a. m.	808	162	191	7	10	24	42	52	65	73	83	92	--		BN
June 6	8:00 a. m.	754	960	1,270	11	18	38	49	62	72	84	91	97	100		BN
June 18	9:00 a. m.	1,880	11,400	2,320	52	59	70	78	83	90	95	100	--	--		BW
June 18	9:00 a. m.	1,880	11,400	4,120	7	9	32	84	85	89	94	98	100	--		BN
July 2	8:30 a. m.	2,230	1,050	3,020	9	15	26	40	58	73	84	94	96	100		BN
July 31	8:15 a. m.	440	158	495	18	22	42	58	68	71	78	90	98	100		BN
Aug. 13	12:25 p. m.	--	--	295	22	40	68	80	87	90	92	96	100	--		BN
Aug. 13	12:25 p. m.	24	228	248	--	50	70	84	90	95	96	98	99	99		BW



## YELLOWSTONE RIVER BASIN--Continued

## POWDER RIVER AT ARVADA, WYO.

LOCATION.--At county bridge, 0.1 mile south of Arvada, Sheridan County, a quarter of a mile upstream from Wildhorse Creek and half a mile downstream from gaging station.

DRAINAGE AREA.--6,050 square miles.

RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1947.

Sediment records: April 1946 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 1,200,000 tons per day June 18; minimum, 0 tons per day Sept. 10-19.

EXTREMES, 1946-48.--Sediment loads: Maximum, 1,200,000 tons per day June 18, 1948; minimum, 0 tons per day each year.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	38	824	85	163	4,530	1,990	195	4,870	2,560
2-----	38	884	91	163	4,200	1,850	195	2,850	1,500
3-----	44	961	114	160	5,000	2,160	170	1,930	885
4-----	46	1,070	133	151	4,520	1,840	150	828	336
5-----	46	1,060	132	133	3,520	1,260	125	414	140
6-----	48	1,270	164	127	2,870	984	70	258	49
7-----	55	1,250	186	121	3,360	1,100	110	--	--
8-----	46	1,170	145	145	3,320	1,300	100	--	--
9-----	44	988	117	154	3,840	1,600	70	--	--
10-----	44	959	114	151	3,810	1,550	65	--	--
11-----	55	1,060	157	139	3,650	1,370	90	--	--
12-----	60	1,230	199	127	2,990	1,030	110	--	--
13-----	59	1,300	207	27	565	41	100	--	--
14-----	60	1,370	222	23	181	11	95	--	--
15-----	59	1,420	226	60	384	62	90	--	--
16-----	60	1,680	272	187	2,260	1,140	95	--	--
17-----	72	2,400	466	154	1,350	561	100	--	--
18-----	90	2,770	673	115	710	220	90	--	--
19-----	87	2,710	636	139	1,680	630	100	--	--
20-----	87	2,660	625	155	885	370	115	--	--
21-----	87	2,730	641	120	155	50	100	--	--
22-----	107	3,370	974	80	145	31	105	--	--
23-----	121	4,610	1,510	110	--	1/60	110	--	--
24-----	110	4,800	1,420	150	450	182	115	--	--
25-----	124	5,100	1,710	195	593	312	120	--	--
26-----	148	5,280	2,110	205	529	291	125	--	--
27-----	169	7,000	3,200	225	736	447	130	--	--
28-----	169	6,010	2,750	250	2,320	1,560	100	--	--
29-----	160	5,840	2,520	190	1,750	898	85	--	--
30-----	166	6,390	2,870	195	2,300	1,210	70	--	--
31-----	166	5,010	2,250	--	--	--	50	--	--
Total -	2,665	--	26,920	4,314	--	26,110	3,345	--	2/7,700

1/Estimated.

2/Includes estimated load for missing days.

## YELLOWSTONE RIVER BASIN--Continued

## POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	55	--	--	100	532	144	370	2,200	2,200
2-----	60	--	--	95	481	123	350	2,840	2,680
3-----	80	--	--	90	462	112	340	1,900	1,740
4-----	58	--	--	88	479	114	291	950	747
5-----	58	--	--	90	494	120	288	875	634
6-----	80	--	--	90	515	125	227	900	552
7-----	100	--	--	90	476	116	190	950	488
8-----	120	420	136	85	--	1/110	244	1,000	659
9-----	95	276	71	110	--	1/170	328	400	354
10-----	80	406	88	130	--	1/170	716	150	290
11-----	80	--	1/85	100	420	113	891	200	481
12-----	70	542	162	100	410	111	891	260	625
13-----	70	--	1/100	120	375	122	889	325	763
14-----	80	--	1/110	160	400	173	803	2,150	4,660
15-----	75	--	1/105	190	430	221	1,050	3,600	10,200
16-----	70	539	102	220	510	303	1,460	4,780	18,800
17-----	80	581	128	260	432	304	2,750	8,320	3/84,500
18-----	90	596	145	300	1,500	1,220	2,660	10,800	77,500
19-----	100	534	144	640	3,300	5,710	2,280	14,500	89,400
20-----	95	535	137	460	1,350	1,680	2,020	20,600	112,000
21-----	100	511	138	380	1,300	1,330	1,420	27,600	106,000
22-----	105	488	138	266	1,630	1,140	913	31,600	77,900
23-----	110	521	155	330	670	597	608	26,200	43,000
24-----	100	532	144	250	370	250	586	21,000	33,200
25-----	85	493	113	230	555	345	781	34,000	71,800
26-----	70	448	85	340	1,250	1,150	1,040	42,700	120,000
27-----	60	486	79	410	2,280	2,520	803	38,000	82,400
28-----	60	571	95	370	2,460	2,480	500	33,300	45,000
29-----	80	735	159	350	1,990	1,680	416	17,200	19,400
30-----	90	777	189	--	--	--	356	11,300	10,900
31-----	105	625	177	--	--	--	307	9,260	7,680
Total -	2,541	--	2/3,550	6,438	--	22,930	26,728	--	1,027,000
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	272	9,580	7,040	261	6,480	4,570	632	32,000	54,600
2-----	244	8,550	5,630	287	9,190	7,120	476	21,000	27,000
3-----	258	6,520	4,540	390	8,840	9,100	440	14,500	17,200
4-----	261	5,060	3,570	416	8,230	9,250	544	17,500	25,700
5-----	275	4,880	3,620	400	7,900	8,540	476	14,500	18,700
6-----	237	4,770	3,060	333	7,960	7,160	351	13,500	12,800
7-----	234	5,310	3,360	328	7,440	6,590	264	12,000	8,550
8-----	227	5,210	3,190	328	6,180	5,470	227	10,500	6,440
9-----	227	5,230	3,210	311	9,730	8,160	221	9,500	5,670
10-----	221	4,690	2,800	291	15,200	11,900	1,560	65,400	3/359,000
11-----	214	4,280	2,480	360	11,400	11,100	1,450	67,000	272,000
12-----	196	4,290	2,270	390	13,300	14,000	333	24,000	21,600
13-----	187	4,010	2,020	405	14,000	15,300	422	30,000	34,200
14-----	193	4,070	2,120	380	13,300	13,600	234	18,000	11,400
15-----	184	4,400	2,190	315	11,800	10,000	261	14,000	9,870
16-----	172	3,980	1,850	315	11,200	9,530	422	33,000	37,600
17-----	157	3,540	1,500	395	18,500	19,700	4,240	77,200	917,000
18-----	151	3,490	1,420	440	17,000	20,200	6,280	68,200	1,200,000
19-----	205	5,600	3,100	446	22,000	26,500	1,580	33,200	142,000
20-----	272	6,210	4,550	608	20,400	33,500	761	25,000	51,400
21-----	311	6,230	5,230	792	17,000	36,400	518	23,500	32,900
22-----	328	6,230	5,520	1,060	20,000	56,800	2,020	51,800	293,000
23-----	299	5,600	4,520	968	17,800	46,500	3,380	47,800	452,000
24-----	291	4,950	3,890	847	17,400	39,800	2,200	44,700	275,000
25-----	287	5,280	4,090	1,300	40,000	146,000	2,140	59,900	359,000
26-----	356	8,140	7,820	1,280	36,900	132,000	1,160	28,800	90,200
27-----	342	6,650	6,140	869	37,700	91,700	1,870	37,700	197,000
28-----	311	6,900	5,800	512	28,500	39,400	2,940	81,600	672,000
29-----	299	5,680	4,750	422	20,300	23,200	1,160	58,300	189,000
30-----	287	6,540	5,060	440	16,000	19,000	725	33,400	65,400
31-----	--	--	--	558	27,100	40,800	--	--	--
Total -	7,498	--	116,300	16,437	--	922,900	39,287	--	5,858,000

1/Estimated.

2/Includes estimated load for missing days.

3/Sediment discharge computed by subdividing day.

## YELLOWSTONE RIVER BASIN--Continued

## POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	506	20,000	27,400	40	2,600	281	3.0	219	2
2-----	360	14,600	14,200	423	51,500	61,000	2.1	165	1
3-----	291	9,920	7,790	221	40,600	25,100	1.4	112	1
4-----	247	6,340	4,230	148	16,200	6,470	1.1	92	--
5-----	227	4,140	2,540	133	6,770	2,430	.8	102	--
6-----	193	3,280	1,710	224	24,300	14,700	.6	95	--
7-----	163	3,120	1,370	127	32,300	11,100	.9	398	1
8-----	157	2,440	1,030	98	32,400	8,570	.4	148	--
9-----	139	1,960	735	87	23,700	5,560	.1	262	--
10-----	115	1,730	537	80	14,800	3,200	0	--	0
11-----	87	1,340	315	69	7,400	1,380	0	--	0
12-----	62	1,160	194	57	4,000	615	0	--	0
13-----	50	925	125	74	11,400	2,280	0	--	0
14-----	2,110	35,000	199,000	139	25,400	9,530	0	--	0
15-----	1,070	46,800	140,000	112	24,000	7,250	0	--	0
16-----	458	20,900	25,800	62	14,800	2,480	0	--	0
17-----	307	16,000	13,300	39	3,400	358	0	--	0
18-----	2,180	50,000	305,000	24	1,090	71	0	--	0
19-----	1,240	36,100	125,000	16	696	30	0	--	0
20-----	537	20,200	29,300	15	496	20	2.4	240	2
21-----	385	25,000	26,000	13	335	12	49	10,200	3/3,840
22-----	338	25,000	22,800	12	198	6	761	87,000	185,000
23-----	221	18,200	10,900	10	182	5	299	61,000	51,100
24-----	166	11,500	5,150	8.4	122	3	136	45,200	17,200
25-----	154	8,580	3,560	7.4	103	2	80	36,000	8,060
26-----	157	10,600	4,500	7.8	47	1	69	27,100	5,050
27-----	124	7,450	2,490	8.1	38	1	46	18,500	2,300
28-----	130	5,750	2,020	8.8	41	1	39	11,900	1,250
29-----	85	5,080	1,170	9.2	48	1	34	6,100	560
30-----	67	5,700	1,030	9.2	128	3	32	3,000	259
31-----	46	3,920	487	4.8	240	3	--	--	--
Total -	12,372	--	979,700	2,286.7	--	162,500	1,557.8	--	4/274,600
Total discharge for year (second-foot-days) -----									125,469.5
Total load for year (tons) -----									9,428,000

3/Sediment discharge computed by subdividing day.

4/Includes sediment discharge for days less than 0.5 ton.

## YELLOWSTONE RIVER BASIN--Continued

## POWDER RIVER AT ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis		
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Oct. 3, 1947	3:10 p.m.	44	1,170	3,750		2	7	15	25	46	69	97	99	100		BN
Mar. 18, 1948	8:13 p.m.	1,800	10,700	6,080		5	10	70	85	88	97	100	--	--		BN
Mar. 18	8:35 p.m.	1,800	10,600	6,700		36	50	60	69	78	89	98	100	--		BW
Mar. 18	8:50 p.m.	1,800	10,500	9,100		17	23	29	33	39	52	92	99	100		BN
Mar. 19	4:45 p.m.	2,140	16,800	5,820		4	10	54	68	76	84	95	99	100		BW
Mar. 19	4:45 p.m.	2,140	16,800	5,870		33	44	56	68	79	91	100	--	--		BW
Mar. 19	5:00 p.m.	2,140	16,700	9,260		3	8	44	59	66	80	96	99	100		BN
Apr. 8	1:30 p.m.	237	3,520	1,960		27	42	56	67	95	95	99	100	--		BW
Apr. 8	1:30 p.m.	237	3,520	6,730		2	5	18	59	72	94	98	99	100		BN
Apr. 14	2:40 p.m.	199	3,310	2,770		4	12	47	65	77	94	98	100	--		BN
May 4	2:50 p.m.	422	6,840	10,900		1	3	9	71	81	94	100	--	--		BN
May 18	2:25 p.m.	458	10,700	9,610		2	6	30	68	80	95	100	--	--		BW
May 18	2:25 p.m.	458	10,700	10,300		18	28	40	60	82	95	100	--	--		BW
May 18	2:25 p.m.	458	10,700	10,200		18	27	39	57	74	90	96	99	100		BWC
May 26	4:20 p.m.	1,690	34,400	5,340		29	40	54	72	86	92	97	99	100		BW
May 26	4:30 p.m.	1,690	34,300	4,650		2	8	33	73	84	89	95	99	100		BN
June 4	12:30 p.m.	672	20,400	3,680		5	13	56	75	84	92	97	100	--		BN
June 4	12:30 p.m.	672	20,400	--		34	46	58	68	82	90	95	99	100		BW
June 4	12:30 p.m.	672	20,400	--		33	44	57	65	73	87	92	99	100		BW
July 14	4:20 p.m.	5,000	82,500	8,760		26	39	51	66	78	88	92	96	98		BW
July 14	4:20 p.m.	5,000	82,500	8,650		2	4	24	72	76	86	92	97	99		BN
July 14	4:20 p.m.	5,000	82,500	--		26	39	51	66	80	88	97	99	--		BWC
July 27	7:00 p.m.	163	3,760	6,140		3	6	52	87	88	89	95	100	--		BN
July 27	7:00 p.m.	163	3,760	6,480		51	65	74	80	89	97	100	--	--		BW
July 27	7:00 p.m.	163	3,760	5,250		1	7	82	89	89	90	92	97	99		BN
Aug. 17	6:00 p.m.	29	2,000	2,440		64	80	86	89	92	98	98	100	--		BW
Sept. 22	6:40 a.m.	1,040	95,000	18,400		1	3	70	94	94	96	99	100	--		BN
Sept. 22	6:40 a.m.	1,040	95,000	16,900		47	66	83	89	93	96	100	--	--		BW

YELLOWSTONE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN YELLOWSTONE RIVER BASIN IN MONTANA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- sodium	
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate		
YELLOWSTONE RIVER AT MILES CITY																						
Sept. 10, 1948-----	4,720	7.7	767	13	0.10	61	27	86	3.2	190	276	13	0.5	1.0	0.35		592	0.81		263	107	41
YELLOWSTONE RIVER NEAR SIDNEY																						
Sept. 26, 1948-----	6,850	7.5	946	17	0.02	65	31	100		220	294	13	0.6	2.0	0.18		680	0.92		290	110	43

## MISSOURI RIVER BASIN

## YELLOWSTONE RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN YELLOWSTONE RIVER BASIN IN WYOMING

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
OWL CREEK NEAR LUCERNE			
Mar. 29, 1948 -----	91	4,880	1,200
Apr. 17 -----	35	1,300	123
Apr. 19 -----	240	15,000	9,710
Apr. 23 -----	32	816	70
Apr. 26 -----	23	348	22
June 22 -----	535	37,000	53,400
COTTONWOOD CREEK AT WINCHESTER			
Mar. 29, 1948 -----	45	12,600	2,000
Apr. 17 -----	110	33,100	10,000
Apr. 19 -----	350	37,300	35,000
Apr. 23 -----	30	12,100	1,000
Apr. 26 -----	30	4,140	300
June 22 -----	450	150,000	182,000
GOOSEBERRY CREEK AT PULLIAM			
Mar. 23, 1948 -----	65	12,400	2,180
Mar. 29 -----	176	50,900	24,200
Apr. 17 -----	44	12,200	1,450
Apr. 19 -----	132	29,500	10,500
Apr. 23 -----	83	7,260	1,630
Apr. 26 -----	53	6,390	914
June 22 -----	135	107,000	39,000

## LITTLE MISSOURI RIVER BASIN

## LITTLE MISSOURI RIVER AT MEDORA, N. DAK.

LOCATION.--At gaging station at bridge on U. S. Highway 10, a quarter of a mile west of Medora, Billings County, 1 mile upstream from Andrews Creek.  
DRAINAGE AREA.--6,150 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1945 to October 1946, March 1947 to September 1948.

Water temperatures: March 1947 to September 1948.  
Sediment records: March 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 2,160 parts per million Jan. 1-Feb. 4; minimum, 182 parts per million Mar. 19-20.  
Total hardness: Maximum, 529 parts per million Jan. 1-Feb. 4; minimum, 43 parts per million Mar. 18.

Water temperatures: Maximum, 86° F. Aug. 19; minimum, freezing point on many days in January, February, March, and April.

Sediment loads: Maximum, 199,000 tons per day June 19; minimum, less than 1 ton per day on many days in December, January, February, and September.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 2,160 parts per million Jan. 1-Feb. 4, 1948; minimum, 182 parts per million Mar. 19-20, 1948.

Total hardness: Maximum, 529 parts per million Jan. 1-Feb. 4, 1948; minimum, 43 parts per million Mar. 18, 1948.

Water temperatures (March 1947-September 1948): Maximum, 92° F. Aug. 2, 9, 1947; minimum, freezing point on many days in winter months.

Sediment loads (1946-48): Maximum, 438,000 tons per day June 24, 1947; minimum, less than 1 ton per day each year.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-8, 1947-----	23	8.5	1,980	12	0.07	83	43	334	9.2	1/326	813	9.0	0.5	0.4	0.37	1,470	2.00	91	384	150	65
Oct. 9-Nov. 10-----	32	8.3	1,970	12	.07	70	38	348	8.8	2/369	754	10	.5	.7	.37	1,420	1.93	123	331	128	69
Nov. 11-20-----	12	8.2	2,500	15	.08	96	53	456	9.2	505	1,000	11	.6	.4	.41	1,890	2.57	61	437	43	68
Nov. 21-Dec. 31----	12	8.2	2,480	18	.03	76	46	477	11	622	995	13	.5	.2	.36	1,870	2.54	61	379	0	73
Jan. 1-Feb. 4, 1948	5	8.2	2,800	18	.02	123	54	525	11	622	1,100	15	.4	1.0	.27	2,160	2.94	29	529	19	68
Feb. 5-18-----	3	8.3	1,980	17	.05	100	40	330	6.0	3/408	781	8.4	.3	1.2	.27	1,490	2.03	12	414	79	63
Feb. 19-----	2,300	7.4	362	7.6	.10	28	9.6	34	34	138	63	.2	.4	5.3	.27	248	.34	1,540	109	0	41
Feb. 20-----	3,500	7.7	376	9.0	.14	24	8.4	42	42	120	78	.2	.6	7.0	--	280	.38	2,690	94	0	49
Feb. 21 4/-----	400	7.2	440	8.5	.10	20	7.2	73	73	108	137	3.0	.7	2.2	--	304	.41	328	80	0	67
Feb. 21-Mar. 13----	106	7.2	586	9.6	.08	27	10	77	9.2	174	154	5.2	.4	2.8	.08	412	.56	118	108	0	58
Mar. 14-----	500	7.3	678	10	.04	37	13	93	93	174	189	4.0	.4	2.7	--	470	.64	635	151	8	58
Mar. 15-----	3,500	7.4	491	8.9	.12	42	12	45	45	160	110	1.0	.4	4.6	--	348	.47	3,290	154	23	39
Mar. 16-----	5,800	7.3	373	7.4	.10	25	8.9	39	39	120	77	1.0	.5	2.7	--	248	.34	3,880	99	1	46
Mar. 17-----	5,200	7.1	316	7.8	.20	17	5.2	34	34	88	59	1.0	.4	3.0	--	220	.30	3,090	64	0	54
Mar. 18 (7:30 a.m.)	3,130	7.2	266	8.0	.30	13	2.5	41	41	84	58	.2	.4	3.2	--	216	.29	1,830	43	0	68
Mar. 18 (6:40 p.m.)	3,130	7.6	310	4.2	.08	26	8.0	28	28	130	46	1.5	.4	2.5	.18	223	.30	1,880	98	0	39
Mar. 19-----	5,120	7.3	247	7.3	.06	18	5.3	23	23	100	37	2.0	.6	3.0	--	182	.25	2,520	67	0	48
Mar. 20-----	4,960	7.3	244	8.5	.12	20	6.2	23	23	100	38	.2	.5	3.3	--	182	.25	2,440	75	0	40
Mar. 21-23-----	4,710	8.2	287	9.1	.06	22	6.8	27	4.8	96	68	.2	.4	1.5	.28	198	.27	2,520	83	4	40

3/Includes equivalent of 16 parts per million of carbonate (CO<sub>3</sub>).

4/Not included in weighted average.

2/Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

LITTLE MISSOURI RIVER BASIN--Continued  
LITTLE MISSOURI RIVER AT MEDORA, N. DAK.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Mar. 24, 1948-----	6,940	7.3	461	10	0.04	47	9.5	40		173	96	0.3	0.3	1.4	--	316	0.43	5,920	156	14	36
Mar. 25-----	3,810	7.1	466	10	.12	44	11	50		144	138	1.6	.3	.3	--	328	.45	3,380	155	37	41
Mar. 26-31-----	2,630	8.1	516	10	.07	37	13	56		128	155	2.6	.3	2.5	--	350	.48	2,490	146	41	45
Apr. 1-30-----	660	8.0	872	15	.03	54	16	119	3.6	204	284	5.6	.4	2.1	0.14	629	.86	1,120	200	33	56
May 1-31-----	270	8.1	1,200	18	.03	62	25	178	6.0	232	442	6.4	.5	2.1	--	891	1.21	650	258	68	59
May 26 4/-----	86	8.2	1,530	8.1	.03	76	30	272		344	584	9.0	.5	.6	.35	1,160	1.58	270	313	28	65
June 1-30-----	1,020	7.8	922	22	.08	51	15	131	4.4	183	324	4.4	.5	1.6	.02	680	.92	1,880	189	39	59
June 8 4/-----	1,000	7.1	1,140	19	.02	53	18	182		152	450	4.6	.4	2.5	--	862	1.17	2,330	206	81	66
July 1-31-----	654	8.2	951	17	.01	65	16	136	2.0	180	352	3.4	.5	1.3	.16	702	.95	1,240	228	80	56
July 15 4/-----	1,060	7.9	1,040	13	.00	49	14	163		170	374	1.0	.2	4.0	.33	774	1.05	2,220	180	41	66
Aug. 1-31-----	273	8.1	1,120	18	.02	52	18	184	6.0	201	434	5.1	.5	1.7	.16	836	1.14	616	204	39	65
Aug. 26 4/-----	73	7.8	1,290	14	.00	69	23	191		254	448	4.0	.6	.6	.12	942	1.28	186	267	0	60
Sept. 1-30-----	17	8.3	1,690	15	.01	72	32	305	5.6	5308	662	8.6	.5	1.3	.27	1,260	1.71	58	311	58	68
Weighted average--	458	--	716	14	0.07	44	13	97	3.3	163	235	3.2	0.5	2.1	0.13	520	0.71	642	164	30	52

<sup>4</sup>/Not included in weighted average.

<sup>5</sup>/Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).



Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	59	42	35	33	33	32	31	49	65	68	67	69
2	48	--	35	33	32	32	32	50	--	--	66	68
3	59	--	34	--	32	32	36	56	70	73	77	64
4	54	--	35	33	32	32	43	46	70	73	69	62
5	65	--	35	33	33	32	37	59	--	77	70	60
6	--	--	34	33	31	33	46	61	70	76	71	61
7	50	--	33	34	31	32	36	54	68	76	--	51
8	45	33	32	33	31	32	41	49	66	76	--	52
9	65	33	32	32	32	32	48	40	71	83	64	50
10	68	33	33	33	--	32	41	40	70	75	69	--
11	--	34	32	33	32	--	38	--	61	75	74	76
12	59	33	32	32	33	32	34	60	76	71	--	65
13	43	34	34	32	32	32	36	66	75	74	72	56
14	61	34	33	--	32	32	42	58	62	74	72	57
15	46	34	32	--	33	33	52	56	59	68	73	56
16	--	34	33	31	33	34	54	62	--	66	70	58
17	50	33	33	32	--	--	55	69	54	73	69	59
18	50	34	34	--	--	--	56	61	53	73	75	57
19	63	33	--	--	33	--	47	79	62	69	86	58
20	51	33	--	--	--	--	71	64	64	--	69	57
21	--	33	--	33	--	--	70	63	58	65	70	--
22	45	--	--	32	35	--	68	57	64	--	68	57
23	44	33	--	31	32	--	--	56	62	81	68	57
24	42	33	--	32	32	--	58	--	63	78	74	57
25	43	36	34	32	32	--	52	56	63	73	62	70
26	--	--	--	--	--	--	--	--	--	--	--	--
27	36	36	33	32	33	--	56	--	69	64	65	72
28	37	34	33	31	33	--	60	66	66	70	66	74
29	37	35	32	33	--	--	53	58	64	73	73	72
30	42	32	32	33	33	33	62	--	74	--	71	72
31	41	35	32	32	--	32	51	--	76	72	68	60
31	43	--	32	33	--	32	--	67	--	77	72	--
Average	49	--	33	--	--	--	48	58	66	73	70	61

## LITTLE MISSOURI RIVER BASIN--Continued

## LITTLE MISSOURI RIVER AT MEDORA, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	22	68	4	32	95	8	20	20	1
2-----	23	47	3	31	116	10	19	20	1
3-----	23	32	2	30	104	8	17		
4-----	23	30	2	32	102	9	16		
5-----	24	39	2	36	108	10	15		
6-----	24	40	3	33	108	10	14		
7-----	23	33	2	31	99	8	13		
8-----	21	37	2	20	85	5	13		
9-----	23	43	3	18	84	4	12	--	--
10-----	24	50	3	15	71	3	12		
11-----	23	47	3	14	53	2	11		
12-----	24	38	2	13	53	2	11		
13-----	23	46	3	13	67	2	10		
14-----	24	50	3	12	78	2	10		
15-----	30	70	6	12	87	3	9		
16-----	50	77	10	12	83	3	9	20	--
17-----	40	59	6	12	76	2	9		
18-----	43	220	26	11	55	2	9		
19-----	54	1,120	163	11	43	1	9		
20-----	42	460	52	11	38	1	10	--	--
21-----	40	169	18	11	46	1	10		
22-----	40	248	27	11	46	1	10		
23-----	36	125	12	10	40	1	10		
24-----	36	85	8	10	34	1	10		
25-----	35	96	9	11	30	1	10		
26-----	36	103	10	12	28	1	10	16	--
27-----	36	98	10	13	27	1	10		
28-----	35	90	8	15	25	1	10		
29-----	34	88	8	18	23	1	9		
30-----	34	87	8	20	22	1	8		
31-----	32	83	7	--	--	--	8		
Total -	977	--	425	530	--	105	353	--	1/18
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	8			2			150	36	15
2-----	8			2			100	38	10
3-----	8			1	10	--	80	33	7
4-----	8	--	--	1			70	48	9
5-----	9			1			60	52	8
6-----	10			1			50	50	7
7-----	10			1			45	48	6
8-----	10			1			40	46	5
9-----	10	53	1	1			40	45	5
10-----	9			1			35	44	4
11-----	8			1	2	--	35	35	3
12-----	8			1			35	15	1
13-----	7			1			40	10	1
14-----	7			1			500	200	270
15-----	6	--	--	1			3,500	1,210	11,400
16-----	6			2	170	1	5,800	2,330	36,500
17-----	5			10	700	19	5,200	1,320	18,500
18-----	5			20	900	49	3,130	1,990	16,800
19-----	4			2,300	1,770	11,000	5,120	1,950	27,000
20-----	4			3,500	1,800	17,000	4,960	1,590	21,300
21-----	4			400	780	842	4,250	1,740	20,000
22-----	3	37*	--	200	1,000	540	3,340	2,530	22,800
23-----	3			100	460	124	6,530	3,670	279,000
24-----	3			100	161	43	6,940	5,240	95,200
25-----	3			150	179	72	3,810	3,860	39,700
26-----	3			150	143	58	3,450	3,380	31,500
27-----	2			150	105	43	3,160	3,960	33,800
28-----	2			150	66	27	2,700	4,370	31,900
29-----	2	12	--	150	46	19	2,400	5,500	35,600
30-----	2			--	--	--	2,180	6,600	38,800
31-----	2			--	--	--	1,910	6,200	32,000
Total -	179	--	1/17	7,399	--	1/29,840	70,020	--	595,200

1/Includes loads for days with less than 1 ton.

2/Sediment discharge computed by subdividing day.

LITTLE MISSOURI RIVER BASIN--Continued  
LITTLE MISSOURI RIVER AT MEDORA, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,590	5,220	22,400	542	2,090	3,060	136	2,700	991
2-----	1,210	4,900	16,000	477	1,800	2,320	140	--	3/1,300
3-----	953	3,390	8,720	542	3,980	5,820	144	7,500	2,920
4-----	846	3,300	7,560	452	2,530	3,090	153	6,800	2,810
5-----	701	2,700	5,110	369	2,700	2,690	156	4,400	1,850
6-----	701	2,010	3,800	338	2,860	2,610	458	19,000	2/28,500
7-----	709	2,180	4,170	302	1,370	1,120	1,060	25,000	2/74,300
8-----	589	1,500	2,390	306	1,280	1,060	1,000	20,500	2/62,900
9-----	535	1,160	1,680	316	2,480	2,120	364	15,500	15,200
10-----	446	1,130	1,360	320	2,500	2,160	252	10,800	7,350
11-----	379	1,700	1,740	343	1,970	1,820	252	8,700	5,920
12-----	358	1,320	1,280	329	4,990	4,430	272	9,400	6,900
13-----	353	1,260	1,220	306	4,500	3,720	423	14,600	16,700
14-----	324	790	691	316	2,320	1,980	261	12,900	9,790
15-----	302	500	408	302	1,590	1,300	776	22,300	2/72,700
16-----	264	422	301	302	2,680	2,190	1,640	35,400	2/162,000
17-----	248	389	260	237	3,500	2,240	1,070	20,400	2/59,900
18-----	234	337	213	208	3,490	1,960	701	14,100	26,700
19-----	245	375	248	162	1,550	678	2,600	26,000	2/199,000
20-----	237	310	198	169	1,050	479	1,270	18,600	2/66,300
21-----	234	255	161	122	265	87	1,040	14,700	2/41,200
22-----	264	1,020	727	104	210	59	3,080	20,700	2/177,000
23-----	500	--	3/5,500	86	116	27	3,350	19,100	2/176,000
24-----	1,230	11,500	38,200	86	96	22	2,470	10,000	66,700
25-----	1,490	12,900	51,900	79	62	13	1,980	7,200	38,500
26-----	1,280	9,600	33,200	86	480	111	1,620	5,300	23,200
27-----	1,240	8,000	26,800	404	3,590	2/3,620	1,490	6,500	26,100
28-----	1,000	6,000	16,200	212	11,600	6,640	908	6,900	16,900
29-----	756	4,200	8,570	188	5,300	2,690	740	4,100	8,190
30-----	582	2,960	4,650	198	3,600	1,920	781	5,900	12,400
31-----	--	--	--	169	4,800	2,190	--	--	--
Total	19,802	--	265,700	8,372	--	64,230	30,607	--	1,410,000
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	575	11,400	17,700	104	209	59	28	24	2
2-----	500	--	3/9,000	95	152	39	27		
3-----	477	3,500	4,510	88	156	37	26		
4-----	562	2,700	4,100	82	136	30	26		
5-----	589	2,500	3,980	73	125	25	26		
6-----	693	4,100	7,670	69	107	20	22	15	--
7-----	675	7,930	2/15,200	65	--	3/20	19		
8-----	2,240	12,500	2/76,300	73	8,600	1,700	22		
9-----	1,600	9,330	2/41,800	112	12,000	3,630	25		
10-----	926	6,000	15,000	783	17,600	2/55,600	25		
11-----	864	9,300	21,700	2,050	25,200	2/145,000	23	10	--
12-----	773	13,300	27,800	890	16,800	40,400	18		
13-----	989	12,200	32,600	542	13,500	19,800	18		
14-----	1,300	16,700	2/62,400	458	9,100	11,300	17		
15-----	1,060	16,600	2/52,900	423	8,300	9,480	15		
16-----	1,050	10,700	2/31,700	374	7,250	7,320	16	9.0	--
17-----	716	14,300	27,600	395	6,800	7,250	15		
18-----	477	11,000	14,200	358	5,500	5,320	15		
19-----	298	8,500	6,840	277	2,450	1,830	14		
20-----	298	7,700	6,200	181	700	342	12		
21-----	471	7,500	9,540	178	620	298	12	8.5	--
22-----	500	7,500	10,100	150	650	275	11		
23-----	502	7,800	10,600	136	570	209	9.0		
24-----	542	4,700	6,880	110	290	86	11		
25-----	423	3,500	4,000	77	238	49	9.8		
26-----	306	2,300	1,900	73	160	32	9.0	5.5	--
27-----	256	1,420	962	67	95	17	8.0		
28-----	198	1,220	652	58	68	11	5.5		
29-----	153	720	297	46	48	6	8.5		
30-----	136	540	198	43	45	5	11		
31-----	120	390	126	35	34	3	--	--	--
Total	20,269	--	524,500	8,465	--	310,200	505.8	--	1/21

Total discharge for year (second-foot-days)-----

Total load for year (tons)-----

167,478.8

3,200,000

1/Includes loads for days with less than 1 ton.

2/Sediment discharge computed by subdividing day.

3/Estimated.

## LITTLE MISSOURI RIVER BASIN--Continued

## LITTLE MISSOURI RIVER AT MEDORA, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
Feb. 26, 1948	1:30 p.m.	150	183	486	19	50	--	--	97	99	100	--	--	--	BN	BN	
Mar. 15	11:00 a.m.	4,980	1,760	2,370	--	8	23	29	36	44	56	87	92	92	BN	BN	
Mar. 15	11:00 a.m.	4,980	1,760	2,390	13	20	24	28	36	42	58	82	92	92	BN	BN	
Mar. 16	8:30 a.m.	5,610	1,460	2,140	28	33	38	40	42	44	53	78	91	91	BN	BN	
Mar. 18	6:30 p.m.	3,180	2,910	1,500	22	26	34	42	51	60	68	76	90	90	BN	BN	
Mar. 22	3:30 p.m.	3,160	2,190	2,960	22	28	33	36	45	50	58	85	100	100	BN	BN	
Mar. 24	5:40 p.m.	5,470	5,070	1,590	26	38	48	55	66	75	86	92	94	94	BN	BN	
Mar. 24	3:10 p.m.	5,470	5,070	1,680	6	18	--	--	66	72	84	96	100	100	BN	BN	
Mar. 27	3:10 p.m.	3,100	3,540	2,420	31	36	48	49	52	54	57	70	90	90	BN	BN	
Mar. 30	10:15 a.m.	2,240	6,710	1,800	31	45	58	69	76	78	83	86	90	90	BN	BN	
Apr. 5	5:45 p.m.	683	2,310	2,590	48	60	74	85	89	90	93	96	98	98	BN	BN	
Apr. 29	12:00 p.m.	724	4,120	3,420	45	68	83	88	92	94	95	97	99	99	BN	BN	
Apr. 29	12:00 m.	724	4,120	5,700	724	3	13	88	93	93	94	96	99	99	BN	BN	
May 13	1:00 p.m.	302	4,440	3,150	--	3	6	--	--	97	98	100	--	--	BN	BN	
June 8	11:20 a.m.	789	18,200	14,100	--	1	26	--	--	98	98	100	--	--	BN	BN	
June 16	9:00 a.m.	1,636	37,600	1,910	44	59	75	90	99	99	100	--	--	--	BN	BN	
June 17	9:30 a.m.	1,088	23,900	3,200	36	53	67	79	89	92	92	97	100	100	BN	BN	
June 17	9:30 a.m.	1,088	23,900	3,270	3	4	6	80	87	91	92	95	96	96	BN	BN	
June 22	11:50 a.m.	3,020	18,800	15,600	1	4	63	77	87	92	94	97	100	100	BN	BN	
June 22	8:00 p.m.	3,543	23,500	5,050	23	32	37	48	62	82	95	99	100	100	BN	BN	
June 23	4:40 p.m.	3,178	12,900	9,640	1	3	8	--	86	89	94	99	100	100	BN	BN	
June 24	4:15 p.m.	2,330	8,730	6,860	1	4	12	--	--	92	95	97	100	100	BN	BN	
July 1	10:15 a.m.	588	12,500	10,260	--	2	5	--	--	95	97	98	100	100	BN	BN	
July 9	4:15 p.m.	1,180	8,040	7,080	3	4	19	--	--	94	96	98	100	100	BN	BN	
July 15	4:00 p.m.	781	14,000	3,060	--	2	5	--	--	97	98	99	100	100	BN	BN	
July 15	4:00 p.m.	781	14,000	3,100	39	57	74	87	93	96	98	99	100	100	BN	BN	
Aug. 12	5:10 p.m.	180	15,500	2,570	5	8	18	--	--	96	97	98	100	100	BN	BN	
Aug. 12	5:10 p.m.	180	15,500	3,050	60	78	89	92	95	96	97	99	100	100	BN	BN	

## LITTLE MISSOURI RIVER BASIN--Continued

## LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.

LOCATION.--At gaging station at bridge on U.S. Highway 85, 17½ miles south of Watford City, McKenzie County, and 18 miles upstream from Cherry Creek.  
 DRAINAGE AREA.--8,480 square miles.  
 RECORDS AVAILABLE.--Sediment records: May 1947 to September 1948.  
 EXTREMES, 1947-48.--Sediment loads: Maximum, 305,000 tons per day July 21; minimum, 0 tons per day Feb. 6-19.  
 EXTREMES, 1947-48.--Sediment loads: Maximum, 1,150,000 tons per day June 23 1947; minimum, 0 tons per day Feb. 6-19, 1948.  
 REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Mar. 18, 1948----	7,960	7.0	403	4.5	0.10	32	9.5		47	138	96	4.0	0.5	1.4	0.16		287	0.39	--	129	16	46
May 18 -----	332	7.8	1,270	14	.04	63	24	224	276	276	486	6.0	.5	1.2	.61		957	1.30	--	256	30	66
June 8 -----	670	7.7	1,420	17	.00	61	24	263	294	552	552	4.1	.3	1.7	--		1,070	1.46	--	251	10	70
Aug. 26 -----	136	7.6	1,310	15	.00	76	26	191	218	506	506	4.0	.6	.0	.21		972	1.32	--	296	117	58

## LITTLE MISSOURI RIVER BASIN--Continued

## LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	37	84	8	44	78	9	30	38	3
2-----	39	74	8	40	83	9	30	35	3
3-----	37	62	6	40	76	8	27	30	2
4-----	36	66	6	42	68	8	25	28	2
5-----	35	72	7	39	68	7	22	25	2
6-----	35	62	6	39	67	7	20	22	1
7-----	36	52	5	26	66	5	18	--	--
8-----	36	54	5	33	63	6	17	--	--
9-----	37	58	6	30	50	4	16	--	--
10-----	37	58	6	27	42	3	15	--	--
11-----	36	54	5	25	--	--	14	--	--
12-----	35	48	4	23	--	--	13	--	--
13-----	33	50	4	22	--	--	12	--	--
14-----	33	50	4	21	--	--	12	--	--
15-----	32	47	4	20	--	--	11	--	--
16-----	33	44	4	20	--	--	11	--	--
17-----	32	47	4	19	--	--	11	--	--
18-----	31	47	4	19	12	1	10	--	--
19-----	31	43	4	19	--	--	10	--	--
20-----	35	46	4	18	--	--	10	--	--
21-----	44	52	6	18	--	--	10	--	--
22-----	49	62	8	18	--	--	10	--	--
23-----	57	66	10	18	--	--	10	--	--
24-----	63	66	11	18	--	--	10	--	--
25-----	61	63	10	18	--	--	10	--	--
26-----	58	48	8	19	--	--	10	--	--
27-----	57	49	8	20	--	--	10	--	--
28-----	53	53	8	21	--	--	10	--	--
29-----	49	58	8	23	--	--	9	--	--
30-----	46	64	8	25	37	2	8	--	--
31-----	44	70	8	--	--	--	7	--	--
Total -	1,277	--	197	--	--	1/92	438	--	1/27
	January			February			March		
1-----	6	--	--	1	--	--	160	--	--
2-----	5	--	--	1	--	--	130	--	--
3-----	4	--	--	1	--	--	100	--	--
4-----	3	--	--	1	--	--	80	--	--
5-----	3	--	--	1	--	--	70	--	--
6-----	3	--	--	0	--	0	70	--	--
7-----	3	--	--	0	--	0	60	--	--
8-----	3	--	--	0	--	0	60	--	--
9-----	3	--	--	0	--	0	50	--	--
10-----	3	--	--	0	--	0	50	--	--
11-----	2	--	--	0	--	0	50	--	--
12-----	2	--	--	0	--	0	50	10	1
13-----	2	--	--	0	--	0	50	12	2
14-----	2	--	--	0	--	0	60	108	17
15-----	2	--	--	0	--	0	100	337	91
16-----	2	--	--	0	--	0	220	295	175
17-----	2	--	--	0	--	0	4,000	470	5,080
18-----	2	--	--	0	--	0	9,000	1,880	45,700
19-----	2	--	--	0	--	0	7,400	2,180	43,600
20-----	2	--	--	1,500	500	2,020	7,200	2,780	54,000
21-----	1	--	--	2,500	680	4,590	8,700	4,120	96,800
22-----	1	--	--	1,000	380	1,030	7,400	5,000	99,900
23-----	1	--	--	600	260	421	10,000	5,380	145,000
24-----	1	--	--	500	227	306	10,300	6,900	192,000
25-----	1	--	--	400	210	227	6,400	4,060	70,200
26-----	1	--	--	300	123	100	3,600	2,990	29,100
27-----	1	--	--	250	112	76	3,500	4,580	43,300
28-----	1	--	--	220	107	64	4,000	5,180	55,900
29-----	1	--	--	190	--	2/50	4,500	5,520	67,100
30-----	1	--	--	--	--	--	5,070	6,090	83,400
31-----	1	--	--	--	--	--	3,880	4,650	48,700
Total -	67	--	2/5	7,465	--	1/8,880	96,310	--	1/1,080,000

1/Includes estimated load for missing days.

2/Estimated.

## LITTLE MISSOURI RIVER BASIN--Continued

## LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Suspended sediment, water year October 1947 to September 1948—Continued									
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,590	4,100	28,700	1,100	15,300	45,400	227	3,050	1,870
2-----	2,570	4,480	31,100	1,050	12,600	38,700	255	9,000	6,200
3-----	2,270	6,640	40,700	1,130	13,800	42,100	448	--	2/15,000
4-----	2,530	9,040	61,800	852	10,600	24,800	332	9,800	10,400
5-----	2,050	7,960	44,100	824	9,300	20,700	387	8,800	9,200
6-----	1,590	6,680	28,600	606	5,700	9,330	334	6,700	8,040
7-----	1,690	4,410	20,100	512	3,600	4,980	355	5,000	4,790
8-----	1,050	4,000	11,300	488	1,830	2,410	719	16,800	3/35,000
9-----	879	3,300	7,830	584	2,360	3,720	790	28,200	60,200
10-----	1,210	4,350	14,200	599	4,610	7,460	531	21,400	30,700
11-----	1,410	6,620	25,200	465	4,650	5,840	378	15,200	15,500
12-----	824	6,800	15,100	417	5,150	5,800	276	11,700	8,720
13-----	824	5,650	12,600	411	2,670	2,960	224	10,700	6,470
14-----	852	6,900	15,900	406	2,200	2,410	199	10,100	5,430
15-----	888	6,470	15,500	387	1,760	1,840	248	10,000	6,700
16-----	772	5,620	11,700	355	2,520	2,420	330	11,800	10,500
17-----	636	3,500	6,010	378	3,600	3,670	692	20,400	3/45,000
18-----	558	2,290	3,450	351	1,670	1,580	1,140	30,200	93,000
19-----	512	1,300	1,800	321	1,900	1,680	945	25,000	63,800
20-----	454	1,280	1,570	313	1,980	1,670	1,780	27,400	3/149,000
21-----	432	1,050	1,220	279	2,260	1,700	1,900	29,700	152,000
22-----	406	930	1,020	252	2,350	1,600	985	21,200	56,400
23-----	382	1,120	1,160	221	1,790	1,070	2,270	25,100	3/156,000
24-----	373	1,180	1,190	221	600	358	2,960	26,500	212,000
25-----	406	3,400	3,730	199	570	306	2,840	21,200	163,000
26-----	1,210	10,900	3/38,300	176	590	280	2,380	14,500	93,200
27-----	1,290	14,100	49,100	166	440	197	2,130	9,670	55,600
28-----	1,180	10,800	34,400	158	340	145	1,960	7,980	42,200
29-----	1,180	10,100	32,200	166	240	108	1,560	6,630	27,900
30-----	1,360	16,200	59,500	309	1,150	959	1,070	5,390	15,600
31-----	--	--	--	259	1,290	902	--	--	--
Total-----	34,378	--	619,100	13,955	--	234,100	30,705	--	1,557,000
July									
1-----	738	6,280	12,500	283	1,220	932	74	155	31
2-----	898	5,800	14,100	262	730	516	63	110	19
3-----	614	4,900	7,460	248	460	308	58	80	13
4-----	500	5,900	7,960	239	339	219	57	68	10
5-----	1,070	13,800	3/38,600	227	302	185	54	60	9
6-----	1,680	16,000	3/73,300	221	234	140	47	50	6
7-----	861	9,100	21,200	218	206	121	49	40	5
8-----	1,080	7,800	22,700	215	185	107	49	32	4
9-----	898	4,900	11,900	357	15,600	3/16,600	46	34	4
10-----	1,700	12,400	56,900	298	8,300	6,680	43	42	5
11-----	1,470	15,200	3/65,300	248	2,400	1,610	40	40	4
12-----	1,740	19,200	90,200	2,010	30,500	3/166,000	37	40	4
13-----	1,300	19,800	69,500	1,210	26,500	86,600	37	70	7
14-----	1,700	22,400	103,000	907	21,000	51,400	35	146	14
15-----	2,110	27,000	154,000	790	16,200	34,600	35	130	12
16-----	1,790	21,800	105,000	599	14,400	23,300	33	50	4
17-----	1,070	19,200	55,500	518	13,800	19,300	30	40	3
18-----	1,140	15,900	48,900	422	10,400	11,800	27	42	3
19-----	955	11,200	28,900	477	9,100	11,700	26	50	4
20-----	1,210	19,700	3/70,600	443	7,400	8,850	26	50	4
21-----	2,550	42,700	305,000	309	6,400	5,340	24	40	3
22-----	1,290	27,800	96,800	259	4,700	3,290	24	110	7
23-----	888	14,200	34,000	233	3,600	2,260	24	315	20
24-----	722	8,500	16,600	199	1,420	763	23	53	3
25-----	714	6,000	11,600	166	715	320	26	30	2
26-----	682	5,700	10,500	141	450	171	27	42	3
27-----	599	5,350	8,650	130	377	132	23	32	2
28-----	512	3,580	4,950	114	340	105	23	22	1
29-----	411	2,580	2,860	92	255	63	18	20	1
30-----	364	1,400	1,380	84	215	49	18	15	1
31-----	309	1,320	1,100	82	225	50	--	--	--
Total-----	33,565	--	1,551,000	12,001	--	453,500	1,096	--	208
Total discharge for year (second-foot-days)-----232,021									
Total discharge for year (tons)-----5,504,000									
2/Estimated. 3/Sediment discharge computed by subdividing day.									

LITTLE MISSOURI RIVER BASIN--Continued  
LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
Feb. 20, 1948-----	5:15 p.m.	4,470	1,480	1,220	62	76	82	88	90	95	96	98	99			BW	
Mar. 16-----	4:30 p.m.	218	372	343	90	96	97	98	99	100	--	--	--			BW	
Mar. 17-----	4:30 p.m.	6,100	632	495	50	56	63	69	84	86	93	96	98			BW	
Mar. 18-----	10:10 a.m.	7,800	1,000	776	--	29	30	32	35	45	66	79	90			BW	
Mar. 18-----	11:00 a.m.	8,000	1,330	618	27	30	31	35	40	52	67	81	90			BW	
Mar. 18-----	1:30 p.m.	8,020	2,010	1,310	18	20	23	28	33	45	62	81	91			BW	
Mar. 18-----	7:00 p.m.	11,000	2,230	2,560	16	19	20	23	27	33	43	72	86			BW	
Mar. 19-----	7:20 a.m.	7,700	1,320	1,100	31	33	34	36	38	43	56	64	71			BW	
Mar. 19-----	4:50 p.m.	6,840	2,280	1,630	20	24	26	32	39	52	68	88	93			BW	
Mar. 19-----	6:35 p.m.	6,840	1,820	1,200	28	29	31	37	46	61	78	90	96			BW	
Mar. 20-----	7:20 a.m.	7,300	1,320	845	40	42	43	45	47	53	64	75	81			BW	
Mar. 20-----	5:20 p.m.	7,700	2,680	1,620	--	25	29	33	42	53	77	88	95			BW	
Mar. 21-----	9:47 a.m.	8,500	1,990	1,190	--	30	31	36	41	54	71	80	87			BW	
Mar. 21-----	5:00 p.m.	9,070	4,800	2,700	14	16	20	24	31	46	66	87	92			BW	
Mar. 22-----	7:35 a.m.	7,800	4,020	2,380	13	18	23	29	39	55	75	94	98			BW	
Mar. 22-----	4:40 p.m.	6,900	3,990	2,920	14	18	21	27	37	53	77	92	98			BW	
Mar. 23-----	7:30 a.m.	8,200	2,150	1,510	33	37	41	46	53	62	77	97	99			BW	
Mar. 23-----	6:45 p.m.	12,000	5,630	3,560	24	30	36	43	54	68	82	97	99			BW	
Mar. 24-----	6:55 a.m.	11,500	4,090	4,120	15	20	25	29	36	43	68	88	97			BW	
Mar. 24-----	12:50 p.m.	8,790	4,740	3,040	25	31	37	43	50	59	66	80	91			BW	
Mar. 24-----	4:45 p.m.	8,500	5,070	3,660	--	29	34	40	47	55	69	96	100			BW	
Mar. 25-----	8:56 a.m.	6,700	3,470	2,600	--	38	46	53	60	66	77	93	99			BW	
Mar. 25-----	2:00 p.m.	5,900	3,720	3,320	--	52	60	64	69	72	80	96	99			BW	
Mar. 25-----	5:25 p.m.	6,200	2,470	1,660	--	75	80	82	83	85	88	95	98			BW	
Mar. 26-----	10:20 a.m.	3,700	2,470	1,890	45	57	61	67	70	72	78	95	99			BW	



Mar. 26, 1948	5:47 p. m.	3,000	2,910	2,040	42	48	55	63	71	82	93	98	99	BW
Mar. 27	6:06 a. m.	3,000	4,040	2,360	27	33	42	50	63	77	89	98	99	BW
Mar. 28	9:45 a. m.	4,300	3,960	2,660	32	41	49	60	74	86	93	99	100	BW
Mar. 28	1:00 p. m.	4,100	5,220	3,370	27	35	43	51	62	74	83	92	96	BW
Mar. 29	7:00 a. m.	5,300	4,710	3,460	32	41	50	62	74	84	89	95	98	BW
Mar. 29	5:45 p. m.	4,400	4,800	3,510	36	44	55	66	79	93	98	100	--	BW
Mar. 30	7:10 a. m.	5,610	5,120	3,320	36	47	58	72	87	96	99	100	--	BW
Mar. 30	11:00 a. m.	5,460	7,600	5,850	13	21	40	46	55	63	69	86	92	BW
Mar. 30	4:45 p. m.	5,040	4,660	3,220	39	49	61	73	87	98	100	--	--	BW
Mar. 31	7:15 a. m.	4,290	4,080	2,550	44	55	67	75	86	94	99	--	--	BW
Mar. 31	4:15 p. m.	3,460	4,120	2,660	43	54	65	74	84	93	97	99	--	BW
Apr. 1	7:47 a. m.	2,570	3,500	2,300	53	65	80	88	93	96	98	99	--	BW
Apr. 1	4:00 p. m.	2,380	4,170	2,620	45	54	66	80	90	96	98	99	--	BW
Apr. 2	7:18 a. m.	2,680	4,070	2,990	42	55	63	72	81	86	92	97	99	BW
Apr. 2	11:00 a. m.	2,530	5,290	4,260	33	38	46	52	58	65	71	87	95	BW
Apr. 2	6:10 p. m.	2,310	4,140	2,860	44	57	71	81	90	97	99	100	--	BW
Apr. 3	7:10 a. m.	2,190	5,050	3,420	44	56	70	80	90	96	99	100	--	BW
Apr. 3	4:30 p. m.	2,130	7,580	6,020	34	43	56	66	77	88	93	97	98	BW
Apr. 4	8:25 a. m.	2,460	9,140	5,840	29	38	49	62	73	83	90	95	98	BW
Apr. 4	6:19 p. m.	2,340	7,620	4,710	39	53	68	82	92	97	99	100	--	BW
Apr. 5	7:23 a. m.	2,400	7,740	5,140	37	52	66	79	88	94	97	99	100	BW
Apr. 5	5:39 p. m.	1,720	7,830	5,310	38	55	71	86	94	97	98	99	100	BW
Apr. 6	7:35 a. m.	1,620	6,330	3,980	38	51	70	82	91	96	98	99	--	BW
Apr. 6	5:45 p. m.	1,510	6,270	3,800	42	55	73	87	95	98	99	100	--	BW
Apr. 7	10:35 a. m.	1,900	3,840	2,050	55	70	86	95	99	100	--	--	--	BW

LITTLE MISSOURI RIVER BASIN--Continued  
LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
Apr. 8, 1948	5:55 p. m.	975	4,100	2,920	38	61	85	95	98	99	100	--	BW	
Apr. 9	11:30 a. m.	898	2,980	2,020	24	60	81	89	96	98	99	100	BW	
Apr. 21	3:20 p. m.	422	985	736	55	65	76	84	89	92	94	97	BW	
Apr. 25	2:10 p. m.	411	1,160	874	49	66	76	83	88	89	94	96	BW	
Apr. 25	7:08 p. m.	427	8,010	7,100	6	13	30	38	49	82	86	92	BW	
Apr. 26														
Apr. 26	7:35 a. m.	994	8,100	6,500	5	12	30	43	63	79	83	91	BW	
Apr. 26	3:40 p. m.	1,640	12,500	4,980	31	38	52	70	82	89	94	98	BW	
Apr. 26	5:00 p. m.	1,620	13,600	4,510	30	38	54	70	83	90	95	98	BW	
Apr. 27	11:55 a. m.	1,290	14,700	2,500	50	60	73	82	88	92	96	98	BW	
Apr. 27	7:25 p. m.	1,300	13,500	2,750	51	60	72	81	88	92	95	98	BW	
Apr. 28														
Apr. 28	7:16 a. m.	1,220	11,200	4,160	42	56	67	78	85	91	94	97	BW	
Apr. 28	4:00 p. m.	1,260	10,200	3,980	47	62	72	82	90	94	97	99	BW	
Apr. 29	8:50 a. m.	1,260	11,000	4,470	45	60	68	75	82	84	89	100	BW	
Apr. 29	4:00 p. m.	1,250	10,300	3,760	49	62	71	80	84	88	91	96	BW	
Apr. 30	11:00 a. m.	1,410	21,300	2,260	40	50	60	69	81	86	92	97	BW	
Apr. 30														
Apr. 30	3:20 p. m.	1,900	21,500	1,940	35	51	61	70	81	89	94	97	BW	
May 1	8:11 a. m.	1,180	17,200	3,050	44	57	70	80	88	94	96	99	BW	
May 1	6:15 p. m.	1,060	12,200	1,280	44	62	72	83	92	96	97	100	BW	
May 2	6:10 p. m.	1,210	13,200	2,000	42	56	67	77	85	91	93	97	BW	
May 3	10:05 a. m.	1,220	13,500	5,090	--	52	64	73	84	90	97	99	BW	
May 3														
May 3	4:21 p. m.	1,080	13,900	2,530	42	57	69	81	89	92	96	98	BN	
May 3	4:21 p. m.	1,080	13,900	2,660	50	63	72	82	89	92	96	99	BWC	
May 4	8:43 a. m.	870	11,000	4,300	36	64	76	84	92	93	96	98	BW	
May 4	3:30 p. m.	798	9,850	3,540	54	70	80	90	97	98	99	100	BN	
May 5	8:03 a. m.	880	8,420	1,600	68	68	80	88	92	94	98	100	BN	

May 5	8:03 a.m.	880	8,420	1,720	61	70	82	89	93	95	98	100	--	BW
May 5	3:20 p.m.	824	9,520	1,800	58	67	81	89	94	96	96	98	99	BW
May 6	8:11 a.m.	651	5,360	1,820	66	74	84	92	96	99	100	--	--	BW
May 7	7:48 a.m.	588	4,100	1,720	56	74	85	91	96	99	100	--	--	BW
May 8	7:52 a.m.	589	1,900	1,580	53	67	78	88	95	98	99	100	--	BW
May 9	10:24 a.m.	577	1,900	1,530	54	65	75	86	95	98	99	100	--	BW
May 10	8:25 a.m.	614	4,660	1,790	58	76	86	93	98	100	--	--	--	BW
May 11	7:48 a.m.	525	4,430	1,850	59	82	89	96	98	99	100	--	--	BW
May 12	7:35 a.m.	443	5,610	2,340	27	80	98	98	99	100	--	--	--	BW
May 13	8:00 a.m.	427	2,580	2,040	45	63	83	88	96	98	99	100	--	BW
May 14	5:30 p.m.	422	2,270	1,660	48	64	86	89	92	94	96	98	99	BW
May 15	2:40 p.m.	387	2,520	1,790	28	38	57	66	74	83	90	94	98	BW
May 15	11:00 a.m.	387	1,760	1,440	42	60	83	88	95	97	98	100	--	BW
May 16	2:50 p.m.	364	2,840	1,850	39	66	91	92	94	95	97	98	100	BW
May 17	2:05 p.m.	401	3,940	3,120	--	--	--	--	96	97	98	100	--	BW
May 18	8:05 a.m.	351	1,360	865	52	70	86	94	98	100	--	--	--	BW
May 18	5:50 p.m.	330	1,770	2,220	--	--	--	--	98	98	99	100	--	BW
May 19	11:15 a.m.	342	1,430	1,020	39	65	86	90	98	100	--	--	--	BW
May 20	10:05 a.m.	331	2,090	1,670	--	--	--	--	94	98	100	--	--	BW
May 21	7:35 p.m.	265	2,270	1,520	--	--	--	--	98	98	99	100	--	BW
May 22	7:30 p.m.	248	2,410	813	53	82	92	96	97	98	100	--	--	BW
May 22	7:30 p.m.	248	2,410	850	5	6	27	--	--	98	100	--	--	BN
May 23	3:20 p.m.	242	1,660	1,210	60	78	94	96	98	98	99	100	--	BW
May 24	10:40 a.m.	221	595	456	49	71	86	94	96	98	99	100	--	BW
May 30	9:45 a.m.	359	1,240	982	34	45	58	72	79	87	93	97	99	BW

LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--Continued  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
May 31, 1948	9:10 a. m.	272	1,110	664	--	--	--	--	96	96	98	100	--	--	BW
June 2	9:30 a. m.	262	7,970	2,950	71	88	96	98	98	99	100	--	--	--	BW
June 4	4:30 p. m.	340	9,520	1,600	61	76	90	98	98	100	--	--	--	--	BW
June 5	9:05 a. m.	401	9,020	3,490	53	71	87	94	97	98	98	100	--	--	BW
June 6	9:10 a. m.	334	7,210	2,380	--	--	--	--	--	97	98	99	100	--	BN
June 6	9:10 a. m.	334	7,210	2,500	40	68	95	96	96	97	98	99	100	--	BW
June 7	9:20 a. m.	378	4,450	3,480	40	62	85	93	96	97	98	99	100	--	BW
June 7	3:30 p. m.	342	5,190	1,990	56	70	90	94	97	98	99	100	--	--	BW
June 8	7:30 p. m.	926	17,200	1,500	38	53	68	82	80	92	96	98	99	--	BW
June 9	2:00 p. m.	842	29,800	2,010	52	66	83	88	90	92	93	97	--	--	BW
June 9	7:20 p. m.	824	29,400	2,580	55	72	84	90	93	94	96	98	99	--	BW
June 9	7:30 p. m.	738	29,300	2,220	50	64	80	86	91	94	94	96	99	--	BW
June 10	8:10 a. m.	525	22,500	1,950	60	75	90	94	97	98	98	99	100	--	BW
June 12	8:40 a. m.	290	11,800	2,340	68	85	96	98	99	100	--	--	--	--	BW
June 13	2:10 p. m.	230	10,800	2,020	1	2	16	--	--	97	98	100	--	--	BN
June 13	2:10 p. m.	230	10,800	1,980	64	83	95	97	98	99	100	--	--	--	BW
June 14	9:30 a. m.	193	10,100	1,580	66	86	92	96	98	99	100	--	--	--	BW
June 15	3:05 a. m.	330	9,860	1,690	62	79	86	92	97	98	99	100	--	--	BW
June 16	4:10 p. m.	338	12,900	2,340	67	84	94	97	98	99	100	--	--	--	BW
June 17	10:35 a. m.	525	14,200	2,500	60	72	86	90	92	94	96	98	99	--	BW
June 18	8:30 a. m.	1,056	29,200	1,080	42	58	72	78	83	84	89	94	98	--	BW
June 19	1:056	1,056	27,200	2,530	4	6	9	--	--	92	93	95	--	--	BN
June 19	8:30 a. m.	1,056	27,200	2,530	52	65	78	87	90	92	94	96	--	--	BW
June 19	3:40 p. m.	898	24,000	2,120	50	60	72	78	83	84	87	97	99	--	BW
June 20	3:30 p. m.	2,293	29,200	2,820	35	45	55	64	74	84	92	97	99	--	BW

June 21	11:10 a. m.	1,900	29,900	2,630	42	53	63	75	83	87	93	95	98	BW
June 21	4:30 p. m.	1,900	25,700	1,960	47	58	72	83	83	92	93	96	98	BW
June 21	5:40 p. m.	1,510	25,600	2,560	50	61	71	76	84	88	93	96	98	BW
June 22	9:40 a. m.	955	22,300	1,960	54	66	79	85	89	91	94	97	98	BW
June 22	4:40 p. m.	955	19,000	1,810	59	74	87	93	96	97	98	99	100	BW
June 23	10:40 p. m.	2,314	23,900	2,390	43	53	62	73	83	90	95	98	100	BW
June 23	5:15 p. m.	2,775	25,300	2,260	42	52	58	69	77	89	94	98	99	BW
June 23	5:15 p. m.	2,775	25,300	2,320	--	1	19	--	--	88	94	98	98	BN
June 24	8:40 a. m.	2,867	26,500	2,140	35	46	54	67	77	91	96	98	100	BW
June 24	1:40 p. m.	3,034	24,000	2,350	32	43	56	65	80	91	96	98	100	BW
June 25	7:20 a. m.	2,962	21,000	1,270	41	53	67	76	88	94	98	99	100	BW
June 26	10:30 a. m.	2,314	13,800	2,460	43	53	64	71	81	89	95	98	99	BW
June 26	9:10 p. m.	2,484	12,400	1,850	35	46	57	67	76	86	93	95	98	BW
June 27	10:15 a. m.	2,272	8,500	1,250	43	54	63	70	82	90	97	99	100	BW
June 27	8:15 p. m.	1,919	8,890	1,700	42	56	66	73	86	93	96	99	100	BW
June 28	7:50 a. m.	1,975	7,840	2,900	45	54	61	70	79	89	95	97	99	BW
June 28	6:10 p. m.	2,030	7,540	3,750	28	37	42	51	58	67	72	85	90	BW
June 28	6:10 p. m.	2,030	7,540	3,830	--	7	40	--	--	65	72	85	90	BN
June 29	7:40 a. m.	1,722	6,940	2,140	46	58	68	77	85	93	96	98	100	BW
June 29	7:40 p. m.	1,339	5,800	2,260	49	63	74	80	89	97	100	--	--	BW
June 30	8:40 a. m.	1,109	5,090	1,720	53	65	75	80	86	92	94	96	98	BW
June 30	7:40 p. m.	975	5,790	2,360	60	75	85	91	95	97	100	--	--	BW
July 1	2:45 p. m.	706	6,260	2,002	64	78	88	90	96	97	98	100	--	BW
July 1	7:40 a. m.	706	5,940	1,900	62	77	89	93	95	98	99	100	--	BW
July 1	7:30 p. m.	833	6,530	2,260	62	77	87	92	95	98	99	100	--	BW

## LITTLE MISSOURI RIVER BASIN--Continued

## LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948.--Continued

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
July 2, 1948	7:10 a.m.	1,004	6,220	2,180	53	68	78	87	91	95	98	99	100		BW
July 2	7:20 p.m.	815	4,900	1,580	64	79	92	93	97	98	99	100	--		BW
July 3	9:47 a.m.	628	4,520	1,470	56	73	85	93	95	97	99	100	--		BW
July 3	4:30 p.m.	584	4,380	1,570	63	78	89	92	96	97	99	100	--		BW
July 4	8:30 a.m.	525	4,290	1,590	63	82	93	96	98	99	100	--			BW
July 4	6:30 p.m.	488	6,100	1,800	61	77	91	94	97	99	100	--			BW
July 5	6:20 a.m.	815	17,300	3,240	49	67	85	96	--	--	--				BW
July 5	10:40 a.m.	1,274	11,000	2,130	42	55	65	73	85	89	95	97	100		BW
July 6	10:40 a.m.	2,170	14,400	2,680	1	8	--	--	94	98	99	100	--		BN
July 6	10:40 a.m.	2,170	14,400	2,630	34	49	70	85	97	99	99	100	--		BW
July 7	7:10 a.m.	1,099	9,400	1,860	42	60	82	91	97	98	99	100	--		BW
July 7	5:35 p.m.	788	7,140	2,290	40	57	73	83	89	91	94	96	98		BW
July 8	3:37 p.m.	1,200	7,410	3,730	22	36	48	57	65	70	73	86	93		BW
July 9	7:29 a.m.	852	5,060	1,930	40	54	70	81	88	92	97	99	100		BW
July 9	6:37 p.m.	842	4,240	1,600	41	51	69	76	84	89	94	97	100		BW
July 10	6:05 a.m.	1,956	11,900	1,720	37	46	56	63	74	85	93	96	98		BW
July 10	7:10 p.m.	1,606	13,300	2,350	49	63	75	84	89	93	96	98	100		BW
July 11	9:06 a.m.	1,200	13,400	2,760	53	67	78	85	90	93	97	99	100		BW
July 12	7:15 a.m.	2,050	18,000	1,520	38	51	64	78	88	94	98	99	100		BW
July 12	8:15 p.m.	1,313	19,000	1,890	42	55	69	81	89	92	98	99	100		BW
July 13	8:05 a.m.	1,670	20,800	2,620	31	45	60	70	77	85	90	93	96		BW
July 14	10:03 a.m.	1,590	20,400	1,960	34	44	58	68	76	80	82	86	90		BW
July 14	5:35 p.m.	1,775	23,200	1,980	23	36	53	64	74	80	82	86	91		BW
July 15	1:45 p.m.	1,810	24,400	4,020	15	36	72	77	85	90	95	98	100		BW
July 18	7:40 p.m.	1,326	14,200	1,720	71	86	93	96	98	99	100	--	--		BW

July 29	-----	2,730	2,490	2,700	46	64	88	95	98	98	99	100	100	100	100	BW
July 29	12:00 m.	2,730	2,490	2,700	--	2	8	--	97	98	99	100	100	100	100	BW
July 30	8:10 a. m.	2,325	1,380	2,480	47	71	88	87	93	95	98	100	100	100	100	BW
July 31	8:26 a. m.	321	1,290	748	56	79	87	90	94	96	97	99	100	100	100	BW
Aug. 1	1:55 p. m.	279	1,240	821	--	--	--	--	--	94	97	99	100	100	100	BW
Aug. 2	7:25 a. m.	265	800	479	45	67	80	92	95	98	98	99	100	100	100	BW
Aug. 3	7:25 a. m.	255	493	249	39	60	74	83	96	99	99	100	100	100	100	BW
Aug. 9	2:40 p. m.	448	21,700	1,450	47	60	73	88	94	98	98	99	100	100	100	BW
Aug. 10	7:35 a. m.	298	10,700	1,130	14	13	27	--	95	97	99	100	100	100	100	BW
Aug. 10	7:35 a. m.	298	10,700	1,000	62	80	94	95	97	98	99	100	100	100	100	BW
Aug. 11	7:40 a. m.	265	2,480	96	--	56	71	80	84	91	93	97	100	100	100	BW
Aug. 12	9:10 a. m.	2,110	30,400	1,770	37	49	65	80	95	99	99	100	100	100	100	BW
Aug. 12	12:55 p. m.	1,790	31,800	2,630	32	44	55	61	74	82	--	--	--	--	--	BW
Aug. 13	9:10 a. m.	1,261	27,100	1,780	54	68	81	93	97	99	99	100	100	100	100	BW
Aug. 14	1:24 p. m.	888	20,400	2,000	57	71	84	92	94	97	100	--	--	--	--	BW
Aug. 15	7:40 p. m.	755	15,100	2,650	--	--	--	--	96	97	98	99	100	100	100	BW
Aug. 19	8:20 a. m.	489	9,320	1,740	73	85	92	96	96	97	98	99	100	100	100	BW
Aug. 20	4:45 p. m.	422	7,030	2,470	73	82	91	93	96	97	98	99	100	100	100	BW
Aug. 22	6:55 p. m.	248	3,880	1,640	76	85	93	98	100	--	--	--	--	--	--	BW

LITTLE MISSOURI RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN LITTLE MISSOURI RIVER BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per- cent so- dium	
																Parts per mil- lion	Tons per acre- foot	Total	Non- carbon- ate		
LITTLE MISSOURI RIVER AT MARMARTH																					
Mar. 15, 1948-----	6,100	6.8	233	6.9	0.15	9.0	4.2	43	88	54	88	54	2.0	0.5	1.9	0.07	189	0.26	40	0	70
May 19-----	80	7.8	1,140	7.4	.02	57	23	204	270	430	270	430	7.5	.5	.6	.26	844	1.15	237	16	65
June 10-----	48	7.8	1,350	12	.00	51	18	253	305	466	305	466	6.8	.6	5.5	--	965	1.31	201	0	73
July 23-----	340	7.8	1,090	13	.00	82	25	129	136	450	136	450	4.0	.2	2.6	.21	842	1.15	307	195	48
Aug. 18-----	2.2	7.8	796	11	.02	56	14	122	154	314	154	314	5.0	.7	.9	.08	598	.81	197	71	57
Sept. 3-----	8.5	8.4	1,350	15	.02	58	22	250	1,306	494	1,306	494	9.0	.5	.0	.23	1,000	1.36	235	0	70

1/Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).



## LITTLE MISSOURI RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN LITTLE MISSOURI RIVER BASIN

## IN NORTH DAKOTA--Continued

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
LITTLE MISSOURI RIVER AT MARMARTH			
Oct. 8, 1947 -----	12	66	2.1
Oct. 22 -----	17	389	18
Nov. 13 -----	13	85	3.0
Dec. 4 -----	30	152	12
Dec. 16 -----	6.5	85	1.5
Dec. 29 -----	10	78	2.1
Jan. 19, 1948 -----	3.9	170	1.8
Feb. 12 -----	1.5	74	.3
Feb. 19 -----	566	577	882
Feb. 21 -----	152	274	112
Mar. 1 -----	142	48	18
Mar. 15 -----	5,080	1,700	23,300
Mar. 16 -----	2,400	1,120	7,260
Mar. 18 -----	1,420	849	3,260
Mar. 21 -----	1,710	1,800	8,310
Mar. 22 -----	3,780	4,000	40,800
Mar. 23 -----	3,240	4,920	43,000
Mar. 29 -----	1,870	5,680	28,700
Apr. 5 -----	441	1,310	1,560
Apr. 23 -----	1,980	8,990	48,100
May 6 -----	185	824	412
May 19 -----	81	232	51
June 10 -----	49	325	43
June 23 -----	2,080	4,330	24,300
July 8 -----	710	7,640	14,600
July 9 -----	514	3,930	5,450
July 23 -----	324	3,450	3,020
Aug. 5 -----	44	103	12
Aug. 18 -----	125	1,450	489
Sept. 3 -----	8.0	45	1.0
Sept. 15 -----	6.5	14	.2
Sept. 29 -----	3.9	18	.2

LITTLE MISSOURI RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN LITTLE MISSOURI RIVER BASIN IN NORTH DAKOTA--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Instan- taneous dis- charge (second feet)	Suspended sediment											Methods of analysis		
		Concen- tration of sample (ppm)	Instan- taneous discharge (tons per day)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000
LITTLE MISSOURI RIVER AT MARMARTH															
Feb. 19, 1948	566	577	882	580	65	79	86	93	96	98	99	100	--		BD
Mar. 15	5,080	1,700	23,300	1,490	33	46	56	69	80	88	93	96	100		BD
Mar. 16	2,400	1,120	7,260	904	28	37	44	55	66	80	90	95	100		BD
Mar. 18	1,420	849	3,260	698	28	36	43	57	72	86	92	96	100		BD
Mar. 21	1,710	1,800	8,310	1,420	36	43	49	56	66	75	84	94	100		BD
Mar. 22	3,780	4,000	40,800	3,190	33	41	50	57	64	71	78	90	100		BD
Mar. 29	1,870	5,680	28,700	4,890	27	41	54	64	73	83	89	100		BD	
Apr. 5	441	1,310	1,560	1,090	60	82	88	92	94	96	97	100		BD	
Apr. 23	1,980	8,990	48,100	7,030	44	58	69	78	88	94	97	98	100		BD
Apr. 23	1,980	8,990	48,100	5,740	3	6	26	--	--	94	96	98	100		BN
May 6	185	824	412	752	11	15	23	--	--	95	96	99	100		BN
June 23	2,080	4,330	24,300	3,990	6	11	44	--	--	91	94	96	100		BN
July 8	710	7,640	14,600	6,120	2	4	14	--	--	95	97	100	--		BN
July 9	514	3,830	5,450	3,320	2	3	6	--	--	96	98	99	100		BN
July 23	324	3,450	3,020	4,350	52	78	94	97	98	98	100	--	--		BD
July 23	324	3,450	3,020	4,350	2	2	5	--	--	95	97	98	100		BN

## KNIFE RIVER BASIN

## KNIFE RIVER NEAR GOLDEN VALLEY, N. DAK.

LOCATION.--At gaging station at bridge on county highway, 2½ miles downstream from Elm Creek, and 10 miles south of Golden Valley, Mercer County. DRAINAGE AREA.--1,230 square miles.

RECORDS AVAILABLE.--Sediment records: June 1946 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 26,100 tons per day June 4; minimum, less than 1 ton per day on many days.

EXTREMES, 1946-48.--Sediment loads: Maximum, 29,680 tons per day June 23, 1947; minimum, less than 1 ton per day on many days each year.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent so-dium
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
Mar. 20, 1948-----	2,950	6.7	199	4.5	0.80	12	5.0	25	88	30	0.2	0.0	0.0	1.5	0.00	152	0.21	50	0	52
May 24-----	19	7.9	1,470	7.8	.00	56	18	281	490	400	3.0	2.1	2.1	1.4	.24	1,010	1.37	214	0	74
June 4-----	1,380	8.2	1,557	20.	.02	34	34	34	203	122	2.1	2.1	.2	2.2	--	408	1.55	225	59	25
July 12-----	44	8.1	1,560	12	.07	79	29	286	515	468	4.5	3.3	.3	2.2	.35	1,160	1.58	316	0	66
Aug. 24-----	8.5	8.5	1,590	13	.02	48	31	327	1,551	478	6.0	5.5	.5	.4	.12	1,180	1.60	247	0	74

1/Includes equivalent of 24 parts per million of carbonate (CO<sub>3</sub>).

## KNIFE RIVER BASIN--Continued

## KNIFE RIVER NEAR GOLDEN VALLEY, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	10	45	1.2	12	24	0.8	13	--	--
2-----	10	53	1.4	11	22	.7	13	--	--
3-----	10	53	1.4	11	23	.7	13	--	--
4-----	10	52	1.4	12	25	.8	12	--	--
5-----	10	47	1.3	12	31	1.0	11	--	--
6-----	10	44	1.2	12	27	.9	10	--	--
7-----	10	39	1.1	11	25	.7	10	--	--
8-----	9.8	40	1.1	10	23	.6	9	--	--
9-----	10	41	1.1	11	22	.7	9	--	--
10-----	10	42	1.1	11	23	.7	9	20	0.5
11-----	11	40	1.2	11	23	.7	9	--	--
12-----	11	36	1.1	10	20	.5	9	--	--
13-----	10	36	1.0	10	20	.5	9	--	--
14-----	10	34	.9	11	22	.7	9	--	--
15-----	12	33	1.1	11	25	.7	9	--	--
16-----	11	52	1.5	11	25	.7	9	--	--
17-----	11	53	1.6	11	21	.6	9	--	--
18-----	11	54	1.6	11	26	.8	9	--	--
19-----	11	53	1.6	11	23	.7	10	--	--
20-----	10	51	1.4	12	24	.8	10	--	--
21-----	9.8	52	1.4	11	26	.8	11	--	--
22-----	9.8	37	1.0	11	--	--	11	--	--
23-----	10	29	.8	11	--	--	10	--	--
24-----	11	27	.8	11	--	--	10	--	--
25-----	12	25	.8	11	--	--	10	--	--
26-----	11	25	.7	12	--	--	10	--	--
27-----	11	22	.7	13	--	--	10	--	--
28-----	11	30	.9	13	20	.7	10	--	--
29-----	11	27	.8	13	--	--	9	10	.2
30-----	11	25	.7	13	--	--	9	--	--
31-----	12	25	.8	--	--	--	9	--	--
Total -	327.4	--	34.7	341	--	1/21	310	--	1/13
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	9	--	--	5	--	--	30	20	1.6
2-----	9	--	--	5	--	--	25	19	1.3
3-----	9	--	--	5	--	--	20	18	1.0
4-----	9	--	--	5	--	--	17	18	.8
5-----	9	--	--	5	8	0.1	15	18	.7
6-----	8	--	--	5	--	--	13	19	.7
7-----	8	--	--	5	--	--	12	--	--
8-----	8	--	--	5	--	--	12	--	--
9-----	8	--	--	5	--	--	11	--	--
10-----	8	--	--	5	--	--	11	--	--
11-----	8	--	--	4	--	--	11	--	--
12-----	7	--	--	4	--	--	11	--	--
13-----	7	--	--	4	--	--	10	--	--
14-----	7	10	0.2	4	--	--	10	--	--
15-----	7	--	--	4	--	--	10	22	.6
16-----	7	--	--	4	--	--	15	26	1.1
17-----	7	--	--	4	--	--	50	32	4.3
18-----	7	--	--	4	--	--	180	68	33
19-----	6	--	--	4	--	--	1,000	330	891
20-----	6	--	--	4	8	.1	2,900	498	3,900
21-----	6	--	--	4	--	--	2,500	482	3,250
22-----	6	--	--	20	52	2.8	2,400	534	3,460
23-----	6	--	--	60	46	7.5	4,100	763	8,450
24-----	6	--	--	50	28	3.8	4,000	705	7,610
25-----	6	--	--	70	28	5.3	2,300	330	2,050
26-----	6	--	--	60	37	6.0	1,500	370	1,500
27-----	6	--	--	50	30	4.0	890	289	694
28-----	5	--	--	40	30	3.2	980	498	2/1,370
29-----	5	--	--	35	22	2.1	1,400	745	2/2,810
30-----	5	--	--	--	--	--	1,540	813	3,380
31-----	5	--	--	--	--	--	1,290	740	2/2,580
Total -	216	--	1/6	479	--	1/37	27,263	--	1/42,000

1/Includes estimated load for missing days.

2/Sediment discharge computed by subdividing days.

KNIFE RIVER BASIN--Continued  
KNIFE RIVER NEAR GOLDEN VALLEY, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	890	--	3/1,800	64	1,160	200	24	82	5.3
2-----	681	728	1,340	414	2,100	2/2,480	20	--	3/5
3-----	450	--	3/800	435	1,650	1,940	155	2,040	2/2,720
4-----	628	654	1,110	645	1,730	3,020	1,280	7,850	2/26,100
5-----	450	699	849	465	2,020	2,540	2,080	4,020	2/22,800
6-----	611	--	3/1,300	277	1,500	1,120	725	2,350	2/4,720
7-----	628	--	3/1,300	170	1,090	500	225	1,690	1,030
8-----	361	655	638	117	774	245	148	1,220	488
9-----	264	595	424	92	581	144	94	765	194
10-----	225	567	344	76	404	83	70	--	3/80
11-----	164	416	184	62	304	51	56	305	46
12-----	133	327	117	57	249	38	48	--	3/35
13-----	112	261	79	62	214	36	42	--	3/25
14-----	96	226	59	68	185	34	38	192	20
15-----	109	219	64	52	160	22	35	178	17
16-----	113	227	69	42	142	16	34	156	14
17-----	131	--	3/100	36	125	12	34	108	9.9
18-----	148	270	108	32	117	10	35	98	9.3
19-----	116	--	3/70	29	93	7.3	33	86	7.7
20-----	98	214	57	27	71	5.2	35	115	11
21-----	78	216	45	25	--	3/5	40	155	17
22-----	67	210	38	23	--	3/4	40	118	13
23-----	70	--	3/500	22	68	4.0	42	94	11
24-----	292	8,910	2/7,180	21	65	3.7	41	93	10
25-----	590	--	3/14,000	20	68	3.7	41	--	3/10
26-----	206	3,320	2/2,010	21	76	4.3	41	--	3/10
27-----	102	2,070	570	21	78	4.4	35	86	8.1
28-----	74	1,520	304	20	77	4.2	45	87	11
29-----	58	1,220	191	25	78	5.3	48	98	13
30-----	54	1,110	162	40	80	8.6	42	100	11
31-----	--	--	--	32	80	6.9	--	--	--
Total -	7,999	--	35,810	3,492	--	12,560	5,626	--	58,450
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	34	117	11	16	67	2.9	4.8	57	0.7
2-----	28	--	3/9	14	64	2.4	4.8	55	.7
3-----	24	--	3/7	13	63	2.2	4.5	52	.6
4-----	25	95	6.4	12	63	2.0	4.2	53	.6
5-----	22	91	5.4	12	61	2.0	4.2	50	.6
6-----	19	91	4.7	15	--	3/2.5	3.9	49	.5
7-----	19	70	3.6	15	72	2.9	3.9	50	.5
8-----	18	--	3/3.5	15	--	3/3	4.2	76	.9
9-----	17	87	4.0	24	81	5.2	4.5	62	.8
10-----	17	88	4.0	18	70	3.4	4.5	--	--
11-----	20	74	4.0	17	60	2.8	4.2	--	--
12-----	20	85	4.6	17	--	3/3	4.2	--	--
13-----	19	99	5.1	20	86	4.6	4.2	--	--
14-----	29	200	2/18	19	106	5.4	4.5	--	--
15-----	22	234	14	16	100	4.3	4.5	--	--
16-----	19	--	3/11	16	93	4.0	4.5	--	--
17-----	57	226	35	17	83	3.8	4.2	--	--
18-----	49	154	20	16	74	3.2	4.2	--	--
19-----	55	140	21	16	87	3.8	4.5	--	--
20-----	60	178	29	13	80	2.8	4.5	64	.8
21-----	45	187	23	12	--	3/2	4.8	75	1.0
22-----	32	158	14	10	--	3/2	4.8	87	1.1
23-----	37	132	13	9.1	--	3/2	4.5	83	1.0
24-----	77	139	29	8.2	70	1.5	5.1	82	1.1
25-----	63	113	19	7.5	69	1.4	5.1	90	1.2
26-----	73	100	20	6.9	68	1.3	4.8	81	1.0
27-----	53	88	13	6.3	65	1.1	4.8	45	.6
28-----	33	83	7.4	6.0	62	1.0	4.5	47	.6
29-----	25	70	4.7	5.7	59	.9	4.5	44	.5
30-----	21	70	4.0	5.1	58	.8	4.5	40	.5
31-----	18	69	3.4	5.1	57	.8	--	--	--
Total -	1,050	--	371	403.2	--	81.0	134.4	--	1/23

Total discharge for year (second-foot-days) ----- 47,641.0  
Total load for year (tons) ----- 149,400

1/Includes estimated load for missing days.

3/Estimated.

2/Sediment discharge computed by subdividing day.

KNIFE RIVER BASIN--Continued  
KNIFE RIVER NEAR GOLDEN VALLEY, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment														Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
Mar. 20, 1948	3:30 p. m.	2,970	526	618	19	30	38	52	67	84	94	97	99				BN
Mar. 21	6:15 p. m.	2,220	469	1,040	20	32	41	53	70	89	97	99	100				BN
Mar. 23	6:00 p. m.	4,250	925	1,980	22	32	44	53	66	81	91	96	100				BN
Mar. 25	2:30 p. m.	2,190	315	590	25	47	67	74	83	90	93	97	98				BN
Mar. 30	5:20 p. m.	1,630	908	1,930	32	40	55	64	78	89	95	98	100				BN
Apr. 5	5:30 p. m.	398	716	1,380	22	30	42	50	56	81	95	99	100				BN
June 3	7:45 p. m.	441	7,160	5,770	2	4	16	70	86	95	98	100	--				BN
June 4	12:20 p. m.	1,320	7,440	5,660	10	22	69	88	96	98	99	100	--				BN
June 4	7:30 p. m.	1,600	5,310	3,460	4	6	27	88	93	95	98	--	--				BN
June 5	12:15 p. m.	2,420	3,820	2,950	12	23	70	88	94	98	99	100	--				BN

KNIFE RIVER BASIN--Continued  
KNIFE RIVER AT HAZEN, N. DAK.

LOCATION --At gaging station at bridge on county highway, half a mile south of Hazen, Mercer County, and 2 miles upstream from Antelope Creek.  
DRAINAGE AREA 5,352 square miles.  
RECORDS AVAILABLE --Sediment records: March to July 1946 and April to September 1948.  
EXTREMES, 1946-48 --Sediment loads: Maximum, 29,400 tons per day June 5; minimum, not determined.  
EXTREMES, 1946-48 --Sediment loads: Maximum, 29,400 tons per day June 5, 1948; minimum, not determined.  
REMARKS --Records of discharge for water year October 1947 to September 1948.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent non- so- dium
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate	
Mar. 21, 1948-----	2,960	7.2	237	4.5	0.10	18	6.5	26	92	47	0.2	0.0	5.2	0.02	190	0.26		72	0	44	
May 25 -----	59	8.1	1,180	12	.00	64	32	183	450	306	.2	.3	1.6	.29	874	1.19		291	0	58	
June 4 -----	1,390	7.4	438	14	.80	31	9.5	61	178	94	1.1	.1	3.3	--	309	.42		116	0	53	
July 12 -----	44	8.1	1,330	15	.03	61	30	240	502	382	5.0	.3	2.2	.34	978	1.33		276	0	65	
Aug. 24 -----	30	8.0	1,150	14	.02	57	29	205	492	286	4.0	.3	.1	.14	860	1.17		261	0	63	

KNIFE RIVER BASIN--Continued  
KNIFE RIVER AT HAZEN, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	162	570	249	68	89	16
2-----	--	--	--	167	500	225	60	75	12
3-----	--	--	--	509	1,730	2,520	278	2,710	1/3,590
4-----	--	--	--	610	2,550	4,200	1,520	6,760	1/27,400
5-----	--	--	--	847	1,780	4,070	1,580	6,900	29,400
6-----	--	--	--	631	1,500	2,560	1,990	4,130	1/22,900
7-----	--	--	--	442	1,300	1,550	759	2,440	5,000
8-----	--	--	--	321	950	823	375	1,860	1,880
9-----	--	--	--	258	710	495	242	1,250	817
10-----	--	--	--	209	510	288	175	814	385
11-----	--	--	--	175	400	189	144	554	215
12-----	--	--	--	150	322	130	126	397	135
13-----	--	--	--	133	268	96	110	350	104
14-----	--	--	--	126	218	74	98	260	69
15-----	--	--	--	129	174	61	88	220	52
16-----	--	--	--	111	171	51	84	192	44
17-----	--	--	--	103	165	46	78	150	32
18-----	--	--	--	100	180	49	79	129	28
19-----	--	--	--	102	168	46	77	120	25
20-----	--	--	--	83	114	26	77	116	24
21-----	--	--	--	75	102	21	86	118	27
22-----	--	--	--	68	105	19	90	114	28
23-----	160	250	108	62	95	16	84	110	25
24-----	191	260	134	60	105	17	83	110	25
25-----	413	2,010	2,240	59	91	14	184	1,170	1/848
26-----	825	3,050	6,790	57	85	13	115	1,070	332
27-----	375	2,360	2,390	56	82	12	97	600	157
28-----	242	1,570	1,030	55	78	12	78	400	84
29-----	178	1,140	548	53	75	11	78	213	45
30-----	156	840	354	53	80	11	77	179	37
31-----	--	--	--	63	85	14	--	--	--
Total -	--	--	13,590	--	--	17,910	--	--	93,740
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	79	170	36	46	109	14	21	--	--
2-----	69	156	29	41	98	11	21	--	--
3-----	61	145	24	37	79	7.9	21	--	--
4-----	60	138	22	36	75	7.3	21	--	--
5-----	58	140	22	37	74	7.4	21	--	--
6-----	53	138	20	39	80	8.4	21	--	--
7-----	50	132	18	41	77	8.5	21	34	1.9
8-----	47	127	16	42	105	12	21	59	3.3
9-----	45	115	14	45	105	13	21	66	3.7
10-----	43	108	13	53	90	13	21	68	3.9
11-----	44	108	13	53	132	19	21	68	3.9
12-----	45	105	13	46	125	16	21	69	3.9
13-----	51	170	23	45	128	16	21	73	4.1
14-----	156	650	1/332	47	124	16	21	80	4.5
15-----	177	1,940	1/948	46	110	14	21	72	4.1
16-----	88	1,040	247	44	100	12	21	64	3.6
17-----	62	430	72	41	98	11	20	55	3.0
18-----	76	361	1/75	37	91	9.1	20	45	2.4
19-----	86	265	62	37	103	10	20	55	3.0
20-----	86	250	58	36	105	10	20	49	2.6
21-----	94	196	50	33	68	6.1	20	52	2.8
22-----	84	180	41	32	74	6.4	20	66	3.6
23-----	69	182	34	30	94	7.6	21	61	3.5
24-----	65	157	28	27	88	6.4	21	49	2.8
25-----	97	207	54	26	62	4.4	21	50	2.8
26-----	91	178	44	24	82	5.3	20	56	3.0
27-----	98	178	47	24	85	5.5	20	50	2.7
28-----	92	190	47	24	--	--	19	30	1.5
29-----	70	144	27	25	--	--	20	29	1.6
30-----	61	120	20	22	--	--	19	30	1.5
31-----	53	120	17	22	--	--	--	--	--
Total -	--	--	2,470	--	--	2/292	--	--	2/89

Total load for period Apr. 23 to Sept. 30 (tons) ----- 128,100

1/Sediment discharge computed by subdividing day.

2/Includes estimated load for missing days.



## KNIFE RIVER BASIN--Continued

## KNIFE RIVER AT HAZEN, N. DAK.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Oct. 15, 1947 -----	35	40	3.8
Nov. 5 -----	36	24	2.3
Nov. 20 -----	28	15	1.1
Dec. 11 -----	25	16	1.1
Dec. 29 -----	19	60	3.1
Jan. 14, 1948 -----	22	15	.89
Feb. 5 -----	13	40	1.4
Feb. 20 -----	11	31	.92
Mar. 3 -----	41	12	1.3
Mar. 21 -----	2,920	880	6,940
Mar. 23 -----	4,540	944	11,570
Mar. 24 -----	7,040	842	16,000
Mar. 25 -----	5,570	375	5,640
Mar. 27 -----	1,860	391	1,960
Mar. 30 -----	4,300	616	7,150
Apr. 5 -----	2,650	1,330	9,520
Apr. 16 -----	295	2,900	2,310

KNIFE RIVER BASIN--Continued  
KNIFE RIVER AT HAZEN, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1945 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment												Methods of analysis
			Concentration of sample (ppm)		Concentration of suspension analyzed (ppm)		Percent finer than indicated size, in millimeters								
			0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
July 19, 1946	11:10 a. m.	794	3,920	8,980	52	65	75	86	92	95	96	99	100		BN
Mar. 25, 1947	4:25 p. m.	3,440	426	650	23	37	54	83	--	85	86	--	--		BN
Apr. 2	5:26 p. m.	1,080	646	1,510	22	30	43	57	71	79	85	91	98		BN
Apr. 16	6:06 p. m.	548	1,280	3,550	47	56	68	79	86	94	96	99	100		BN
June 23	2:50 p. m.	4,260	3,120	2,370	9	18	48	78	85	92	94	96	98		BN
June 26	7:40 p. m.	3,080	1,890	2,070	11	20	51	73	84	92	95	97	99		BN
Mar. 21, 1948	1:10 p. m.	2,920	880	--	21	29	40	54	68	83	89	94	96		BW
Mar. 23	12:10 p. m.	4,540	944	--	20	27	40	52	62	72	80	86	92		BW
Mar. 24	4:40 p. m.	7,040	842	--	25	32	44	54	64	71	77	82	95		BW
Mar. 25	10:10 a. m.	5,570	375	--	50	62	75	80	84	87	90	95	97		BW
Mar. 27	5:15 p. m.	1,860	391	--	36	44	52	62	71	80	86	93	96		BW
Mar. 30	12:10 p. m.	4,300	616	--	30	43	52	64	74	82	86	96	98		BW
Apr. 5	2:00 p. m.	2,650	1,330	--	27	35	46	60	73	85	94	98	99		BWM
May 10	4:00 p. m.	201	483	--	71	86	92	95	97	98	98	--	--		BWM
June 4	6:45 p. m.	1,390	5,810	1,520	20	41	67	86	94	96	97	99	100		BN
June 4	6:45 p. m.	1,390	5,810	1,600	33	50	68	84	90	96	97	99	100		BW
June 5	7:30 a. m.	1,400	7,370	1,280	29	48	70	86	93	96	97	99	100		BN
June 5	7:30 a. m.	1,400	7,370	1,350	39	56	76	89	96	97	98	100	--		BW
June 5	12:15 p. m.	1,500	7,030	1,980	36	55	72	84	86	91	91	95	97		BW
June 5	6:30 p. m.	1,800	6,500	1,630	40	54	73	84	92	95	97	99	100		BW
June 6	12:00 p. m.	2,190	4,020	1,740	45	59	70	83	91	95	97	99	100		BW

HEART RIVER BASIN  
HEART RIVER NEAR SOUTH HEART, N. DAK.

LOCATION.--At gaging station half a mile downstream from North Creek, three quarters of a mile south of U. S. Highway 10, and 2 miles east of South Heart, Stark County.

DRAINAGE AREA.--315 square miles.

RECORDS AVAILABLE.--Chemical analyses: May 1947 to September 1948.

Water temperatures: May 1947 to September 1948.

Sediment records: May 1947 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 2,230 parts per million Jan. 12-20; minimum, 124 parts per million Mar. 11-31.

Total hardness: Maximum, 290 parts per million Oct. 1-20; minimum, 36 parts per million Mar. 11-31.

Water temperatures: Maximum, 80° F. July 2; minimum, freezing point on many days in November, December, January, February, March, and April.

Sediment loads: Maximum, 6,090 tons per day June 3; minimum, less than 0.05 ton per day on several days in December, January, and February.

EXTREMES May 1947-September 1948.--Dissolved solids: Maximum, 2,230 parts per million Jan. 12-20, 1948; minimum, 124 parts per million Mar. 11-31, 1948.

Total hardness: Maximum, 319 parts per million July 20-26, 1947; minimum, 36 parts per million Mar. 11-31, 1948.

Water temperatures: Maximum, 80° F. July 2, 1948; minimum, freezing point on many days in November and December 1947, January, February, March, and April 1948.

Sediment loads: Maximum, 7,260 tons per day June 23, 1947; minimum, less than 0.05 ton per day on several days in December 1947, January and February 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Car-bonate (CO <sub>3</sub> )	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent non-carbon-ate
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
Oct. 1-20, 1947	1.0	8.5	2,470	16	0.05	62	33	529	6.8	50	749	693	5.7	0.6	1.0	0.97	1,770	2.41	4.8	290	0	79
Oct. 21-Nov. 7	1.2	8.4	2,460	17	.00	48	27	534	3.2	30	812	598	20	.9	1.4	.62	1,670	2.27	5.4	231	0	83
Nov. 8-Dec. 15	.9	8.4	2,730	19	.00	50	30	587	4.8	24	914	675	24	.9	2.0	.82	1,860	2.53	4.5	248	0	83
Dec. 16-Jan. 11, 1948	.7	8.2	2,840	25	.02	44	32	635	8.0	0	1,000	800	7.5	.8	3.3	.86	2,040	2.77	3.9	241	0	85
Jan. 12-20	.6	8.2	3,100	23	.02	38	30	712	9.2	0	1,070	869	7.0	.7	13	1.05	2,230	3.03	3.6	218	0	87
Jan. 21-Feb. 20	.5	8.1	2,480	22	.02	40	24	577	5.2	0	959	620	36	.7	3.3	.74	1,800	2.45	2.4	199	0	86
Feb. 21	5.0	8.1	1,340	13	.02	26	15	266	5.6	0	450	332	7.5	.3	2.0	---	924	1.26	12	126	0	81
Feb. 22-23, 26-27	10	7.4	511	6.6	10	17	6.0	80	11	0	142	127	4.0	.2	1.2	---	358	.49	9.7	67	0	68
Feb. 24	13	7.8	416	8.9	20	17	6.2	63	11	0	112	104	2.2	.8	2.5	---	284	.39	10	68	0	67
Feb. 25	11	7.6	412	7.9	20	17	6.0	58	0	0	106	98	3.0	.6	4.0	---	288	.39	8.6	72	0	64
Feb. 28-Mar. 5	2.7	7.2	681	9.0	.02	29	5.0	118	8.8	0	214	170	6.8	.3	3.0	.12	464	.63	3.4	93	0	71
Mar. 6-10	1.0	7.8	1,120	13	.00	33	3.0	231	8.8	0	385	296	8.0	.4	3.9	.10	816	1.11	2.2	115	0	80
Mar. 11-31	404	7.4	153	7.1	.30	9.0	3.3	13	13	0	58	29	.3	.3	1.9	.18	124	.17	14	36	0	35
Mar. 17	180	7.0	275	5.5	.25	12	5.2	37	37	0	70	68	.5	.4	2.4	---	210	.29	102	51	0	61
Apr. 1-30	17	7.9	554	11	.12	22	8.5	81	9.2	0	172	133	1.3	.3	1.8	.31	386	.52	18	90	0	63

1/Not included in weighted average.

HEART RIVER BASIN--Continued  
HEART RIVER NEAR SOUTH HEART, N. DAK.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean dis-charge (second-foot)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbo-nate (CO <sub>3</sub> )	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
May 1-31, 1948-----	10	8.3	1,220	20	0.05	88	16	234	9.2	6	346	357	3.0	0.4	2.0	0.33	886	1.20	24	161	0	75
May 26 1/-----	1.8	8.4	1,940	11	.02	60	28	385	22	622	522	522	7.0	.7	.7	--	1,350	1.84	6.6	265	0	76
June 1-30-----	50	8.2	540	17	.01	28	8.1	85	2.0	0	174	132	8.4	.0	1.4	--	374	.51	50	103	0	64
June 3 1/-----	635	8.1	152	15	.15	18	4.8	17	0	82	28	1.9	1.9	.2	2.3	--	154	.21	264	65	0	36
June 16 1/-----	36	7.5	915	15	.03	32	12	168	0	286	244	244	1.1	.5	2.9	.21	652	.89	63	129	0	74
July 1-31-----	13	8.4	904	26	.01	22	7.3	183	7.6	8	272	246	2.7	.4	.8	.12	656	.89	23	85	0	81
July 13 1/-----	37	8.4	459	34	.02	14	2.0	92	6	194	67	67	1.8	.3	1.4	.42	336	.46	34	43	0	82
Aug. 30 1/-----	.6	8.3	1,930	19	.00	84	17	436	28	708	432	432	2.0	1.0	.5	.42	1,340	1.52	2.2	155	0	86
Sept. 18 1/-----	.5	8.0	2,390	26	.07	39	21	574	0	892	660	660	7.0	.6	1.7	.46	1,780	2.42	2.4	164	0	87
Aug. 1-31-----	1.2	8.3	1,610	21	.02	35	14	321	6.8	14	508	360	2.0	.4	1.4	.46	1,030	1.40	3.3	145	0	82
Sept. 1-30-----	.6	8.5	2,390	18	.02	38	20	491	7.2	37	754	522	4.0	.8	2.2	.43	1,520	2.07	2.5	177	0	85
Weighted average ---	31.4	--	314	9.8	0.23	14	5.0	46	11	107	73	73	0.8	0.3	1.8	--	293	0.32	20	56	0	44

1/Not included in weighted average.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	46	38	33	32	32	32	32	51	59	--	64	67
2	44	39	33	34	32	32	32	46	65	80	63	65
3	52	39	32	35	32	32	32	43	61	74	62	69
4	52	--	32	34	32	--	32	46	50	72	61	70
5	52	35	32	33	32	32	34	48	63	74	62	70
6	--	--	--	--	--	--	--	--	--	--	--	--
7	51	37	34	34	32	32	34	47	64	75	63	66
8	45	31	33	34	32	32	34	54	66	76	64	60
9	45	--	32	34	32	32	33	37	66	76	62	61
10	47	34	32	35	32	32	32	42	68	77	64	67
11	48	32	32	36	--	32	34	38	67	71	64	--
12	49	34	32	33	32	32	34	44	62	70	67	70
13	47	32	32	32	32	32	--	45	58	71	66	61
14	46	33	34	34	32	32	--	51	60	69	68	56
15	48	32	33	32	32	33	36	56	60	61	60	58
16	--	--	32	32	34	32	40	49	61	64	--	59
17	48	32	32	32	32	32	38	50	59	64	69	58
18	50	33	32	--	33	32	--	48	56	65	70	58
19	45	32	32	32	33	32	51	64	52	72	69	59
20	48	32	33	33	32	32	46	57	55	66	71	59
21	46	32	34	33	32	32	--	66	56	68	67	59
22	--	--	--	--	--	--	--	--	--	--	--	--
23	45	32	35	32	32	32	46	64	55	68	70	58
24	44	32	34	34	32	32	52	64	57	60	76	56
25	40	32	34	33	32	32	39	62	57	63	76	59
26	40	32	34	35	32	32	52	60	61	73	60	60
27	39	33	34	32	32	32	56	61	64	--	65	58
28	39	33	34	--	33	32	50	64	61	65	63	56
29	45	34	36	32	32	32	--	60	61	71	66	55
30	39	34	33	32	32	32	50	56	60	66	65	51
31	43	33	32	32	32	32	46	59	62	66	65	52
32	45	33	32	32	--	32	46	54	--	60	64	52
33	39	--	32	32	--	32	--	55	--	64	68	--
Average	46	34	33	33	32	32	41	53	60	69	66	60

## HEART RIVER BASIN--Continued

## HEART RIVER NEAR SOUTH HEART, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.9	43	0.1	1.1	64	0.2	1.2	45	0.2
2-----	.9	43	.1	1.1	63	.2	1.2	43	.1
3-----	.9	45	.1	1.1	70	.2	1.1	39	.1
4-----	.8	52	.1	1.1	55	.2	1.0	49	.1
5-----	.8	61	.1	1.1	43	.1	.9	46	.1
6-----	.8	49	.1	1.0	42	.1	.8	33	.1
7-----	.9	68	.2	1.0	47	.1	.8	26	.1
8-----	.9	78	.2	.9	55	.1	.7	23	--
9-----	.9	80	.2	.9	57	.1	.7	20	--
10-----	1.0	83	.2	.9	58	.1	.7	20	--
11-----	1.1	77	.2	.9	58	.1	.7	20	--
12-----	1.1	59	.2	.9	58	.1	.7	20	--
13-----	1.1	46	.1	.9	59	.1	.7	24	--
14-----	1.1	43	.1	.8	60	.1	.8	26	.1
15-----	1.1	42	.1	.8	65	.1	.8	33	.1
16-----	1.1	42	.1	.8	65	.1	.8	42	.1
17-----	1.1	43	.1	.8	63	.1	.7	42	.1
18-----	1.1	38	.1	.8	61	.1	.7	42	.1
19-----	1.1	39	.1	.8	59	.1	.7	42	.1
20-----	1.0	36	.1	.8	45	.1	.7	42	.1
21-----	1.0	43	.1	.8	32	.1	.7	41	.1
22-----	1.1	48	.1	.8	30	.1	.7	41	.1
23-----	1.1	29	.1	.8	36	.1	.7	41	.1
24-----	1.1	20	.1	.8	40	.1	.6	41	.1
25-----	1.1	20	.1	.8	50	.1	.6	41	.1
26-----	1.1	17	.1	.9	48	.1	.6	41	.1
27-----	1.2	18	.1	1.0	49	.1	.6	42	.1
28-----	1.2	26	.1	1.0	50	.1	.7	41	.1
29-----	1.2	35	.1	1.0	43	.1	.7	40	.1
30-----	1.1	50	.1	1.0	43	.1	.6	40	.1
31-----	1.1	67	.2	--	--	--	.6	40	.1
Total -	32.0	--	3.8	27.4	--	3.4	23.5	--	1/2.8
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.7	40	0.1	0.4	25	--	3	18	0.1
2-----	.7	40	.1	.4	23	--	2	19	.1
3-----	.8	40	.1	.4	27	--	2	20	.1
4-----	.8	40	.1	.4	28	--	2	20	.1
5-----	.8	40	.1	.4	26	--	1	20	.1
6-----	.7	40	.1	.3	26	--	1	20	.1
7-----	.7	40	.1	.3	29	--	1	20	.1
8-----	.8	40	.1	.3	30	--	1	20	.1
9-----	.8	40	.1	.3	30	--	1	20	.1
10-----	.9	40	.1	.3	30	--	1	20	.1
11-----	.8	40	.1	.3	26	--	1	20	.1
12-----	.7	40	.1	.3	25	--	1	20	.1
13-----	.7	40	.1	.3	28	--	1	20	.1
14-----	.6	40	.1	.3	34	--	2	25	.1
15-----	.6	40	.1	.4	36	--	30	102	8.3
16-----	.6	40	.1	.5	52	0.1	200	100	54
17-----	.6	40	.1	.6	52	.1	180	58	28
18-----	.5	40	.1	.8	43	.1	150	81	33
19-----	.5	40	.1	2	50	.3	700	231	437
20-----	.5	40	.1	1	39	.1	1,430	220	849
21-----	.5	40	.1	5	72	1.0	900	140	340
22-----	.5	40	.1	10	48	1.3	650	282	495
23-----	.5	40	.1	15	42	1.7	1,530	397	1,640
24-----	.5	39	.1	13	60	2.1	1,170	321	1,010
25-----	.4	39	--	11	21	.6	350	151	143
26-----	.4	38	--	9	15	.4	120	92	30
27-----	.4	36	--	7	15	.3	80	112	24
28-----	.4	33	--	5	16	.2	250	278	188
29-----	.4	32	--	4	17	.2	377	365	372
30-----	.4	31	--	--	--	--	246	347	230
31-----	.4	30	--	--	--	--	119	232	75
Total -	18.6	--	1/2.7	89.0	--	1/8.9	8,502	--	5,960

1/Includes sediment discharge less than 0.05 ton.

HEART RIVER BASIN--Continued  
HEART RIVER NEAR SOUTH HEART, N. DAK.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	77	184	38	18	494	3/30	3.7	112	1.1
2-----	47	225	29	16	7,900	341	1.9	79	.4
3-----	38	--	2/25	47	7,790	3/984	635	3,200	3/6,090
4-----	49	395	52	30	5,400	437	394	2,850	3/3,400
5-----	31	1,270	106	21	2,450	139	58	770	3/135
6-----	30	395	32	15	120	4.9	38	339	3/36
7-----	26	280	20	9.8	90	2.4	16	250	11
8-----	21	500	28	8.8	104	2.5	9.1	181	4.4
9-----	18	245	12	29	3,340	3/320	6.0	152	2.5
10-----	26	205	14	25	3,820	258	4.0	118	1.3
11-----	22	1,330	79	15	2,400	97	3.1	110	.9
12-----	17	1,830	84	12	478	15	3.5	104	1.0
13-----	15	227	9.2	11	80	2.4	8.4	88	2.0
14-----	14	102	3.9	6.8	49	.9	3.8	55	.6
15-----	13	73	2.6	5.1	51	.7	3.4	55	.5
16-----	10	67	1.8	4.3	32	.4	18	4,330	3/364
17-----	8.6	60	1.4	3.7	28	.3	19	5,780	297
18-----	7.7	52	1.1	3.0	26	.2	36	3,530	3/351
19-----	7.0	51	1.0	3.0	38	.3	45	6,140	3/752
20-----	6.4	55	1.0	2.8	61	.5	23	4,600	286
21-----	5.7	55	.8	2.6	37	.3	25	2,210	149
22-----	4.9	55	.7	2.3	34	.2	19	2,000	103
23-----	4.5	55	.7	2.2	38	.2	13	1,730	61
24-----	4.1	48	.5	1.9	28	.1	11	760	23
25-----	3.8	45	.5	1.8	27	.1	7.7	86	1.8
26-----	3.2	43	.4	1.8	31	.2	41	10,400	3/1,520
27-----	3.0	35	.3	1.8	132	.6	20	12,200	3/687
28-----	2.8	40	.3	1.8	110	.5	11	5,620	167
29-----	2.8	48	.4	1.8	99	.5	6.2	120	2.0
30-----	4.0	83	.9	1.9	113	.6	3.8	41	.4
31-----	--	--	--	5.7	146	2.2	--	--	--
Total -	522.5	--	546	311.9	--	2,640	1,486.6	--	14,450
Day	July			August			September		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	2.7	37	0.3	1.3	58	0.2	0.5	52	0.1
2-----	2.1	39	.2	1.2	50	.2	.5	53	.1
3-----	1.8	45	.2	1.1	50	.1	.5	53	.1
4-----	1.8	49	.2	1.0	46	.1	.5	52	.1
5-----	2.7	56	.4	1.0	48	.1	.5	50	.1
6-----	3.5	51	.5	.9	50	.1	.5	49	.1
7-----	1.8	43	.2	.9	55	.1	.6	50	.1
8-----	1.5	46	.2	.9	65	.2	.6	40	.1
9-----	1.3	49	.2	1.4	66	.2	.6	33	.1
10-----	1.3	59	.2	4.5	79	1.0	.6	37	.1
11-----	1.6	82	.4	4.0	66	.7	.6	37	.1
12-----	5.1	5,880	81	1.6	62	.3	.6	37	.1
13-----	37	14,000	3/1,450	1.1	68	.2	.7	37	.1
14-----	24	9,820	636	1.2	65	.2	.6	37	.1
15-----	62	5,520	3/1,410	2.1	58	.3	.6	38	.1
16-----	86	5,200	3/1,440	1.9	42	.2	.5	38	.1
17-----	29	1,160	91	1.2	40	.1	.6	36	.1
18-----	18	558	27	1.1	42	.1	.5	38	.1
19-----	16	252	11	.9	53	.1	.5	39	.1
20-----	9.8	206	5.5	.8	48	.1	.5	39	.1
21-----	7.7	168	3.5	.8	49	.1	.5	39	.1
22-----	12	161	5.2	.8	40	.1	.6	42	.1
23-----	20	243	13	.7	32	.1	.6	52	.1
24-----	26	297	21	.7	47	.1	.6	74	.1
25-----	17	156	7.2	.6	60	.1	.6	88	.1
26-----	9.3	126	3.2	.6	43	.1	.6	73	.1
27-----	5.7	90	1.4	.6	37	.1	.6	46	.1
28-----	3.7	80	.8	.5	50	.1	.6	52	.1
29-----	2.6	72	.5	.6	57	.1	.6	55	.1
30-----	2.0	71	.4	.6	60	.1	.6	42	.1
31-----	1.7	66	.3	.5	52	.1	--	--	--
Total	416.7	--	5,210	37.1	--	5.7	17.0	--	3.0

Total discharge for year (second-foot-days)

11,484.3

Total load for year (tons)

28,840

2/Estimated.

3/Sediment discharge computed by subdividing day.

HEART RIVER BASIN--Continued  
HEART RIVER NEAR SOUTH HEART, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis			
			Concentration of sample (ppm)		Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
			0.002	0.004		0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000		
June 3, 1948																	
June 3	1:00 p. m.	262	2,360	1,720	43	60	84	93	98	99	99	100					BN
June 3	6:25 a. m.	698	3,860	2,770	36	54	80	92	97	98	99	100					BN
June 3	8:40 p. m.	1,290	2,870	1,910	32	53	77	91	95	98	99	100					BN
June 4	10:05 a. m.	479	2,530	1,820	17	35	92	98	99	99	100	--					BN
June 19	8:05 p. m.	28	6,330	4,800	2	27	--	--	--	98	99	100					BN
July 16	6:35 a. m.	109	7,100	4,990	1	1	31	98	--	99	100	--					BN



## HEART RIVER BASIN--Continued

## HEART RIVER NEAR RICHARDTON, N. DAK.

LOCATION.--At gaging station at bridge on State Highway 8, half a mile downstream from Blacktail Creek and 9½ miles south of Richardton, Stark County. DRAINAGE AREA.--1,310 square miles.

RECORDS AVAILABLE.--Sediment records: March 1946 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 26,800 tons per day July 21; minimum, less than 1 ton per day on many days.

EXTREMES, 1946-48.--Sediment loads: Maximum, 36,700 tons per day Apr. 11, 1947; minimum, less than 1 ton per day on many days each year.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
Mar. 18, 1948-----	433	6.8	297	6.0	0.02	16	7.0	36	102	54	1.0	0.4	0.4	6.7	0.08	214	0.29	69	0	53
May 26-----	20	8.2	1,270	7.0	.00	70	38	171	386	362	6.5	.4	.3	.27	.908	908	1.23	331	14	53
June 4-----	1,480	7.2	632	12	.03	53	19	68	183	194	3.0	.5	.5	1.3	.16	457	.62	210	60	41
July 13-----	24	8.1	1,150	11	.02	68	24	188	357	358	7.7	.2	.2	.9	.50	844	1.15	268	0	60
Aug. 25-----	8.2	7.9	1,210	10	.02	59	33	201	370	384	11	.4	.4	.0	.21	906	1.23	283	0	81

## MISSOURI RIVER BASIN

## HEART RIVER BASIN--Continued

## HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	11	23	0.7	16	23	1.0	17		
2-----	11	22	.7	15	22	.9	16		
3-----	11	31	.9	15	26	1.1	15		
4-----	11	27	.8	17	20	.9	13		
5-----	10	23	.6	19	15	.8	12		
6-----	9.0	28	.7	18	16	.8	11		
7-----	8.5	26	.6	13	19	.7	10		
8-----	8.5	28	.6	11	21	.6	10		
9-----	8.5	25	.6	15	24	1.0	9		
10-----	9.0	25	.6	15	21	.9	9		
11-----	11	29	.9	14	20	.8	8		
12-----	11	21	.6	12	22	.7	8		
13-----	11	21	.6	13	23	.8	8		
14-----	11	23	.7	13	23	.8	9		
15-----	12	33	1.1	12	22	.7	8		
16-----	11	32	1.0	12	20	.6	8		
17-----	12	30	1.0	12	18	.6	9		
18-----	12	26	.8	12	16	.5	10		
19-----	14	28	1.1	12	15	.5	10		
20-----	13	25	.9	12	14	.5	10		
21-----	12	29	.9	12	10	.3	10		
22-----	11	23	.7	12	10	.3	10		
23-----	11	15	.4	11	11	.3	10		
24-----	12	15	.5	11	12	.4	10		
25-----	15	15	.6	12	--	--	10		
26-----	15	18	.7	14	--	--	10		
27-----	15	20	.8	17	--	--	10		
28-----	15	20	.8	19	--	--	11		
29-----	15	21	.9	19	--	--	10		
30-----	15	23	.9	17	--	--	10		
31-----	16	23	1.0	--	--	--	10		
Total -	367.5	--	23.7	422	--	2/22	321		1/15
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	9			4	--	--	30	19	1.5
2-----	8			4	--	--	20	20	1.1
3-----	7			4	--	--	15	20	.8
4-----	7			4	--	--	13	20	.7
5-----	7			3	--	--	11	20	.6
6-----	6			3	--	--	10	20	.5
7-----	7			3	--	--	10	20	.5
8-----	12			2	--	--	10	20	.5
9-----	10			2	--	--	9	20	.5
10-----	11			2	--	--	9	20	.5
11-----	12			2	--	--	8	22	.5
12-----	12			2	--	--	8	25	.5
13-----	13			2	--	--	10	30	.8
14-----	12			2	--	--	500	150	202
15-----	10			2	--	--	1,500	465	1,880
16-----	9			2	--	--	600	300	486
17-----	8			5	156	2.1	400	114	123
18-----	7			20	187	10	600	880	1,430
19-----	7			70	77	15	2,500	2,040	13,800
20-----	6			80	70	15	2,700	1,490	10,900
21-----	6			90	33	8.0	2,200	1,060	6,300
22-----	5			100	37	10	2,300	1,660	10,300
23-----	5			90	40	9.7	3,000	2,330	18,900
24-----	5			80	22	4.8	3,500	1,840	17,400
25-----	5			70	28	5.3	2,900	1,080	8,460
26-----	5			60	33	5.3	1,400	660	2,490
27-----	5			80	31	6.7	700	570	1,080
28-----	5			60	22	3.6	500	700	945
29-----	5			40	19	2.1	1,000	1,220	3,290
30-----	5			--	--	--	1,650	1,670	7,440
31-----	4			--	--	--	1,280	1,280	4,420
Total -	235		1/10	888	--	2/100	29,393	--	109,900

1/Estimated.

2/Includes estimated loads for missing days.

HEART RIVER BASIN--Continued  
HEART RIVER NEAR RICHARDTON, N. DAK.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	950	910	2,330	150	426	173	22	52	3.1
2-----	513	425	589	164	316	140	20	50	2.7
3-----	391	450	475	248	552	3/391	120	979	3/1,450
4-----	385	450	468	312	704	3/599	1,490	5,910	3/24,400
5-----	385	410	426	267	502	362	1,580	4,340	3/19,500
6-----	610	1,020	1,730	201	267	145	483	1,760	3/2,490
7-----	329	475	422	137	209	77	188	840	426
8-----	329	400	355	107	151	44	118	430	137
9-----	217	225	132	88	94	22	90	310	75
10-----	164	148	66	88	60	14	64	207	36
11-----	125	104	35	124	109	3/42	62	160	27
12-----	114	88	27	183	150	74	58	131	21
13-----	118	88	28	128	108	37	48	100	13
14-----	123	74	25	100	105	28	41	83	9.2
15-----	123	83	28	75	143	29	36	53	5.2
16-----	116	56	18	62	96	16	41	56	6.2
17-----	103	54	15	51	74	10	44	46	5.5
18-----	107	52	15	36	62	6.0	54	64	9.3
19-----	96	38	9.8	39	52	5.5	67	73	13
20-----	88	38	9.0	30	56	4.5	69	80	15
21-----	71	48	9.2	29	63	4.9	90	62	15
22-----	67	70	13	27	60	4.4	90	50	12
23-----	195	2,810	3/2,960	23	67	4.2	73	48	9.5
24-----	283	4,930	3/3,900	20	68	3.7	71	56	11
25-----	147	2,520	1,000	20	67	3.6	71	170	33
26-----	100	930	251	20	60	3.2	111	488	3/149
27-----	73	255	50	23	47	2.9	69	224	42
28-----	60	185	30	22	52	3.1	56	88	13
29-----	66	110	20	24	50	3.2	58	72	11
30-----	83	222	50	24	44	2.9	38	72	7.4
31-----	--	--	--	24	40	2.6	--	--	--
Total -	6,531	--	15,490	2,846	--	2,260	5,422	--	48,950
	July			August			September		
1-----	31	62	5.2	24	42	2.7	5.0	62	0.8
2-----	21	55	3.1	21	37	2.1	6.0	60	1.0
3-----	12	60	1.9	19	67	3.4	5.5	49	.7
4-----	17	55	2.5	17	68	3.1	4.1	52	.6
5-----	23	55	3.4	16	74	3.2	3.6	50	.5
6-----	22	57	3.4	18	73	3.5	3.6	48	.5
7-----	22	60	3.6	15	82	3.3	3.6	49	.5
8-----	18	73	3.5	23	360	3/47	3.6	42	.4
9-----	15	51	2.1	279	3,550	3/3,240	3.2	55	.5
10-----	16	61	2.6	70	548	3/110	3.6	38	.4
11-----	20	54	2.9	39	198	21	3.2	48	.4
12-----	21	51	2.9	26	134	9.4	3.2	48	.4
13-----	37	379	3/88	23	103	6.4	3.2	43	.4
14-----	128	4,250	1,470	25	106	7.2	3.2	44	.4
15-----	228	1,760	3/1,300	24	100	6.5	3.2	42	.4
16-----	172	1,140	3/632	22	91	5.4	2.8	40	.3
17-----	123	360	120	18	93	4.5	3.2	40	.3
18-----	140	545	206	15	90	3.6	3.2	34	.3
19-----	135	3,520	1,280	13	90	3.2	4.1	26	.3
20-----	600	1,180	3/5,340	10	87	2.3	5.0	24	.3
21-----	1,720	4,390	3/26,800	7.5	78	1.6	5.0	20	.3
22-----	187	1,080	3/622	7.5	92	1.9	4.6	22	.3
23-----	86	445	103	8.0	87	1.9	4.1	23	.3
24-----	71	188	36	8.5	86	2.0	3.6	28	.3
25-----	83	108	24	8.0	76	1.6	4.1	42	.5
26-----	73	86	17	8.0	83	1.8	3.2	46	.4
27-----	66	61	11	7.5	67	1.4	3.6	40	.4
28-----	51	57	7.8	6.0	69	1.1	5.5	31	.5
29-----	38	59	6.1	5.5	62	.9	4.1	30	.3
30-----	30	50	4.1	5.5	60	.9	4.1	24	.3
31-----	26	44	3.1	5.5	64	1.0	--	--	--
Total -	4,232	--	38,110	794.5	--	3,500	118.0	--	13.0
Total discharge for year (second-foot-days)									51,570.0
Total load for year (tons)									218,400

3/Sediment discharge computed by subdividing day.

HEART RIVER BASIN--Continued  
HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis	
			Concentration of sample (ppm)		Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters								
			0.002	0.004		0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Mar. 15, 1948	4:00 p.m.	1,940	993	2,070	15	23	32	40	55	68	81	100		BN
Mar. 20	5:15 p.m.	2,560	1,150	1,190	12	23	35	47	59	75	87	95	100	BN
Mar. 22	10:45 a.m.	2,080	1,260	1,520	5	13	22	33	46	65	89	100		BN
Mar. 25	1:00 p.m.	2,970	1,010	1,980	16	25	33	39	49	61	72	92		BN
Mar. 27	11:30 a.m.	648	531	592	--	14	19	35	48	68	93	100		BN
Mar. 31	12:00 m.	1,240	1,140	2,890	13	19	27	32	42	55	72	100		BN
June 4	11:00 a.m.	1,230	4,880	3,370	8	20	37	62	88	95	96	98	100	BN
June 4	5:55 a.m.	1,840	6,960	5,340	9	13	28	48	68	89	96	99	100	BN
June 5	11:50 a.m.	1,780	4,450	3,830	16	35	60	75	84	89	93	96	100	BN
June 5	2:10 p.m.	1,490	3,870	3,150	23	40	65	76	84	90	93	96	100	BN
July 21	6:35 a.m.	2,250	5,120	3,960	18	31	55	74	88	94	95	97	98	BN
July 21	5:10 p.m.	634	3,230	2,100	19	31	56	79	93	97	98	100		BN
July 22	8:05 a.m.	201	1,190	893	31	48	77	93	98	99	100			BN
July 22	1:15 p.m.	160	917	1,020	30	52	--	--	99	100				BN
July 22	1:15 p.m.	160	917	961	42	55	77	90	98	99	99	100		BN
Aug. 10	11:00 a.m.	67	482	1,180	23	37	80	94	96	97	99	100		BN

HEART RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN HEART RIVER BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per- cent so- dium
																Parts per mil- lion	Tons per acre- foot	Total	Non- carbon- ate	
May 26, 1948----		8.6	441	4.2	0.10	23	18	39	7.2	1/210	37	4.0	0.3	0.9	0.18	300	0.41	131	0	38
June 18-----		8.7	412	3.7	.03	14	17	62		2/216	54	1.9	.4	2.8	.15	257	.35	105	0	36
July 30-----		7.6	515	9.9	.03	19	11	81		191	100	2.5	.3	4.6	.13	344	.47	93	0	66
Aug. 30-----		8.1	587	6.8	.00	23	13	88		228	110	.2	.4	.0	.13	394	.54	111	0	63

RAILROAD RESERVOIR NEAR DICKINSON

HEART RIVER NEAR ELGIN

Mar. 20, 1948----	4,450	7.2	231	6.0	0.40	27	6.0	24		108	51	0.5	0.4	0.7	0.03	168	0.23	92	3	36
May 22-----	46	8.1	1,210	8.0	.02	64	35	167		388	325	6.2	.4	.7	.26	860	1.17	304	0	54
June 5-----	2,160	8.3	518	11	.02	43	14	57		167	142	.8	.2	3.6	--	372	.51	165	28	43
July 22-----	890	8.0	466	20	.02	50	10	69		360	16	1.3	.3	3.2	.15	328	.45	166	0	48
Aug. 25-----	12	8.1	1,220	19	.00	60	33	185		384	352	3.0	.4	.1	.40	866	1.18	285	0	58

1/Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

2/Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

## HEART RIVER BASIN--CONTINUED

## MISCELLANEOUS ANALYSES OF STREAMS IN HEART RIVER BASIN IN NORTH DAKOTA--Continued

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
HEART RIVER NEAR GLEN ULLIN			
Feb. 4, 1948 -----	1.7	52	0.2
Feb. 19 -----	3.8	15	.2
Feb. 25 -----	144	23	8.9
Mar. 2 -----	59	14	2.2
Mar. 16 -----	1,400	726	2,740
Mar. 17 -----	660	311	554
Mar. 20 -----	4,480	1,740	21,000
Mar. 22 -----	3,940	2,660	28,300
Mar. 24 -----	4,310	3,800	44,200
Mar. 27 -----	1,060	1,100	3,150
Mar. 30 -----	1,560	2,620	11,000
Apr. 6 -----	411	404	448
Apr. 21 -----	114	48	15
Apr. 28 -----	103	720	200
May 11 -----	107	122	35
May 22 -----	46	62	7.7
June 4 -----	118	136	43
June 5 -----	2,160	5,720	33,400
June 17 -----	59	66	11
June 29 -----	83	104	23
July 12 -----	26	77	5.4
July 22 -----	932	4,200	10,600
July 27 -----	103	247	69
Aug. 9 -----	930	4,940	12,400
Aug. 10 -----	508	3,030	4,160
Aug. 25 -----	18	74	3.6
Sept. 3 -----	8.0	40	.9
Sept. 24 -----	8.0	29	.6

HEART RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN HEART RIVER BASIN IN NORTH DAKOTA--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Instantaneous discharge (second-foot)	Suspended sediment											Methods of analysis		
		Concentration of sample (ppm)	Instantaneous discharge (tons per day)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000
HEART RIVER NEAR GLEN ULLIN															
Mar. 16, 1948	1,400	726	2,740	564	18	30	41	49	54	63	73	93	99		BD
Mar. 20	4,480	1,740	21,000	1,240	10	19	28	36	47	64	78	99	100		BD
Mar. 22	3,940	2,680	28,300	2,130	12	17	25	34	45	64	82	97	99		BD
Mar. 24	4,310	3,800	44,200	2,500	12	20	26	35	48	66	80	92	96		BD
Mar. 27	1,060	1,100	3,150	1,330	16	20	28	40	54	72	86	93	97		BD
Mar. 27	1,060	1,100	3,150	1,360	15	20	29	40	55	77	90	96	98		BN
Mar. 30	1,560	2,620	11,000	1,910	9	14	21	31	43	60	76	95	98		BD
June 5	2,160	5,720	33,400	4,360	12	21	41	62	79	89	92	95	98		BN
July 22	832	4,200	10,600	1,390	2	16	40	72	88	91	93	95	100		BN
Aug. 9	930	4,940	12,400	4,030	33	49	70	84	94	97	97	99	100		BD
Aug. 10	508	3,030	4,160	3,550	28	42	58	74	84	86	89	96	100		BD
Aug. 10	508	3,030	4,160	3,610	8	20	56	--	--	89	91	96	--		BN

## CANNONBALL RIVER BASIN

## CANNONBALL RIVER NEAR NEW LEIPZIG, N. DAK.

LOCATION ---At gaging station at bridge on State Highway 49, 2½ miles south of New Leipzig, Grant County, and 8 miles downstream from Thirtymile Creek.

DRAINAGE AREA ---1,180 square miles (revised).

RECORDS AVAILABLE ---81 month records: April 1946 to September 1948.

EXTREMES, 1947-48 ---Sediment loads: Maximum, 2,550 tons per day Mar. 16; minimum, less than 0.1 ton per day on many days.

EXTREMES, 1946-48 ---Sediment loads: Maximum, 2½, 200 tons per day Apr. 12, 1947; minimum, less than 0.1 ton per day on many days each year.

REMARKS ---Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	W. discharge (second feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Mar. 15, 1948	1,300	6.9	180	6.1	0.25	12	4.8	24		84	30	0.4	0.2	1.2	0.01	134	0.18	50	0	51
May 25	11	8.1	1,290	5.0	.00	62	40	179		385	369	6.0	.4	.1	.32	916	1.25	319	3	55
June 17	20	7.9	1,080	4.5	.04	51	26	183		374	300	7.0	.5	1.4	.37	837	1.14	234	0	63
July 20	138	8.2	1,350	9.5	.05	40	22	243		394	378	.2	.2	1.8	.40	980	1.33	190	0	74
Aug. 3	20	7.5	638	13	.03	39	18	93		232	168	4.0	.5	3.1	.09	462	.63	171	0	54



## CANNONBALL RIVER BASIN--Continued

## CANNONBALL RIVER NEAR NEW LEIPZIG, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	6.1	16	0.3	8.8	13	0.3	10	--	--
2-----	6.1	15	.2	8.8	11	.3	10	--	--
3-----	6.1	11	.2	8.8	9	.2	10	--	--
4-----	7.3	12	.2	8.8	9	.2	9	--	--
5-----	7.3	13	.3	9.8	12	.3	9	--	--
6-----	7.3	14	.3	13	10	.4	9	--	--
7-----	6.9	13	.2	11	8	.2	9	--	--
8-----	7.3	10	.2	11	14	.4	7	--	--
9-----	7.3	9	.2	10	17	.5	6	--	--
10-----	8.2	13	.3	10	18	.5	6	--	--
11-----	8.8	15	.4	10	17	.5	6	3	0.1
12-----	11	10	.3	8.2	19	.4	6	--	--
13-----	12	15	.5	7.7	22	.5	6	--	--
14-----	9.3	14	.4	8.2	21	.5	6	--	--
15-----	8.8	20	.5	8.2	21	.5	6	--	--
16-----	9.8	25	.7	9	19	.5	5	--	--
17-----	9.3	27	.7	10	18	.5	5	--	--
18-----	8.2	29	.6	9	18	.4	5	--	--
19-----	8.2	28	.6	9	18	.4	5	--	--
20-----	8.2	16	.4	8	18	.4	5	--	--
21-----	7.7	13	.3	8	17	.4	5	--	--
22-----	7.3	17	.3	8	17	.4	5	--	--
23-----	6.5	24	.4	8	16	.3	5	26	.4
24-----	6.1	21	.3	8	16	.3	5	--	--
25-----	6.5	20	.4	9	--	1/.3	5	--	--
26-----	7.7	20	.4	11	--	--	6	--	--
27-----	8.2	18	.4	11	--	--	6	--	--
28-----	8.8	9	.2	10	--	1/.4	6	--	--
29-----	9.3	16	.4	10	--	--	6	--	--
30-----	9.3	19	.5	10	--	--	5	--	--
31-----	9.3	11	.3	--	--	--	4	--	--
Total -	250.2	--	11.4	280.3	--	11.6	198	--	2/6
	January			February			March		
1-----	3	--	--	3	--	--	130	24	8.4
2-----	4	--	--	3	--	--	70	24	4.5
3-----	4	--	--	3	--	--	50	--	--
4-----	4	--	--	3	24	0.2	40	--	--
5-----	5	--	--	3	--	--	35	--	--
6-----	5	--	--	2	--	--	30	--	--
7-----	5	10	0.1	2	--	--	30	--	--
8-----	7	--	--	2	--	--	25	--	--
9-----	7	--	--	2	--	--	25	--	--
10-----	9	--	--	2	--	--	25	--	--
11-----	8	--	--	2	--	--	20	--	--
12-----	6	--	--	2	--	--	20	--	--
13-----	5	--	--	2	--	--	25	--	--
14-----	5	--	--	2	--	--	300	317	257
15-----	5	--	--	2	--	--	1,600	359	1,550
16-----	5	--	--	2	--	--	2,000	472	2,550
17-----	4	--	--	3	--	--	1,200	193	625
18-----	4	--	--	6	--	--	1,100	332	986
19-----	4	--	--	10	--	--	1,400	300	1,130
20-----	4	--	--	8	--	--	1,800	330	1,600
21-----	4	--	--	8	--	--	1,600	396	1,710
22-----	4	--	--	10	--	--	1,400	448	1,690
23-----	4	--	--	12	--	--	1,100	482	1,430
24-----	4	--	--	12	--	--	650	428	751
25-----	4	--	--	13	24	.8	550	332	493
26-----	4	--	--	10	--	--	500	123	166
27-----	4	--	--	40	--	--	350	155	146
28-----	4	--	--	80	--	--	300	212	172
29-----	4	--	--	50	--	--	250	265	179
30-----	4	--	--	--	--	--	200	185	100
31-----	4	--	--	--	--	--	170	165	76
Total -	147	--	2/6	299	--	2/19	16,995	--	2/15,650

1/ Estli. &amp; ed.

2/ Include: estimated load for missing days.

## MISSOURI RIVER BASIN

## CANNONBALL RIVER BASIN--Continued

CANNONBALL RIVER NEAR NEW LEIPZIG, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	150	162	66	60	41	6.6	10	21	0.6
2-----	140	188	71	47	47	6.0	9.8	22	.6
3-----	130	154	54	57	84	13	11	15	.4
4-----	120	145	47	69	67	12	11	18	.5
5-----	110	145	43	71	52	10	10	34	.9
6-----	100	155	42	61	40	6.6	11	38	1.
7-----	90	145	35	48	46	6.0	9.8	22	.6
8-----	80	112	24	41	58	6.4	9.3	31	.8
9-----	70	74	14	36	54	5.2	8.8	30	.7
10-----	64	73	13	35	26	2.5	7.3	31	.6
11-----	65	60	11	33	27	2.4	8.8	28	.7
12-----	61	52	8.6	32	65	5.6	9.8	18	.5
13-----	55	43	6.4	30	70	5.7	8.8	20	.5
14-----	50	41	5.5	27	40	2.9	8.8	29	.7
15-----	48	42	5.4	24	103	6.7	11	30	.9
16-----	44	45	5.3	23	98	6.1	14	28	1.1
17-----	40	48	5.2	23	50	3.1	19	21	1.1
18-----	40	48	5.2	19	60	3.1	24	40	2.6
19-----	38	46	4.7	17	44	2.0	24	45	2.9
20-----	35	36	3.4	16	35	1.5	36	50	4.9
21-----	33	38	3.4	14	30	1.1	36	48	4.7
22-----	34	36	3.3	13	30	1.1	35	46	4.3
23-----	41	57	6.3	12	30	1.0	29	45	3.5
24-----	80	269	58	11	28	.8	27	45	3.3
25-----	41	359	40	11	28	.8	38	45	4.6
26-----	45	356	43	11	28	.8	53	45	6.4
27-----	44	88	10	12	20	.6	46	42	5.2
28-----	37	49	4.9	12	20	.6	38	52	5.3
29-----	32	100	8.6	17	22	1.0	49	72	9.5
30-----	38	48	4.9	14	20	.8	42	64	7.3
31-----	--	--	--	11	16	.5	--	--	--
Total -	1,955	--	652	907	--	122	655.2	--	76.8
1-----	42	49	5.6	25	291	20	7.3	52	1.0
2-----	37	52	5.2	22	233	14	7.3	37	.7
3-----	32	52	4.5	19	196	10	6.9	43	.8
4-----	31	42	3.5	16	194	8.4	6.1	46	.8
5-----	33	40	3.6	15	170	6.9	6.1	43	.7
6-----	31	40	3.3	17	166	7.6	6.1	40	.7
7-----	28	40	3.0	16	156	6.7	6.1	38	.6
8-----	22	40	2.4	16	94	4.1	6.9	29	.5
9-----	19	42	2.2	16	89	3.8	7.3	28	.6
10-----	17	53	2.4	29	107	3/12	6.9	31	.6
11-----	15	58	2.3	258	625	435	6.1	38	.6
12-----	19	58	3.0	139	265	99	5.3	37	.7
13-----	19	48	2.5	128	181	63	4.9	48	.6
14-----	18	50	2.4	193	166	87	4.9	35	.5
15-----	20	54	2.9	130	115	40	4.1	30	.3
16-----	54	55	8.0	93	112	28	4.1	28	.3
17-----	87	69	16	70	109	21	3.7	30	.3
18-----	139	98	37	59	102	16	3.7	45	.4
19-----	121	--	1/60	49	95	13	3.7	48	.5
20-----	133	468	168	38	86	8.8	3.7	32	.3
21-----	130	456	160	30	85	6.9	4.1	30	.3
22-----	82	380	84	27	78	5.7	4.5	30	.4
23-----	128	454	3/168	24	78	5.1	4.5	30	.4
24-----	213	349	201	20	76	4.1	4.5	30	.4
25-----	174	191	90	17	70	3.2	3.7	30	.3
26-----	120	194	63	15	63	2.6	3.2	34	.3
27-----	80	300	65	14	61	2.3	2.9	33	.3
28-----	59	263	42	12	54	1.7	2.9	32	.3
29-----	49	312	41	10	50	1.4	2.9	38	.3
30-----	37	335	33	9.8	60	1.6	2.9	39	.3
31-----	30	330	27	8.2	71	1.6	--	--	--
Total-	2,019	--	1,310	1,535	--	940	147.3	--	14.8
Total discharge for year (second-foot-days)									25,388.0
Total load for year (tons)									18,820

1/Estimated.

3/Sediment discharge computed by subdividing day.

## CANNONBALL RIVER BASIN--Continued

## CANNONBALL RIVER NEAR NEW LEIPZIG, N. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis		
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000
Mar. 15, 1948	1:00 p. m.	1,560	480	528	4	12	25	44	58	79	94	98	100		BN
Mar. 15	1:00 p. m.	1,560	480	486	15	16	30	40	56	78	92	97	100		BW
Mar. 17	4:40 p. m.	1,040	140	269	62	81	93	94	95	98	99	100	--		BN
Mar. 20	2:40 p. m.	1,870	414	908	36	46	53	58	63	68	81	97	100		BN
Mar. 22	1:50 p. m.	1,400	636	635	--	38	45	54	62	72	83	100	--		BN
Mar. 25	5:30 p. m.	552	169	585	61	76	94	96	98	98	99	100	--		BN
Mar. 30	4:00 p. m.	191	160	535	58	78	--	--	--	99	100	--	--		BN
July 20	6:30 p. m.	140	639	553	28	45	67	85	94	97	98	99	100		BN
July 22	6:30 p. m.	78	360	270	42	70	81	89	96	98	99	100	--		BN

CANNONBALL RIVER BASIN--Continued  
CEDAR CREEK NEAR PRETTY ROCK, N. DAK.

LOCATION.--At gaging station at bridge on county highway, 7 miles north of Keldron, Corson County, S. Dak., 10½ miles south of Pretty Rock, Grant County, and 15 miles downstream from Timber Creek.

DRAINAGE AREA.--1,260 square miles.

RECORDS AVAILABLE.--Sediment records: May 1946 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 1,030 tons per day Mar. 15; minimum, less than 0.05 ton per day on many days in fall and winter months.

EXTREMES, 1946-48.--Sediment loads: Maximum, 18,500 tons per day June 23, 1947; minimum, less than 0.05 ton per day on many days in fall and winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
Mar. 15, 1948 ---	1,950	6.5	201	4.7	0.10	12	5.3	24		84	46	0.2	0.3	3.2	0.00	146	0.20	52	0	50
May 25 -----	5.9	7.9	1,600	4.0	.00	79	55	227		406	566	7.0	.4	.8	.36	1,140	1.55	440	107	53
June 9 -----	6.2	8.0	1,580	8.0	.00	76	53	259		420	592	6.0	.4	1.2	.33	1,210	1.65	408	64	58
July 20 -----	34	7.0	981	11	.04	42	28	151		326	262	4.0	.5	2.2	--	692	1.94	220	0	80
Aug. 3 -----	14	7.6	1,050	8.8	.00	52	30	130		320	260	2.0	.3	.0	.45	752	1.02	253	0	53

## CANNONBALL RIVER BASIN--Continued

## CEDAR CREEK NEAR PRETTY ROCK, N. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.2	23	--	3.0	--	1/0.1	5	8	0.1
2-----	.2	24	--	3.0	--	1/1	5	8	.1
3-----	.3	20	--	3.0	--	1/1	5	8	.1
4-----	.3	19	--	3.4	--	1/2	5	8	.1
5-----	.3	17	--	3.4	--	1/2	5	8	.1
6-----	.2	16	--	3.4	25	.2	5	8	.1
7-----	.2	18	--	3.4	25	.2	5	8	.1
8-----	.2	19	--	3.0	19	.2	5	8	.1
9-----	.2	13	--	3.4	--	1/2	5	8	.1
10-----	.2	7	--	3.8	--	1/2	5	8	.1
11-----	.4	10	--	3.8	--	1/2	4	8	.1
12-----	1.3	14	--	5.4	15	.2	4	8	.1
13-----	2.4	14	.1	3.4	15	.1	4	8	.1
14-----	2.1	12	.1	3.0	16	.1	4	8	.1
15-----	2.1	11	.1	3.4	16	.1	4	8	.1
16-----	2.7	12	.1	3.0	18	.1	4	8	.1
17-----	3.0	13	.1	3.4	22	.2	4	8	.1
18-----	3.8	17	.2	3.4	15	.1	4	8	.1
19-----	3.8	20	.2	3	18	.1	4	8	.1
20-----	4.2	21	.2	3	16	.1	4	8	.1
21-----	3.8	18	.2	3	13	.1	4	8	.1
22-----	3.4	17	.2	3	12	.1	4	8	.1
23-----	3.4	14	.1	3	11	.1	4	8	.1
24-----	3.4	8	.1	3	10	.1	4	8	.1
25-----	3.0	12	.1	4	9	.1	4	8	.1
26-----	3.8	18	.2	5	8	.1	4	8	.1
27-----	3.8	11	.1	6	8	.1	4	8	.1
28-----	3.4	13	.1	5	8	.1	4	8	.1
29-----	3.4	15	.1	5	8	.1	4	8	.1
30-----	3.4	--	1/1	5	8	.1	3	9	.1
31-----	3.4	--	1/1	--	--	--	3	10	.1
Total -	66.3	--	2/2.7	109.6	--	4.0	132	--	3.1
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2	11	0.1	2	20	0.1	80	16	3.5
2-----	2	12	.1	2	20	.1	60	12	1.9
3-----	2	14	.1	2	20	.1	50	12	1.6
4-----	3	15	.1	2	20	.1	45	10	1.2
5-----	3	16	.1	1	20	.1	40	10	1.1
6-----	3	17	.1	1	20	.1	35	10	.9
7-----	3	18	.1	1	20	.1	30	10	.8
8-----	5	19	.3	1	20	.1	30	11	.9
9-----	5	20	.3	1	20	.1	25	12	.8
10-----	6	20	.3	1	20	.1	25	12	.8
11-----	6	20	.3	1	20	.1	25	15	1.0
12-----	5	20	.3	1	20	.1	20	10	.5
13-----	4	20	.2	1	20	.1	20	14	.8
14-----	3	20	.2	1	20	.1	500	55	74
15-----	3	20	.2	1	20	.1	1,700	225	1,030
16-----	2	--	1/1	1	20	.1	1,900	185	949
17-----	2	--	1/1	2	20	.1	1,500	135	547
18-----	2	--	1/1	4	20	.2	1,000	175	472
19-----	2	--	1/1	10	--	1/1	1,500	205	830
20-----	2	--	1/1	40	28	3.0	1,800	185	899
21-----	2	--	1/1	60	12	1.9	1,400	151	571
22-----	2	20	.1	80	15	3.2	1,000	214	578
23-----	2	20	.1	80	20	4.3	750	270	547
24-----	2	20	.1	70	17	3.2	500	375	506
25-----	2	20	.1	50	14	1.9	400	370	400
26-----	2	20	.1	70	38	7.2	300	158	128
27-----	2	20	.1	150	27	11	267	134	97
28-----	2	20	.1	130	22	7.7	299	106	86
29-----	2	20	.1	100	20	5.4	263	156	111
30-----	2	20	.1	--	--	--	238	227	146
31-----	2	20	.1	--	--	--	181	224	109
Total -	87	--	4.4	866	--	51.7	15,983	--	8,100

1/Estimated.

2/Includes sediment discharge less than 0.05 ton.

CANNONBALL RIVER BASIN--Continued  
CEDAR CREEK NEAR PRETTY ROCK, N. DAK.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	145	155	61	28	38	2.9	5.4	35	0.5
2-----	149	122	49	36	40	3.9	6.1	24	.4
3-----	90	126	31	38	42	4.3	7.4	25	.5
4-----	84	124	28	42	43	4.9	6.1	37	.6
5-----	72	110	21	41	42	4.6	4.7	49	.6
6-----	65	78	14	36	48	4.7	4.2	54	.6
7-----	63	60	10	29	47	3.7	3.8	57	.6
8-----	58	51	8.0	28	47	3.6	3.8	62	.6
9-----	49	45	6.0	25	40	2.7	5.4	51	.7
10-----	45	40	4.9	22	32	1.9	6.1	45	.7
11-----	43	38	4.4	22	38	2.3	6.1	40	.7
12-----	40	36	3.9	21	41	2.3	6.1	36	.6
13-----	38	32	3.3	21	48	2.7	6.1	35	.6
14-----	34	36	3.3	21	51	2.9	8.8	38	.9
15-----	32	37	3.2	18	58	2.8	10	37	1.0
16-----	31	39	3.3	17	55	2.5	18	37	1.8
17-----	27	38	2.8	15	40	1.6	20	40	2.2
18-----	26	39	2.7	13	38	1.3	26	45	3.2
19-----	26	33	2.3	12	48	1.6	31	45	3.8
20-----	26	29	2.0	12	31	1.0	38	45	4.6
21-----	26	25	1.8	9.5	30	.8	42	46	5.2
22-----	25	22	1.5	8.8	28	.7	60	58	9.4
23-----	26	22	1.5	8.1	30	.7	60	60	9.7
24-----	68	52	3/8.7	8.1	39	.9	59	53	8.4
25-----	32	24	2.1	7.4	40	.8	79	201	43
26-----	26	64	4.5	6.1	55	.9	74	--	1/50
27-----	25	187	13	6.1	29	.5	73	172	34
28-----	23	94	5.8	5.4	39	.6	80	162	35
29-----	22	70	4.2	5.4	55	.8	56	150	23
30-----	23	61	3.8	6.1	50	.8	47	124	16
31-----	--	--	--	5.4	40	.6	--	--	--
Total -	1,439	--	311	573.4	--	66.3	853.1	--	259
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	40	101	11	18	50	2.4	4.7	62	0.8
2-----	38	100	10	16	50	2.2	3.8	31	.3
3-----	33	80	7.1	16	48	1.8	3.4	20	.2
4-----	28	73	5.5	12	60	1.9	2.4	28	.2
5-----	27	70	5.1	12	70	2.3	1.8	31	.2
6-----	22	60	3.6	12	71	2.3	1.8	30	.1
7-----	18	65	3.2	11	70	2.1	1.5	32	.1
8-----	15	57	2.3	9.5	80	2.1	1.5	34	.1
9-----	23	55	3.4	9.5	65	1.7	1.3	30	.1
10-----	28	55	4.2	9.5	56	1.4	1.1	25	.1
11-----	25	52	3.5	7.4	60	1.2	1.0	19	.1
12-----	20	48	2.6	11	85	1.9	1.0	18	--
13-----	17	47	2.2	11	80	2.4	.9	28	.1
14-----	15	52	2.1	8.1	73	1.6	1.0	30	.1
15-----	18	50	2.4	6.7	50	.9	1.1	20	.1
16-----	29	55	4.3	53	71	3/13	1.0	16	--
17-----	27	58	4.2	106	73	21	.8	19	--
18-----	27	58	4.2	86	52	12	.7	29	.1
19-----	40	60	6.5	67	79	14	.7	29	.1
20-----	37	64	6.4	55	71	11	.7	27	.1
21-----	67	125	3/27	46	65	8.1	.8	30	.1
22-----	69	94	18	41	67	7.4	.6	27	--
23-----	80	95	21	34	65	6.0	.8	24	.1
24-----	76	80	16	28	70	5.3	.6	29	--
25-----	65	71	12	25	77	5.2	.4	23	--
26-----	58	64	10	20	78	4.2	.4	23	--
27-----	49	64	8.5	16	68	2.9	.3	21	--
28-----	38	63	6.5	14	64	2.4	.2	20	--
29-----	32	60	5.2	12	62	2.0	.2	19	--
30-----	26	55	3.9	10	60	1.6	.2	15	--
31-----	22	52	3.1	6.1	63	1.0	--	--	--
Total -	1,109	--	225	786.8	--	145	36.7	--	2/3.3
Total discharge for year (second-foot-days)									22,041.9
Total load for year (tons)									9,180

1/Estimated.

2/Includes sediment discharge less than 0.05 ton.

3/Sediment discharge computed by subdividing day.

CANNONBALL RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN CANNONBALL RIVER BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate	
CANNONBALL RIVER AT BREIEN																					
June 3, 1948 -----	42	8.0	1,170	6.9	0.03	48	31	183	358	322	10	0.4	0.7	0.53	0.53	841	1.14		247	0	62
Aug. 13-----	40	7.8	936	15	.06	44	21	159	306	270	5.0	.5	1.6	.41	.41	698	.95		196	0	64
Sept. 1-----	24	7.8	971	12	.06	38	23	177	339	274	6.0	.5	1.3	.47	.47	724	.98		189	0	67
Sept. 16-----	5.4	8.0	1,120	10	.05	36	31	207	397	312	11	.5	1.0	.61	.61	840	1.14		217	0	67

## GRAND RIVER BASIN

## GRAND RIVER AT SHADEHILL, S. DAK.

LOCATION.--At gaging station at bridge on State Highway 73 at Shadehill, Perkins County, 5 miles downstream from confluence of North and South Forks, and 12 miles south of Lemmon, Perkins County.

DRAINAGE AREA.--3,120 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

Water temperatures: October 1945 to September 1948.

Sediment records: March 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 2,310 parts per million Jan. 1-31; minimum, 208 parts per million Mar. 16.

Total hardness: Maximum, 284 parts per million Jan. 1-31; minimum, 59 parts per million Mar. 16.

Water temperatures: Maximum, 79° F. July 7; minimum, freezing point on many days in November, December, January, February, and March.

Sediment loads: Maximum, 12,300 tons per day June 20; minimum, 0 tons per day Feb. 2-5, 9-11.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 3,910 parts per million Jan. 11-20, 1946; minimum, 188 parts per million Mar. 24-31, 1947.

Total hardness: Maximum, 590 parts per million Feb. 1-5, 1946; minimum, 39 parts per million Sept. 11-20, 1946.

Water temperatures: Maximum, 80° E. July 11, 1946; minimum, freezing point on many days in winter months.

Sediment loads (1946-1948): Maximum, 83,800 tons per day June 24, 1947; minimum, 0 tons per day Feb. 2-5, 9-11, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO <sub>3</sub> )	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-sodium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1-31, 1947	24	8.5	2,320	6.6	0.09	18	21	512	6.4	27	628	653	14	0.6	0.9	0.38	1,570	2.14	102	131	0
Nov. 1-Dec. 1	21	8.6	2,470	9.4	.07	30	35	538	8.0	34	651	736	14	.7	.9	.56	1,730	2.35	98	219	0
Dec. 2	32	8.2	2,110	10	.04	41	20	476		0	656	641	9.0	.6	.9	--	1,530	2.08	132	184	0
Dec. 3-20	15	8.3	2,610	12	.05	35	36	581	11	20	754	805	15	.6	1.6	.61	1,890	2.57	77	235	0
Dec. 21-31	14	8.5	2,810	15	.05	29	30	618	16	33	744	872	16	.6	1.0	1.00	2,000	2.72	76	196	0
Jan. 1-31, 1948	6.5	8.7	3,120	12	.03	43	43	717	10	45	842	1,000	17	.6	1.4	.63	2,310	3.14	41	284	0
Feb. 1-29	158	7.9	400	9.4	.05	17	7.6	50	10	0	134	81	6.0	.0	3.0	.12	278	.38	119	74	0
Mar. 1-31	598	8.2	1,220	11	.03	32	13	245	6.0	0	380	335	6.5	.2	1.7	.33	842	1.15	1,360	183	0
Mar 16 1/2	3,800	7.7	258	6.6	.55	16	4.6	28	12	0	99	45	2.0	.0	2.8	.11	208	.28	2,130	59	0
Apr. 1-30	102	8.9	1,560	13	.03	33	15	318	14	33	402	446	7.5	.3	2.8	.39	1,080	1.47	298	144	0
May 1-20	87	8.4	848	9.4	.09	24	14	143	14	10	205	242	16	.2	3.5	.28	598	.81	140	117	0
May 21-31	68	8.4	1,570	18	.04	30	13	322	7.2	18	416	444	6.0	.8	1.4	.14	1,070	1.46	196	128	0
May 24 1/2	27	8.8	2,050	10	.03	24	22	455	10	35	496	632	11	.6	.67	.67	1,450	1.97	106	150	0
May 26 1/2	202	7.7	2,200	36	.90	28	17	519		0	710	648	7.5	.3	.8	--	1,610	2.19	878	140	0
May 27 1/2	110	7.4	1,170	27	--	23	7.0	254		0	444	228	2.5	.3	.8	--	912	1.24	271	86	0
May 31 1/2	120	8.1	1,170	28	.40	17	6.0	265		0	392	300	5.0	.3	1.2	--	834	1.13	270	67	0

1/Not included in weighted average.



June 1-30-----	95	8.4	1,340	19	.04	27	11	272	391	9.4	14	364	364	4.0	.8	1.6	.16	916	1.25	235	113	0	83
June 8 1/2-----	27	8.5	1,790	13	.00	25	13		391		33	497	520	6.4	.4	1.6	.20	1,220	1.66	89	116	0	88
July 1-31-----	100	8.3	1,480	17	.04	30	15	318		7.6	12	394	452	4.0	.7	1.1	.36	1,050	1.43	264	136	0	83
July 20 1/2-----	182	8.0	1,360	11	.07	25	17		262		0	339	400	3.0	.5	3.2	.57	931	1.27	407	132	0	81
Aug. 1-31-----	25	8.3	1,610	15	.02	19	11	360		6.4	11	483	434	6.0	.4	.9	.48	1,100	1.50	74	93	0	88
Aug. 4 1/2-----	20	8.4	1,540	10	.02	26	17		353		18	446	474	8.0	.6	.2	.29	1,130	1.54	61	135	0	85
Sept. 1-30-----	47	8.7	2,960	8.3	.01	9.0	13	724		13	87	770	848	18	.9	1.5	--	2,110	2.87	27	84	0	94
Sept. 13 1/2-----	47	8.6	2,960	5.5	.01	9.7	16	704		53	61	801	836	20	1.0	.3	.53	2,110	2.87	27	90	0	91
Weighted average----	103	--	1,250	12	0.04	29	13	253		8.1	380	349	349	7.0	0.3	1.9	0.31	869	1.18	242	126	0	77

1/Not included in weighted average.

## MISSOURI RIVER BASIN

## GRAND RIVER BASIN--Continued

## GRAND RIVER AT SHADEHILL, S. DAK.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	45	39	33	32	32	32	36	50	64	69	64	60
2	45	48	32	32	32	32	34	51	67	73	62	62
3	55	42	31	33	32	32	38	49	72	75	65	66
4	54	38	31	33	32	32	43	49	66	75	63	66
5	54	33	31	33	32	32	40	40	66	78	63	59
6	52	33	31	33	32	32	43	47	67	78	64	57
7	48	31	31	33	32	32	--	55	66	79	64	52
8	46	31	31	33	32	32	32	48	67	77	66	55
9	49	31	31	--	32	32	35	43	69	72	65	55
10	50	31	31	33	32	--	43	42	67	73	65	53
11	55	31	31	33	--	32	39	43	60	71	67	56
12	47	31	31	32	32	33	35	49	60	72	68	57
13	46	31	32	32	33	33	34	54	66	72	65	58
14	50	32	32	32	33	33	44	50	63	70	65	61
15	53	31	32	32	32	--	52	57	59	69	72	64
16	54	31	31	32	32	32	41	51	60	67	68	64
17	53	31	31	31	34	32	51	57	62	66	69	65
18	48	31	32	32	34	32	55	61	65	69	67	60
19	49	31	32	32	32	32	50	65	59	70	69	68
20	50	31	32	32	32	33	45	66	57	70	63	58
21	50	31	32	32	32	33	51	62	56	69	61	54
22	45	31	32	32	32	33	53	64	60	66	67	57
23	40	32	33	32	32	37	60	62	62	67	67	64
24	40	32	32	32	32	32	55	60	65	70	65	57
25	41	33	33	32	32	37	53	58	64	68	59	57
26	38	34	33	32	33	33	51	68	63	66	70	54
27	41	34	33	32	33	32	50	58	66	67	66	54
28	39	33	32	33	33	34	50	56	65	69	71	48
29	40	33	32	32	32	38	51	52	67	63	67	51
30	47	32	--	32	32	38	51	50	66	62	66	52
31	41	--	32	32	--	33	--	55	--	65	67	--
Average	47	33	32	32	32	33	45	54	64	70	66	58

GRAND RIVER BASIN--Continued  
GRAND RIVER AT SHADEHILL, S. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	15	34	1.4	22	45	2.7	32	36	3.1
2-----	16	33	1.4	22	45	2.7	32	48	4.1
3-----	16	37	1.6	23	45	2.8	22	49	2.9
4-----	16	35	1.5	25	41	2.8	18	49	2.4
5-----	16	34	1.5	24	38	2.5	18	49	2.4
6-----	16	27	1.2	24	35	2.3	16	49	2.1
7-----	16	32	1.4	26	36	2.5	12	49	1.6
8-----	15	42	1.7	24	28	1.8	10	49	1.3
9-----	15	45	1.8	12	41	1.3	12	49	1.6
10-----	15	42	1.7	13	38	1.3	14	49	1.9
11-----	20	75	4.0	14	42	1.6	16	49	2.1
12-----	31	163	14	11	44	1.3	16	50	2.2
13-----	31	84	7.0	14	43	1.6	14	50	1.9
14-----	35	84	7.9	18	51	2.5	14	51	1.9
15-----	38	94	9.6	20	48	2.6	12	51	1.7
16-----	42	78	8.8	17	51	2.3	12	52	1.7
17-----	37	70	7.0	17	53	2.4	12	52	1.7
18-----	32	62	5.4	13	47	1.6	14	53	2.0
19-----	29	65	5.1	19	46	2.4	18	53	2.6
20-----	36	72	7.0	18	40	1.9	20	52	2.8
21-----	28	66	5.0	14	34	1.3	18	51	2.5
22-----	22	67	4.0	14	45	1.7	16	50	2.2
23-----	22	58	3.4	16	45	1.9	16	50	2.2
24-----	22	56	3.3	20	35	1.9	16	49	2.1
25-----	21	54	3.1	24	37	2.4	16	48	2.1
26-----	21	47	2.7	34	39	3.6	18	47	2.3
27-----	21	53	3.0	32	37	3.2	20	46	2.5
28-----	21	47	2.7	30	31	2.5	16	46	2.0
29-----	21	41	2.3	28	28	2.1	10	45	1.2
30-----	20	43	2.3	26	30	2.1	4	44	.5
31-----	23	45	2.8	--	--	--	4	43	.5
Total -	729	--	126	614	--	65.6	488	--	64.1
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	6	43	0.7	3	46	0.4	150	55	22
2-----	8	42	.9	0	--	0	120	55	18
3-----	10	41	1.1	0	--	0	110	50	15
4-----	11	40	1.2	0	--	0	100	30	8.1
5-----	11	43	1.3	0	--	0	90	25	6.1
6-----	11	46	1.4	1	47	.1	80	28	6.0
7-----	16	72	3.1	2	47	.3	70	27	5.1
8-----	18	80	3.9	1	47	.1	60	27	4.4
9-----	18	80	3.9	0	--	0	50	28	3.8
10-----	12	80	2.6	0	--	0	40	29	3.1
11-----	10	76	2.1	0	--	0	40	28	3.0
12-----	8	72	1.6	1	48	.1	40	27	2.9
13-----	6	70	1.1	2	48	.3	40	26	2.8
14-----	4	70	.8	1	48	.1	500	116	157
15-----	4	70	.8	1	48	.1	3,000	554	4,490
16-----	3	70	.6	1	48	.1	3,800	996	10,200
17-----	2	68	.4	8	48	1.0	2,400	612	3,970
18-----	2	66	.4	80	205	44	1,150	653	2,030
19-----	2	64	.3	1,700	990	4,540	1,000	978	2,640
20-----	2	58	.3	500	440	594	1,200	1,290	4,180
21-----	2	53	.3	300	289	234	906	757	1,850
22-----	2	46	.2	290	226	177	694	650	1,220
23-----	4	46	.5	280	68	51	800	480	778
24-----	5	46	.6	200	40	22	520	520	730
25-----	5	46	.6	120	45	15	460	663	823
26-----	5	46	.6	400	60	65	308	675	1/563
27-----	3	46	.4	300	200	162	120	453	1/148
28-----	3	46	.4	200	84	45	257	634	440
29-----	2	46	.2	180	55	27	254	670	459
30-----	3	46	.4	--	--	--	220	550	327
31-----	5	46	.6	--	--	--	167	470	212
Total -	203	--	33.3	4,571	--	5,980	18,546	--	35,320

1/Sediment discharge computed by subdividing day.

## MISSOURI RIVER BASIN

## GRAND RIVER BASIN--Continued

## GRAND RIVER AT SHADEHILL, S. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	167	390	176	67	150	27	79	4,580	977
2-----	148	340	136	86	290	67	59	2,400	382
3-----	128	293	101	90	390	95	49	2,850	377
4-----	119	237	76	228	5,790	1/3,780	47	2,120	269
5-----	121	236	77	172	6,250	2,900	38	590	61
6-----	105	213	60	121	4,150	1,360	30	205	17
7-----	97	190	50	86	3,950	917	28	118	8.9
8-----	77	152	32	68	3,650	670	27	70	5.1
9-----	86	141	33	70	2,100	397	24	55	3.6
10-----	88	122	29	68	1,500	275	20	90	4.9
11-----	82	120	27	65	1,070	188	22	276	16
12-----	84	95	22	62	793	1/195	24	94	6.1
13-----	86	90	21	150	2,890	1/1,150	26	59	4.1
14-----	86	80	19	97	4,300	1,130	28	65	4.9
15-----	80	55	12	79	5,510	1,180	30	81	6.6
16-----	77	63	13	62	4,100	686	34	69	6.3
17-----	67	56	10	52	2,690	378	140	4,900	1/1,840
18-----	64	49	8.5	44	1,500	178	115	5,500	1,710
19-----	64	48	8.3	38	445	46	340	8,200	1/10,500
20-----	80	45	9.7	36	381	37	407	11,100	1/12,300
21-----	177	2,130	1/1,840	34	82	7.5	234	11,700	7,390
22-----	220	5,760	1/3,360	33	81	7.2	180	8,150	3,960
23-----	148	8,500	3,400	29	26	2.0	153	4,880	2,020
24-----	128	8,680	3,000	27	33	2.4	132	2,880	1,030
25-----	103	8,260	2,300	26	52	3.7	117	1,820	575
26-----	92	7,050	1,750	202	11,800	1/7,680	125	1,350	456
27-----	86	3,980	924	110	12,200	1/3,700	118	1,340	1/428
28-----	75	1,160	235	68	8,400	1,540	86	400	93
29-----	65	600	105	54	6,050	882	68	105	19
30-----	64	240	41	50	4,600	621	58	66	10
31-----	---	---	---	120	6,550	1/2,100	---	---	---
Total -	3,064	--	17,880	2,494	--	32,200	2,836	--	44,480
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	54	82	12	24	34	2.2	3.2	89	0.8
2-----	49	93	12	22	34	2.0	2.9	71	.6
3-----	54	158	1/23	21	32	1.8	2.6	54	.4
4-----	94	260	1/68	20	50	2.7	2.6	60	.4
5-----	187	3,840	1/2,610	20	174	1/9.6	2.6	65	.5
6-----	166	5,160	1/2,300	38	368	38	2.6	59	.4
7-----	111	5,070	1,520	34	308	28	3.2	41	.4
8-----	88	2,940	699	34	370	34	3.7	42	.4
9-----	70	600	113	37	1,000	100	4.2	46	.5
10-----	62	320	54	80	555	1/123	4.7	40	.5
11-----	62	160	27	66	341	1/64	5.1	36	.5
12-----	79	220	47	77	2,850	593	4.7	38	.5
13-----	68	130	24	58	6,900	1,080	4.7	42	.5
14-----	62	240	40	41	6,680	739	5.1	50	.7
15-----	149	655	1/273	30	5,500	446	4.7	46	.6
16-----	170	1,230	1/584	24	3,310	314	4.2	48	.5
17-----	299	6,200	1/4,800	23	680	42	3.7	50	.5
18-----	181	6,080	1/2,990	18	194	9.4	3.7	52	.5
19-----	201	4,330	2,350	16	91	3.9	3.7	50	.5
20-----	162	3,090	1,350	12	100	3.2	5.1	43	.6
21-----	143	3,000	1,160	11	52	1.5	6.1	43	.7
22-----	117	1,850	584	9.2	80	2.0	7.1	52	1.0
23-----	93	500	126	8.5	45	1.0	7.1	91	1.7
24-----	77	210	44	7.1	48	.9	6.6	58	1.0
25-----	64	80	14	6.6	69	1.2	6.6	68	1.2
26-----	52	58	8.1	6.1	93	1.5	6.6	67	1.2
27-----	46	60	7.5	5.6	80	1.2	6.1	57	.9
28-----	41	65	7.2	4.7	76	1.0	5.6	25	.4
29-----	35	55	5.2	4.2	85	1.0	6.1	32	.5
30-----	30	57	4.6	4.2	97	1.1	5.6	62	.9
31-----	27	44	3.2	3.7	185	1.8	--	--	--
Total -	3,093	--	21,860	765.9	--	3,550	140.5	--	19.8
Total discharge for year (second-foot-days)									
Total load for year (tons)									
								37,544.4	
								161,600	

\* /Sediment discharge computed by subdividing day.

GRAND RIVER BASIN--Continued  
GRAND RIVER AT SHADEHILL, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500
Mar. 16, 1948	11:15 a.m.	3,070	898	592	8	18	22	30	38	46	58	68	78	BW
Mar. 18	4:40 p.m.	935	1,020	1,260	10	18	32	41	56	72	82	88	96	BN
Mar. 24	5:30 p.m.	511	1,573	276	35	50	76	85	89	95	98	99	100	BW
Apr. 28	8:45 a.m.	77	1,220	866	5	7	14	46	--	99	100	--	--	BN
May 11	7:00 p.m.	65	1,727	581	3	7	19	--	--	98	99	100	--	BN
May 26	8:20 a.m.	319	9,190	3,560	38	49	70	92	98	99	99	100	--	BW
June 20	9:45 a.m.	406	10,460	2,080	72	79	88	92	93	94	95	96	98	BW
June 21	7:45 a.m.	245	12,800	2,470	78	88	94	97	99	100	--	--	--	BW

GRAND RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN GRAND RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per- cent so- lids	
																Parts per mil- lion	Tons per acre- foot	Total	Non- carbon- ate		
NORTH FORK GRAND RIVER NEAR WHITE BUTTE																					
Mar. 17, 1948----	1,940	7.0	246	5.3	0.20	13	5.5	35	76	54	0.2	0.0	5.9	0.17		210	0.29	55	0	58	
May 25-----	7.8	8.6	1,900	4.1	.01	50	38	374	9.2	1/461	676	9.0	.7	.7	.86	1,390	1.89	281	0	74	
June 9-----	5.7	8.0	1,960	5.0	.03	42	19	436	442	722	9.4	.7	1.6	.85		1,460	1.99	183	0	84	
July 20-----	92	7.9	1,290	12	.20	31	16	261	351	398	3.5	5.5	2.8	.59		920	1.25	143	0	80	
Aug. 17-----	4.0	8.1	1,640	9.8	.05	34	30	301	387	518	4.0	.6	1.1	.70		1,090	1.48	208	0	76	
GRAND RIVER NEAR WAKPALA																					
June 10, 1948----	68	8.3	1,620	18	0.05	40	17	347	2/467	494	16	0.5	4.9	0.41		1,170	1.59	170	0	82	
June 28-----	244	7.6	817	16	.00	24	7.5	158	210	244	5.0	4	1.1	.16		614	.84	91	0	79	
July 22-----	236	8.2	1,540	13	.02	40	9.1	303	348	480	6.0	5	1.8	.44		1,030	1.40	137	0	83	
Aug. 12-----	54	8.1	1,640	14	.02	47	18	321	411	516	9.5	5	5.0	.33		1,130	1.54	191	0	78	
Sept. 1-----	12	8.2	1,870	12	.06	50	25	368	498	578	12	.4	1.0	.31		1,300	1.77	228	0	78	
SOUTH FORK GRAND RIVER NEAR CASH																					
Mar. 16, 1948----	1,380	6.7	173	7.3	0.40	10	3.5	23	70	30	0.2	0.0	2.1	0.09		140	0.19	39	0	56	
May 24-----	14	9.0	2,350	11	.05	11	13	534	16	2/760	600	11	.7	.6	.57	1,580	2.15	81	0	92	
June 8-----	15	8.6	1,570	15	.50	18	8.0	452	3/694	462	6.0	4	1.6	.42		1,310	1.78	78	0	93	
July 19-----	54	8.0	1,020	14	.12	19	6.8	209	288	290	1.5	7	5.6	--		711	.97	75	0	86	
Aug. 17-----	12	8.7	1,640	16	.00	16	7.0	380	5/559	414	2.0	.6	6.6	.46		1,120	1.52	69	0	92	
Sept. 14-----	6.0	8.9	2,650	13	.08	10	10	674	5/999	660	16	.7	1.4	.52		1,880	2.56	66	0	96	

1/Includes equivalent of 28 parts per million of carbonate (CO<sub>3</sub>).

2/Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

3/Includes equivalent of 63 parts per million of carbonate (CO<sub>3</sub>).

4/Includes equivalent of 52 parts per million of carbonate (CO<sub>3</sub>).

5/Includes equivalent of 43 parts per million of carbonate (CO<sub>3</sub>).

6/Includes equivalent of 90 parts per million of carbonate (CO<sub>3</sub>).

## GRAND RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN GRAND RIVER BASIN IN SOUTH DAKOTA--Continued

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)

## NORTH FORK GRAND RIVER NEAR WHITE BUTTE

Jan. 5, 1948 -----	4.9	23	0.3
Jan. 27 -----	1.8	53	.3
Feb. 17 -----	2.0	55	.3
Feb. 19 -----	70	44	8.3
Feb. 23 -----	120	23	7.5
Mar. 17 -----	1,850	333	1,660
Mar. 19 -----	530	733	1,050
Mar. 23 -----	285	203	156
Mar. 29 -----	109	69	20
Apr. 5 -----	48	43	5.6
Apr. 13 -----	32	31	2.7
Apr. 28 -----	28	50	3.8
May 10 -----	25	48	3.2
May 25 -----	8	54	1.2
June 9 -----	7	38	.7
June 24 -----	52	63	8.8
July 7 -----	13	25	.9
July 20 -----	93	118	30
Aug. 4 -----	9	50	1.2
Aug. 17 -----	4.2	58	.7
Sept. 2 -----	.3	32	0

## SOUTH FORK GRAND RIVER NEAR CASH

Jan. 5, 1948 -----	3.9	178	1.9
Jan. 27 -----	2.0	111	.6
Feb. 21 -----	130	104	37
Feb. 24 -----	18	53	2.6
Mar. 16 -----	1,400	464	1,750
Mar. 17 -----	339	797	729
Mar. 19 -----	878	656	1,560
Mar. 22 -----	346	1,040	972
Mar. 29 -----	89	936	225
Apr. 5 -----	43	327	38
Apr. 13 -----	28	158	12
Apr. 27 -----	34	823	76
May 10 -----	32	799	69
May 24 -----	14	121	4.6
June 8 -----	14	124	4.7
June 23 -----	54	3,940	574
July 7 -----	36	1,830	178
July 19 -----	49	6,180	818
Aug. 4 -----	8	134	2.9
Aug. 17 -----	11	92	2.7
Sept. 2 -----	4.5	69	.8
Sept. 14 -----	6	80	1.3
Sept. 28 -----	7	55	1.0

GRAND RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN GRAND RIVER BASIN IN SOUTH DAKOTA--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Instantaneous discharge (second-feet)	Concentration of sample (ppm)	Instantaneous discharge (tons per day)	Concentration of suspension analyzed (ppm)	Suspended sediment											Methods of analysis	
					Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
NORTH FORK GRAND RIVER NEAR WHITE BUTTE																	
Mar. 17, 1948	1,850	333	1,660	900	18	31	46	62	78	90	93	97	98			BN	
Mar. 19	530	733	1,050	779	9	14	20	37	54	74	92	98	100			BN	
Mar. 23	285	203	156	536	32	42	62	82	95	98	99	100	--			BN	
SOUTH FORK GRAND RIVER NEAR CASH																	
Mar. 16, 1948	1,400	464	1,750	582	48	60	70	82	92	94	95	98	99			BN	
Mar. 16	1,400	464	1,750	566	48	63	75	88	94	98	99	100	--			BN	
Mar. 17	339	797	729	737	43	54	63	71	80	90	96	98	100			BN	
Mar. 19	878	656	1,560	1,850	54	66	78	86	96	98	100	--	--			BN	
May 10	32	799	69	674	6	10	20	--	--	98	99	100	--			BN	
July 7	36	1,330	178	1,750	4	8	19	--	--	99	--	--	--			BN	



MOREAU RIVER BASIN  
MOREAU RIVER NEAR FAITH, S. DAK.

LOCATION.--At bridge on State Highway 73 at Usta, Perkins County, 3 miles downstream from Rabbit Creek, and 13½ miles northwest of Faith, Meade County.  
DRAINAGE AREA.--2,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1945, June to October 1946, March 1947 to September 1948.

Water temperatures: April 1947 to September 1948.

Sediment records: August 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 2,800 parts per million Jan. 8-12; minimum, 138 parts per million Mar. 15.

Total hardness: Maximum, 599 parts per million May 24; minimum, 45 parts per million Mar. 15.

Water temperatures: Maximum, 77° F. July 7; minimum, freezing point on many days in November, December, January, February, and March.

Sediment loads: Maximum, 57,900 tons per day June 20; minimum, 0 tons per day on many days.

EXTREMES, March 1947-September 1948.--Dissolved solids: Maximum, 2,800 parts per million Jan. 8-12, 1948; minimum, 138 parts per million Mar. 15, 1948.

Total hardness: Maximum, 599 parts per million May 24, 1948; minimum, 45 parts per million Jan. 8-12, 1948.

Water temperatures: Maximum, 77° F. July 7, 1948; minimum, freezing point on many days in November and December 1947, January, February, and March 1948.

Sediment loads: Maximum, 131,000 tons per day June 24, 1947; minimum, 0 tons per day on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carb. bicarbonate (CO <sub>3</sub> )	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-sodium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-11, 1947-----	4.5	8.3	3,090	7.6	0.04	52	49	708	18	11	395	1,460	26	0.9	0.0	0.62	2,530	3.44	31	331	0	81
Oct. 12-18-----	43	8.2	1,960	13	.07	42	21	492	7.2	0	425	872	17	.8	.9	.45	1,680	2.28	195	191	0	84
Oct. 30-Nov. 30-----	18	8.3	2,600	12	.02	38	23	569	4.8	24	652	793	18	.7	.6	.48	1,810	2.46	88	189	0	86
Dec. 1-31-----	8.6	8.2	2,880	12	.02	56	33	642	3.2	0	830	942	19	.7	1.5	.45	2,130	2.90	49	275	0	83
Dec. 16 1/2-----	1.0	8.3	3,070	13	.24	65	34		695	28	904	960	18	.5	.8	--	2,270	3.09	6.1	302	0	83
Jan. 1-7, 1948-----	1.9	8.1	3,290	18	.03	53	48	799	9.6	0	858	1,280	24	.8	2.0	.56	2,660	3.62	14	330	0	84
Jan. 8-12-----	7.4	8.4	3,760	18	.02	38	47	858	5.6	39	848	1,340	27	.9	1.5	.41	2,800	3.81	56	288	0	86
Jan. 13-Feb. 20-----	2.0	8.2	3,320	16	.03	86	40	718	10	0	868	1,200	26	.6	.9	.36	2,520	3.43	14	379	0	80
Feb. 19 1/2-----	1.0	6.5	3,158	7.5	.30	13	3.5		39	0	87	50	1.0	.2	6.9	--	192	26	15	47	0	64
Feb. 21-26-----	137	7.4	505	9.6	.25	12	4.4	91	13	0	166	109	3.5	.4	4.9	.00	370	50	137	48	0	76
Feb. 27-28-----	380	7.7	342	9.4	.60	15	4.5	58	1.6	0	116	81	1.0	.6	2.9	--	300	41	308	56	0	68
Feb. 29-Mar. 2-----	250	7.6	238	9.3	.30	15	3.0	52	5.6	0	100	82	2.0	.4	2.1	.21	262	36	177	50	0	66
Mar. 3-6-----	123	7.4	470	9.5	.15	28	6.3	59	2.4	0	124	117	2.5	.5	2.4	--	340	46	113	96	0	56
Mar. 7-13-----	36	7.0	702	12	.15	30	11	108	5.2	0	174	203	6.0	.1	3.0	.00	490	67	48	120	0	63
Mar. 14-----	900	6.6	265	7.0	.22	14	2.8		38	0	81	59	2.0	.0	1.4	--	202	27	491	46	0	64
Mar. 15-----	1,400	6.7	182	7.5	.29	15	1.8		20	0	72	28	.2	.0	1.5	--	138	19	522	45	0	49
Mar. 16 8:15 a.m.---	1,800	6.5	161	7.5	.18	17	1.8		15	0	64	28	.2	.0	1.3	--	142	19	690	50	0	40
Mar. 16 6:00 p.m.---	1,800	7.0	396	12	.60	16	5.0		69	0	146	86	.2	.0	2.0	.05	298	41	1,450	60	0	71

1/Not included in weighted average.

MOREAU RIVER BASIN--Continued  
MOREAU RIVER NEAR FAITH, S. DAK.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean dis-charge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbo-nate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bor-on (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium
																Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
Mar. 17, 1948																					
8:00 a. m. -----	1,040	6.9		304	0.28	14	4.5		48	0	104	70	0.2	1.7	--	224	0.30	629	53	0	66
Mar. 17 3:00 p. m. -	1,040	7.3	252	7.0	.60	12	4.0	47		0	82	75	.2	2.9	.01	204	.28	573	46	0	68
Mar. 18-21 -----	1,200	6.9	370	9.4	.34	33	6.7	50	4.0	0	81	118	8.0	2.6	.00	284	.39	920	110	44	44
Mar. 22-23 -----	925	7.4	590	10	1.08	43	13	71	6.0	0	94	219	8.0	2.2	--	414	.56	1,030	161	84	48
Mar. 24-25 -----	450	7.9	1,010	11	.83	64	26	135	6.0	0	98	415	28	2.1	--	726	.99	882	267	187	52
Mar. 26-31 -----	255	8.1	1,120	11	.00	50	30	158	4.8	0	121	476	9.0	3.1	.00	806	1.10	555	248	149	57
Apr. 1-9 -----	83	8.1	1,450	9.2	.07	70	35	214	7.6	0	227	562	9.0	3.4	.16	1,010	1.37	226	319	133	59
Apr. 10-30 -----	139	8.5	1,500	22	.06	62	32	220	4.0	10	186	580	9.5	3.2	.20	1,020	1.39	383	286	109	62
May 1-31 -----	60	8.5	2,230	14	.06	95	71	330	2.8	12	236	1,010	14	1.5	--	1,670	2.27	271	529	316	57
May 24 1/2 -----	17	8.2	2,650	5.0	.00	95	88	514		0	353	1,350	15	.7	.03	2,240	3.05	103	599	310	65
June 1-30 -----	314	7.8	1,130	22	.90	47	19	167	4.4	0	165	386	5.0	2.1	.14	710	.97	602	195	60	64
June 4 1/2 -----	372	7.6	567	10	.02	22	5.0		100	0	144	164	1.6	2.1	--	395	.54	397	75	0	74
June 8 1/2 -----	15	7.7	720	9.0	--	27	6.5		135	0	208	202	3.8	1.9	--	505	.69	20	94	0	76
July 1-31 -----	95	8.1	1,110	21	.30	47	19	166	4.0	0	199	364	5.0	1.9	.14	708	.96	182	195	32	64
July 19 1/2 -----	120	7.9	841	13	.14	28	6.0		154	0	197	246	6.0	1.1	--	580	.79	188	94	0	78
Aug. 1-31 -----	26	8.4	1,470	20	.20	27	11	286	4.4	12	344	406	8.0	2.1	--	944	1.28	66	113	0	84
Aug. 4 1/2 -----	8.0	8.0	1,520	15	.00	33	20	296		0	388	460	7.0	.6	.1	1,030	1.40	22	165	0	80
Sept. 1-30 -----	0.04	8.5	2,620	7.8	.02	25	23	515	10	17	390	904	16	1.0	.43	1,710	2.33	.2	157	0	87
Weighted average 2/	102	--	970	15	0.45	42	18	151	4.3	169	344	6.8	0.3	2.1	--	669	0.91	190	179	40	60

1/Not included in weighted average.

2/Weighted average for period sampled only.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	45	40	32	32	32	32	--	52	63	66	64	--
2	49	39	32	32	32	32	32	50	70	74	62	60
3	56	40	--	32	32	32	35	50	72	71	62	66
4	55	40	32	32	32	32	36	--	61	72	61	62
5	55	32	32	32	32	32	--	50	65	76	61	56
6	48	--	32	--	32	32	40	50	67	76	64	55
7	--	32	32	32	32	32	40	60	65	77	65	40
8	48	32	33	35	32	32	32	50	87	76	66	48
9	49	32	32	32	32	32	40	44	70	73	64	56
10	50	32	32	32	32	32	43	40	67	71	64	50
11	56	32	32	32	32	--	39	40	63	70	67	54
12	48	32	32	32	32	32	32	50	60	72	66	52
13	46	32	32	32	32	--	40	60	65	71	65	52
14	--	--	34	32	32	34	--	60	60	70	66	58
15	53	32	32	32	32	32	50	--	62	66	64	60
16	--	32	32	32	32	32	40	55	62	65	70	60
17	51	32	32	32	40	32	50	55	56	66	70	58
18	46	32	32	32	32	32	--	65	50	68	68	56
19	--	44	32	32	32	32	50	70	58	70	68	60
20	--	32	32	32	32	32	40	62	56	68	62	56
21	--	32	32	32	32	32	50	60	51	66	64	54
22	--	32	32	32	32	32	56	60	60	65	68	55
23	--	32	32	32	32	32	50	64	60	64	68	58
24	--	34	32	32	32	32	52	60	62	69	--	58
25	--	36	34	32	32	32	52	60	62	67	64	56
26	--	34	32	32	32	32	50	64	64	63	59	54
27	--	34	32	32	34	34	--	60	64	64	67	53
28	--	34	32	32	32	34	50	56	65	66	69	52
29	--	34	32	32	32	32	50	50	65	64	68	--
30	46	32	35	32	--	32	56	50	65	58	65	--
31	--	--	32	--	--	32	--	55	--	65	66	--
Average	--	34	32	32	32	32	44	55	63	69	65	56

## MOREAU RIVER BASIN--Continued

## MOREAU RIVER NEAR FAITH, S. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Suspended sediment Mean concentration (ppm)	Tons per day
1-----	3.7	18	0.2	12	91	2.9	30	172	14
2-----	3.1	18	.2	10	87	2.3	30	145	12
3-----	3.7	18	.2	9	94	2.3	25	152	10
4-----	3.7	18	.2	9	102	2.5	20	162	8.7
5-----	3.7	20	.2	10	102	2.8	15	130	5.3
6-----	3.4	25	.2	11	102	3.0	10	115	3.1
7-----	3.1	28	.2	25	102	6.9	8	103	2.2
8-----	3.1	38	.3	24	101	6.5	9	130	3.2
9-----	4.6	48	.6	18	93	4.5	7	114	2.2
10-----	5	45	.6	17	85	3.9	5	99	1.3
11-----	12	1,990	1/110	14	77	2.9	3	118	1.0
12-----	77	5,860	1/1,250	12	71	2.3	3	131	1.1
13-----	64	3,950	683	12	93	3.0	3	126	1.0
14-----	66	2,550	454	11	100	3.0	1	93	.3
15-----	39	1,600	168	7	93	1.8	1	89	.2
16-----	18	330	16	8	95	2.1	1	116	.3
17-----	18	198	9.6	8	84	1.8	4	136	1.5
18-----	17	125	5.7	8	83	1.8	5	126	1.7
19-----	14	110	4.2	9	78	1.9	4	106	1.1
20-----	14	263	9.9	10	80	2.2	8	99	2.1
21-----	13	152	5.3	20	74	4.0	7	93	1.8
22-----	13	173	6.1	20	62	3.3	6	85	1.4
23-----	13	85	3.0	15	61	2.5	6	78	1.3
24-----	12	70	2.3	30	61	4.9	7	82	1.5
25-----	12	80	2.6	40	71	7.7	8	69	1.5
26-----	12	93	3.0	35	116	11	8	64	1.4
27-----	12	108	3.5	40	116	13	10	78	2.1
28-----	11	135	4.0	40	118	13	10	80	2.2
29-----	11	100	3.0	30	210	17	10	77	2.1
30-----	11	107	3.2	35	193	18	4	77	.8
31-----	12	108	3.5	--	--	--	0	--	0
Total -	508.1	--	2,750	549	--	155	268	--	88
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Suspended sediment Mean concentration (ppm)	Tons per day
1-----	1	80	0.2	0	--	0	250	43	29
2-----	1	86	.2	0	--	0	200	--	--
3-----	1	85	.2	0	--	0	160	--	--
4-----	1	75	.2	0	--	0	130	--	--
5-----	1	70	.2	0	--	0	110	--	--
6-----	3	100	.8	0	--	0	90	--	--
7-----	5	120	1.6	0	--	0	70	--	--
8-----	8	135	2.9	0	--	0	50	--	--
9-----	10	110	3.0	0	--	0	35	--	--
10-----	10	100	2.7	0	--	0	10	32	.9
11-----	7	97	1.8	0	--	0	10	31	.8
12-----	2	94	.5	0	--	0	5	33	.4
13-----	1	92	.2	0	--	0	70	60	11
14-----	1	90	.2	0	--	0	900	105	255
15-----	1	88	.2	1	20	.1	1,400	180	680
16-----	1	86	.2	1	25	.1	1,800	610	2,960
17-----	1	84	.2	1	30	.1	1,040	500	1,400
18-----	2	82	.4	1	70	.2	800	137	296
19-----	2	80	.4	1	410	1.1	1,110	325	974
20-----	1	78	.2	55	610	91	1,600	557	2,410
21-----	1	76	.2	100	340	92	1,300	530	1,860
22-----	0	--	0	170	110	50	1,000	635	1,110
23-----	0	--	0	200	47	25	850	1,170	2,690
24-----	0	--	0	50	38	5.1	480	1,250	1,620
25-----	0	--	0	100	70	19	420	1,080	1,220
26-----	0	--	0	200	67	36	350	670	633
27-----	0	--	0	440	82	97	300	500	405
28-----	2	60	.3	320	70	60	270	670	488
29-----	2	45	.2	300	50	40	220	1,150	683
30-----	2	25	.1	--	--	--	190	810	416
31-----	0	--	0	--	--	--	200	510	275
Total -	67	--	17	1,940	--	517	15,420	--	2/21,100

1/Sediment discharge computed by subdividing day.

2/Includes estimated load for missing days.

## MOREAU RIVER BASIN--Continued

## MOREAU RIVER NEAR FAITH, S. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	170	470	216	57	360	55	12	92	3.0
2-----	150	380	154	58	1,840	288	12	96	3.1
3-----	120	480	156	44	650	77	140	1,530	1/1,440
4-----	80	870	188	43	180	21	372	4,800	1/4,910
5-----	62	650	109	109	472	1/185	123	2,230	1/789
6-----	43	270	31	246	2,320	1,540	41	1,080	120
7-----	24	177	11	160	3,600	1,560	23	522	32
8-----	66	115	20	121	2,090	683	15	100	4.0
9-----	35	147	14	82	2,110	467	14	52	2.0
10-----	36	205	20	86	1,600	372	12	50	1.6
11-----	26	80	5.6	66	860	153	11	61	1.8
12-----	9	68	1.7	60	540	87	11	59	1.8
13-----	7	57	1.1	49	960	127	11	60	1.8
14-----	25	65	4.4	53	2,860	1/420	12	72	2.3
15-----	21	83	4.7	181	4,280	1/2,110	25	134	1/11
16-----	18	97	4.7	101	4,050	1,100	51	309	43
17-----	21	175	9.9	70	1,710	323	91	1,260	1/585
18-----	19	115	5.9	46	810	101	805	8,810	1/18,500
19-----	31	888	129	35	454	43	728	8,950	1/17,700
20-----	266	9,750	1/7,830	33	248	22	1,390	14,400	1/57,900
21-----	544	16,500	24,200	25	65	4.4	1,130	12,000	1/39,400
22-----	628	11,800	20,000	24	74	4.8	673	7,800	14,200
23-----	393	8,600	9,120	20	80	4.3	585	4,500	7,110
24-----	261	7,500	5,290	17	71	3.3	502	3,780	1/5,230
25-----	171	6,800	3,140	13	81	2.8	876	9,150	1/21,200
26-----	119	4,900	1,570	13	65	2.3	585	8,100	12,800
27-----	106	2,670	764	11	68	2.0	429	5,300	6,140
28-----	91	870	214	10	64	1.7	324	3,920	3,430
29-----	77	450	94	11	65	1.9	261	3,030	2,140
30-----	58	290	45	12	66	2.1	171	2,140	988
31-----	--	--	--	12	72	2.3	--	--	--
Total -	3,677	--	73,350	1,868	--	9,770	9,435	--	214,700
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	124	1,050	352	8	47	1.0	0.7	48	0.1
2-----	91	400	98	8	45	1.0	.3	50	--
3-----	117	1,230	1/577	8	45	1.0	.2	26	--
4-----	372	5,930	1/5,940	8	43	.9	0	--	0
5-----	317	3,280	1/2,780	11	56	1.7	0	--	0
6-----	318	3,760	1/3,150	19	2,050	105	0	--	0
7-----	186	4,370	2,190	12	5,350	173	0	--	0
8-----	121	3,540	1,160	14	3,100	1/114	0	--	0
9-----	91	1,610	396	39	2,380	251	0	--	0
10-----	68	572	105	20	2,120	114	0	--	0
11-----	49	340	45	39	2,040	1/241	0	--	0
12-----	44	200	1/24	208	3,250	1/1,840	0	--	0
13-----	64	280	1/49	101	2,610	712	0	--	0
14-----	52	519	1/109	57	6,660	1,020	0	--	0
15-----	203	3,410	1/1,960	64	8,700	1,500	0	--	0
16-----	94	1,970	1/499	53	6,600	944	0	--	0
17-----	152	2,780	1/1,140	32	3,850	333	0	--	0
18-----	86	2,160	502	23	197	12	0	--	0
19-----	120	3,690	1/1,890	16	116	5.0	0	--	0
20-----	98	2,280	1/705	11	110	3.3	0	--	0
21-----	47	720	91	9	62	1.5	0	--	0
22-----	29	276	22	8	50	1.1	0	--	0
23-----	20	145	7.8	8	55	1.2	0	--	0
24-----	16	60	2.6	6	54	.9	0	--	0
25-----	13	60	2.1	7	46	.9	0	--	0
26-----	9	58	1.4	6	42	.7	0	--	0
27-----	9	60	1.5	6	55	.9	0	--	0
28-----	8	50	1.1	6	55	.9	0	--	0
29-----	9	50	1.2	4.0	52	.6	0	--	0
30-----	9	49	1.2	4.0	45	.5	0	--	0
31-----	8	48	1.0	1.9	56	.3	--	--	--
Total -	2,944	--	23,800	816.9	--	7,380	1.2	--	3/0.1

Total discharge for year (second-foot-days) ----- 37,494.2

Total load for year (tons) ----- 353,600

1/Sediment discharge computed by subdividing day.

3/Includes sediment discharge less than 0.05 ton.

MOREAU RIVER BASIN--Continued  
MOREAU RIVER NEAR FAITH, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 17, 1948	2:15 p. m.	926	494	1,390	77	87	92	95	97	98	98	99	100		BW	
Mar. 19	1:00 p. m.	996	422	470	52	70	--	92	93	96	98	99	100		BN	
Mar. 19	1:00 p. m.	996	422	450	74	84	90	95	96	97	98	99	100		BW	
Mar. 24	12:00 m.	386	1,190	924	48	63	79	92	97	98	99	100	--		BW	
Mar. 30	11:45 a. m.	171	801	848	2	12	51	--	--	98	99	100	--		BN	
Apr. 27	5:30 p. m.	101	2,120	1,580	2	5	16	--	--	99	100	--	--		BN	
May 11	10:45 a. m.	64	853	751	10	14	21	--	--	92	--	--	--		BN	
June 18	6:00 a. m.	628	8,180	1,710	--	78	87	88	91	92	94	96	98		BW	
June 19	6:00 a. m.	870	9,420	1,540	--	5	15	--	76	82	88	95	98		BN	
June 19	12:30 p. m.	673	8,740	1,830	58	68	81	86	92	94	96	98	99		BW	
June 23	3:45 p. m.	602	3,860	2,590	1	4	28	--	--	94	96	98	100		BN	
July 4	5:00 a. m.	411	9,620	3,720	46	60	71	78	82	86	93	96	99		BW	
July 4	11:00 a. m.	429	3,920	1,480	44	58	70	80	86	89	94	97	99		BW	
July 4	6:00 p. m.	340	4,940	1,890	48	65	78	88	92	94	96	98	99		BW	
July 7	9:30 a. m.	194	5,120	4,530	--	1	2	22	--	98	100	--	--		BN	
July 15	6:00 a. m.	230	4,260	3,420	3	9	--	--	89	93	94	98	100		BN	
July 15	1:00 p. m.	276	3,840	3,000	6	11	--	--	94	95	96	99	100		BN	
July 19	4:40 p. m.	188	8,720	6,030	54	71	87	93	99	99	100	--	--		BW	

MOREAU RIVER BASIN—Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN MOREAU RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- di- um
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate	
MOREAU RIVER NEAR EAGLE BUTTE																					
July 1, 1948	241	7.5	896	12	0.00	41	17	146		155	332	12	0.0	0.8	0.18	642	0.87		172	45	65
July 20	1,680	7.8	652	12	.00	45	12	81		156	198	1.0	.4	.8	.11	460	.63		162	34	52
Aug. 10	10	7.5	1,200	8.2	.00	57	19	192		228	422	8.0	.5	.2	.06	876	1.19		220	33	66
Aug. 31	2.4	7.8	1,720	6.6	.00	37	16	354		384	572	11	.6	.6	.34	1,190	1.62		158	0	83
MOREAU RIVER AT PROMISE																					
June 10, 1948	141	7.6	858	15	0.08	27	9.7	160		210	261	6.2	0.4	2.0	0.21	598	0.81		107	0	76
June 30	430	7.2	1,220	13	.00	78	28	171		110	540	19	.5	.6	.18	905	1.23		310	220	54
July 22	870	7.7	579	11	.00	43	11	63		162	148	.2	.4	1.3	.40	392	.53		152	19	47
Aug. 11	21	7.3	1,440	12	.00	97	26	194		222	554	8.0	.3	1.4	.19	1,000	1.36		349	167	55
Aug. 31	6.7	7.4	2,060	9.1	.00	83	31	363		264	852	14	.6	.0	.35	1,480	2.01		334	118	70

## CHEYENNE RIVER BASIN

## CHEYENNE RIVER NEAR HOT SPRINGS, S. Dak.

LOCATION --At bridge on State Highway 87, a quarter of a mile downstream from Cascade Creek, and 10 miles southwest of Hot Springs, Fall River County.  
DRAINAGE AREA --8,710 square miles.

RECORDS AVAILABLE --Chemical analyses: April 1941 to October 1943, November 1945, July to December 1946, April 1947 to September 1948.

Water temperatures: July 1947 to September 1948.

Sediment loads: April 1946 to September 1948.

EXTREMES, 1947-48: --Dissolved solids: Maximum, 2,930 parts per million Oct. 25-Nov. 30; minimum, 776 parts per million June 1-30.

Total hardness: Maximum, 1,760 parts per million Nov. 22; minimum, 379 parts per million June 1-30.

Water temperatures: Maximum, 80° F. July 5; minimum, 34° F. freezing point on several days in December.

Water hardness: Maximum, 1,760 parts per million Oct. 25-Nov. 30, 1947; minimum, 776 parts per million June 1-30, 1948.

EXTREMES, 1948-49: --Dissolved solids: Maximum, 2,930 parts per million Oct. 25-Nov. 30, 1947; minimum, 776 parts per million June 1-30, 1948.

Total hardness: Maximum, 1,760 parts per million Nov. 22, 1947; minimum, 358 parts per million July 11, 1946.

Water temperatures (July 1947-September 1948): Maximum, 88° F. July 25, 1947; minimum, freezing point on several days in December, February, and March.

Sediment loads: Maximum, 476,000 tons per day June 19, 1946; minimum, less than 1 ton per day on many days each year.

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-24, 1947----	23	7.9	2,430	20	0.12	480	102	56	11	152	1,470	53	1.0	0.9	0.30	2,270	3.09	141	1,620	1,500	7
Oct. 25-Nov. 21, ----																					
Nov. 22-30-----	32	8.0	3,550	14	.11	440	124	317	9.6	180	1,600	331	.9	1.4	.39	2,930	3.98	253	1,610	1,460	30
Dec. 1-31-----	22	7.4	2,860	20	.04	523	110	219	176	219	1,630	185	.8	1.4	--	2,760	3.75	164	1,760	1,580	18
Jan. 1-31, 1948----	37	8.0	2,410	31	.02	309	88	270	8.0	237	1,110	228	.6	2.6	--	2,160	2.94	216	1,130	936	34
Feb. 1-29-----	24	8.0	1,990	34	.02	289	80	179	13	236	1,050	119	.8	1.2	--	1,860	2.56	122	1,050	856	27
Mar. 1-31-----	72	8.0	1,580	24	.05	221	58	137	9.6	182	768	81	.4	1.1	.22	1,390	1.89	270	790	641	27
Apr. 1-30-----	510	7.8	1,050	24	.10	116	31	101	8.6	176	388	64	.4	.9	.18	826	1.12	1,140	417	273	34
May 1-31-----	59	8.1	2,530	18	.02	264	84	321	9.6	199	1,040	304	.6	.8	.22	2,140	2.91	341	1,000	837	41
June 1-30-----	68	8.2	2,070	28	.05	225	65	244	18	267	884	152	.7	.8	--	1,750	2.38	321	829	610	38
July 1-30-----	423	8.0	983	25	.02	101	31	104	5.6	254	332	29	.7	1.0	--	776	1.06	886	379	171	37
Aug. 1-31-----	304	8.0	1,250	24	.05	153	41	114	13	200	584	30	.8	.6	--	1,060	1.44	870	550	386	30
Sept. 1-30-----	162	7.9	1,350	37	.04	178	34	70	70	195	492	43	.6	3.3	.03	955	1.30	418	584	424	21
Weighted average--	15	8.0	2,310	23	.01	515	96	40	6.0	178	1,460	43	.7	.7	.11	2,270	3.09	92	1,680	1,530	5
	145	--	1,330	25	0.06	159	43	124	6.7	207	548	70	0.6	1.1	--	1,090	1.48	427	574	404	32



Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	70	66	51	36	46	37	44	57	59	74	68	70
2	--	54	33	41	45	33	42	60	63	78	69	72
3	65	52	33	39	50	32	47	64	69	77	72	73
4	65	49	33	40	47	33	50	63	71	79	69	72
5	68	44	35	43	50	33	53	--	69	85	69	68
6	68	40	38	45	44	42	45	--	74	83	69	65
7	67	45	32	47	45	35	50	--	72	77	67	62
8	69	44	34	37	48	33	55	--	72	70	76	67
9	65	42	33	33	49	32	--	--	75	75	73	65
10	67	--	35	36	49	32	55	--	72	80	77	63
11	61	44	38	37	38	35	55	--	68	75	74	69
12	59	38	44	36	44	35	50	--	68	75	68	68
13	70	44	42	33	49	36	65	--	70	70	72	69
14	68	38	--	--	51	37	65	--	71	71	66	70
15	65	37	38	35	49	33	66	--	74	65	73	72
16	68	40	41	39	51	34	68	--	70	74	68	71
17	68	37	45	41	48	33	75	--	66	68	68	72
18	65	38	44	41	35	41	67	--	56	70	70	74
19	66	37	41	47	35	33	59	74	54	68	68	68
20	65	38	42	46	33	34	53	73	54	73	72	63
21	70	--	40	38	34	33	67	75	60	70	75	--
22	58	39	40	37	34	35	62	76	62	66	75	60
23	59	40	39	47	32	40	60	72	65	77	69	64
24	59	--	40	46	25	43	52	70	66	71	70	65
25	59	41	39	42	33	45	57	66	65	73	70	66
26	59	37	35	--	39	44	58	62	65	83	70	--
27	56	33	--	45	33	34	60	64	64	86	71	65
28	56	38	37	46	32	40	68	55	69	69	75	62
29	48	48	38	49	32	42	68	63	63	68	71	58
30	56	--	33	50	--	45	67	56	69	72	70	63
31	60	--	34	50	--	35	--	69	--	70	--	--
Average	74	42	38	41	42	36	58	--	67	73	71	67

## MISSOURI RIVER BASIN

CHEYENNE RIVER BASIN--Continued  
 CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	22	19	1	19	34	2	45	210	26
2-----	20			29			54	260	38
3-----	20			25			64	285	49
4-----	20			29			64	335	56
5-----	20			25			72	480	93
6-----	22	8	--	25	111	9	47	330	42
7-----	22			29			47	210	27
8-----	23			30			43	155	18
9-----	22			32			43	145	17
10-----	22			30			41	139	15
11-----	22	14	--	30	38	3	30	90	7
12-----	22			30			31		
13-----	23			29			36		
14-----	23			31			31		
15-----	21			36			26		
16-----	22	46	3	25	300	34	28	30	2
17-----	20			29			32		
18-----	23			31			28		
19-----	25			30			28		
20-----	25			24			29		
21-----	25	46	3	22	300	34	29	43	3
22-----	26			22			28		
23-----	25			22			28		
24-----	27			22			28		
25-----	32			36			26		
26-----	31	46	3	42	300	34	32	43	3
27-----	24			48			35		
28-----	24			64			29		
29-----	25			64			28		
30-----	27			82			30		
31-----	29			--	--	--	30		
Total--	734	--	1/39	992	--	482	1,142	--	440
Day	January			February			March		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	28	31	2	27	19	1	199	1,150	618
2-----	25			28			172	1,800	836
3-----	23			29			158	600	256
4-----	22			28			84	280	64
5-----	23			28			135	240	88
6-----	24	88	10	27	19	1	122	185	61
7-----	24			26			118	200	64
8-----	23			27			116	110	34
9-----	41			27			82	55	12
10-----	27			28			80	36	8
11-----	24	32	2	28	44	4	73	40	8
12-----	30			28			84	65	15
13-----	27			28			95	75	19
14-----	23			30			148	365	146
15-----	18			25			288	1,190	925
16-----	18	16	1	36	400	102	1,930	6,580	2/39,800
17-----	18			54			1,300	5,800	20,400
18-----	21			199			1,140	6,000	2/19,700
19-----	22			186			1,480	12,300	49,200
20-----	24			77			1,930	18,600	97,000
21-----	22	16	1	95	400	102	1,600	19,500	84,400
22-----	22			150			1,140	14,100	43,400
23-----	24			118			805	9,000	19,600
24-----	24			68			450	4,500	5,470
25-----	24			106			510	4,900	6,750
26-----	25	16	1	112	450	136	510	8,400	11,600
27-----	25			199			346	5,500	5,150
28-----	25			135			244	3,500	2,310
29-----	25			133			186	2,300	1,160
30-----	25			--			158	2,200	940
31-----	25			--	--	--	135	850	310
Total--	751	--	63	2,082	--	4,340	15,818	--	410,300

1/Includes sediment discharge less than 1 ton.

2/Sediment discharge computed by subdividing day.

CHEYENNE RIVER BASIN--Continued  
 CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued  
 Suspended sediment water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	133	600	216	51	24	3	73	4,300	848
2-----	108	380	111	45			43	2,700	314
3-----	95	250	64	45			42	2,500	281
4-----	84	180	41	42			38	2,000	205
5-----	84	154	35	42			17	319	15
6-----	73	140	28	42	24	3	12	48	2
7-----	67	160	29	32			11		
8-----	67	116	21	32			11		
9-----	62	94	16	45			11		
10-----	62	82	14	46			11		
11-----	61	54	9	54	30	4	11	48	2
12-----	45	34	4	51	36	5	11		
13-----	35	20	2	48	26	3	11		
14-----	35	18	2	47	10	1	14		
15-----	35	16	2	43			20		
16-----	35	20	2	41			15	39,400	2/264,000
17-----	35			41			18		
18-----	35			38			1,850		
19-----	48			36			1,800		
20-----	50			34			895		
21-----	45	20	2	34	1,200	382	450	10,000	12,100
22-----	45			34			186	5,400	2,720
23-----	45			34			170	3,000	1,380
24-----	47			118			2,360	39,600	2/270,000
25-----	50			106	5,300	1,520	895	26,000	62,900
26-----	50	71	10	72	350	68	510	14,500	20,000
27-----	62	395	66	244	37,500	2/29,400	612	12,500	20,600
28-----	77	255	53	172	18,000	8,360	990	22,900	61,400
29-----	60	58	9	228	18,600	11,500	765	21,000	43,400
30-----	48	26	3	116	9,000	2,820	850	19,000	43,600
31-----	--	--	--	95	4,000	1,030	--	--	--
Total--	1,778	--	755	2,108	--	55,130	12,702	--	976,000
Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	281	8,000	6,070	48	94	12	19	15	--
2-----	199	4,000	2,150	55	102	15	19		
3-----	133	2,630	945	70	144	27	19		
4-----	100	1,700	459	542	24,000	2/44,600	18		
5-----	73	947	187	450	16,600	20,200	14		
6-----	62	515	86	281	7,100	5,400	14	9	--
7-----	51	366	50	172	3,650	1,690	14		
8-----	43	238	28	146	2,090	825	16		
9-----	46	165	20	112	1,500	454	15		
10-----	56	222	34	73	500	98	16		
11-----	45	104	13	70	300	57	16	10	--
12-----	343	15,000	2/27,000	186	5,750	2,890	16		
13-----	301	17,300	14,000	244	7,450	4,910	15		
14-----	199	7,000	3,760	510	13,200	18,200	15		
15-----	805	18,300	39,800	324	25,600	22,400	14		
16-----	480	16,300	21,100	688	27,600	51,200	14	10	--
17-----	450	11,500	14,000	510	14,000	19,300	14		
18-----	1,120	22,100	78,100	148	6,000	2,400	14		
19-----	1,800	37,200	187,000	84	7,900	1,790	14		
20-----	850	21,400	49,100	67	1,260	228	14		
21-----	370	12,500	12,500	46	780	97	14	10	--
22-----	510	22,500	31,000	36	260	25	14		
23-----	261	20,000	14,100	19	135	7	15		
24-----	172	11,600	5,390	19	90	5	14		
25-----	128	7,150	2,470	19	47	2	14		
26-----	172	7,100	3,300	19	20	1	14	10	--
27-----	100	5,960	1,610	19			14		
28-----	75	1,590	322	19			12		
29-----	62	640	107	19			9		
30-----	62	430	72	19			21		
31-----	61	140	23	19			--		
Total--	9,410	--	514,800	5,033	--	196,800	451	--	1/14

Total discharge for year (second-foot-days)

53,001

Total load for year (tons)

2,159,000

1/Includes sediment discharge less than 1 ton.

2/Sediment discharge computed by subdividing day.

CHEYENNE RIVER BASIN--Continued  
CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
Mar. 18, 1948 -----	10:55 a. m.	990	4,260	5,380	3	12	69	80	84	86	91	94	96	BN
Apr. 7 -----	3:05 p. m.	64	210	231	28	53	78	82	92	94	98	99	--	BN

CHEYENNE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN CHEYENNE RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate	
CHEYENNE RIVER NEAR WASTA																					
June 7, 1948 -----	106	7.4	1,950	15	0.02	219	65	184		156	916	91	0.8	1.6	0.35		1,570	2.14		814	686
June 24-----	881	7.5	1,010	20	.02	106	24	89		171	374	16	.7	4.5	.25		771	1.05		363	223
Aug. 24 -----	165	7.9	1,310	9.5	.00	167	40	90		184	540	38	.7	.0	.16		985	1.34		581	430
BELLE FOURCHE RIVER NEAR ELM SPRINGS																					
June 7, 1948 -----	163	7.2	1,864	5.0	0.00	194	87	153		124	1,000	20	0.6	2.7	0.35		1,520	2.07		842	740
June 24-----	1,630	7.4	1,410	9.0	.02	139	50	131		138	672	14	.8	2.6	.18		1,090	1.48		552	439
Aug. 24 -----	188	7.4	2,040	9.4	.00	244	100	128		128	1,110	22	.6	1.0	.25		1,680	2.28		1,020	915
-----																					28
-----																					24
-----																					21

## MISSOURI RIVER BASIN

## CHEYENNE RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN CHEYENNE RIVER BASIN IN WYOMING

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
BELLE FOURCHE RIVER BELOW MOORCROFT			
Mar. 17, 1948 -----	1/250	367	248
Apr. 6 -----	4	194	2.1
Apr. 8 -----	2.2	159	.9
Apr. 14 -----	2.7	60	.4
Apr. 21 -----	3.4	65	0.6
Apr. 26 -----	2.4	38	.2
Apr. 30 -----	1.4	44	.2
May 3 -----	.7	65	.1
May 14 -----	.5	98	.1
May 27 -----	26	7,040	494
June 18 -----	422	5,420	6,180
June 22 -----	55	1,660	246
June 23 -----	602	8,600	14,000
June 24 -----	850	8,600	19,700
June 24 -----	864	8,220	19,200
June 24 -----	876	7,260	17,200
June 25 -----	293	3,950	3,120
June 26 -----	94	1,030	262
June 30 -----	211	2,140	1,220
July 1 -----	82	1,470	326
July 8 -----	11	266	7.9
July 15 -----	18	5,810	282
July 15 -----	109	10,500	3,090
July 16 -----	470	12,000	15,200
July 16 -----	484	6,670	8,700
Aug. 3 -----	45	25,700	3,120
Aug. 7 -----	24	760	49
Aug. 11 -----	3.5	169	1.6

1/ Mean daily discharge

BAD RIVER BASIN  
MISCELLANEOUS ANALYSES OF STREAMS IN BAD RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per- cent so- dium		
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total		Non- carbon- ate	
RAD RIVER NEAR FORT PIERRE																						
Mar. 15, 1948	1,470	7.2	682	12	0.00	86	9.5		47	141	230	0.2	0.4	0.4	0.24		612	0.83		254	139	29
June 18	3,930	7.1	1,110	21	0.03	116	19	136	165	488	11	11	.6	2.4	.32		898	1.22		368	233	44
July 15	132	7.5	1,690	16	0.02	150	22	224	174	734	30	30	.7	.6	.42		1,260	1.71		465	322	51
July 20	569	7.2	1,750	20	0.02	215	26	201	222	836	19	19	.7	.0	.14		1,430	1.94		643	461	40
Aug. 10	960	7.3	1,720	15	0.03	213	27	185	173	848	14	14	.7	.0	.15		1,390	1.89		642	501	39
Aug. 11	244	7.5	1,450	13	0.02	167	22	155	133	684	14	14	.7	1.7	.21		1,120	1.52		507	398	40
Sept. 1	1.0	7.6	2,130	14	0.02	208	32	284	181	1,010	47	47	.7	.0	.42		1,690	2.30		650	502	49

BAD RIVER NEAR FORT PIERRE

## WHITE RIVER BASIN

## WHITE RIVER NEAR OGLALA, S. DAK.

LOCATION.--At gaging station at bridge on U. S. Highway 18, 1 mile downstream from Blacktail Creek, and 6½ miles northwest of Oglala, Shannon County.

DRAINAGE AREA --2,200 square miles.

RECORDS AVAILABLE.--Sediment records: March 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 20,000 tons per day Aug. 9; minimum, 1 ton per day on several days in January and September.

EXTREMES, March 1947-September 1948.--Sediment loads: Maximum, 24,100 tons per day June 21, 1947; minimum, 1 ton per day on several days in January and September 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 14, 1948-----	83	7.6	672	34	0.02	70	11	68	273	117	12	0.6	0.6	3.2	0.15	471	0.64		220	0	40
July 26-----	25	7.8	518	35	.00	64	5.0	45	192	105	6.1	.6	1.7	.04	.04	378	.51		180	23	35



WHITE RIVER BASIN  
WHITE RIVER BASIN--Continued

379

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	31	109	9	39	75	8	40	1,810	195
2-----	31	107	9	39	62	7	40	1,880	203
3-----	30	95	8	39	55	6	38	2,000	205
4-----	31	96	8	38	200	20	37	1,100	110
5-----	33	100	9	33	130	12	36	710	69
6-----	32	88	8	31	73	6	37	--	1/60
7-----	32	82	7	28	105	8	38	492	50
8-----	30	63	5	28	102	8	38	421	43
9-----	30	64	5	27	90	7	38	524	43
10-----	30	65	5	26	57	4	37	390	39
11-----	31	70	6	25	65	4	36	230	22
12-----	39	324	34	23	64	4	35	135	13
13-----	42	375	43	20	43	2	37	--	1/13
14-----	33	304	27	21	57	3	38	117	12
15-----	37	284	28	25	106	7	38	97	10
16-----	47	298	38	27	125	9	35	92	9
17-----	47	235	30	27	105	8	33	90	8
18-----	42	168	19	27	86	6	33	95	8
19-----	37	140	14	26	81	6	35	110	10
20-----	35	131	12	25	67	5	37	115	12
21-----	39	147	15	23	36	2	38	104	11
22-----	36	114	11	20	35	2	38	87	9
23-----	36	105	10	18	47	2	38	85	9
24-----	36	80	8	20	94	5	38	80	8
25-----	38	69	7	22	164	10	39	74	8
26-----	35	61	6	25	195	13	40	98	11
27-----	38	53	5	27	213	16	42	105	12
28-----	53	89	13	28	264	20	45	218	26
29-----	49	113	15	30	205	17	47	104	13
30-----	42	102	12	35	300	28	37	75	8
31-----	42	85	10	--	--	--	25	76	5
Total -	1,144	--	436	822	--	255	1,163	--	1,250
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	20	92	5	35	25	2	40	82	9
2-----	20	70	4	35	--	1/3	40	105	11
3-----	22	70	4	33	41	4	38	75	8
4-----	25	68	5	33	55	5	35	76	7
5-----	24	62	4	33	--	1/4	32	45	4
6-----	25	62	4	33	35	3	30	45	4
7-----	30	134	11	30	--	1/3	30	60	5
8-----	35	200	19	30	--	1/2	30	35	3
9-----	40	125	14	30	30	2	28	35	3
10-----	40	88	10	30	--	1/2	25	36	2
11-----	35	--	1/10	25	26	2	25	35	2
12-----	30	--	1/8	20	--	1/2	30	40	3
13-----	30	--	1/10	20	40	2	40	408	44
14-----	35	--	1/16	25	35	2	50	1,160	157
15-----	33	156	14	30	165	13	70	2,090	395
16-----	30	--	1/10	35	192	18	120	2,200	713
17-----	25	--	1/6	40	104	11	180	1,700	826
18-----	20	52	3	45	206	25	250	1,700	1,150
19-----	20	--	1/3	50	--	1/27	350	2,150	2,020
20-----	25	--	1/3	45	110	13	450	2,350	2,860
21-----	30	42	3	40	170	18	435	1,950	2,290
22-----	30	92	7	40	180	19	399	2,450	2,640
23-----	28	45	3	45	250	30	321	3,600	3,120
24-----	25	--	1/2	45	270	33	208	3,500	1,970
25-----	25	--	1/2	50	160	22	163	3,220	1,420
26-----	20	25	1	60	145	24	115	2,400	745
27-----	18	--	1/1	50	162	22	108	1,300	380
28-----	18	--	1/1	45	85	10	95	1,450	372
29-----	22	26	2	45	90	11	88	1,050	249
30-----	30	--	1/3	--	--	--	76	950	195
31-----	35	31	3	--	--	--	72	690	134
Total -	845	--	191	1,077	--	334	3,973	--	21,740

1/Estimated.

## MISSOURI RIVER BASIN

## WHITE RIVER BASIN--Continued

## WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	67	550	100	88	14,700	3,500	98	1,400	370
2-----	65	480	84	88	11,000	2,620	90	1,070	260
3-----	65	480	84	80	4,200	906	85	850	195
4-----	59	460	73	83	1,680	377	88	970	230
5-----	57	410	63	83	1,000	224	80	760	164
6-----	57	372	57	80	740	160	74	430	86
7-----	55	357	53	74	570	114	105	1,150	326
8-----	53	330	47	72	600	117	88	700	166
9-----	53	310	44	85	2,200	505	76	500	103
10-----	51	270	37	102	3,100	854	76	1,430	294
11-----	46	260	32	108	1,490	432	76	960	197
12-----	44	205	24	158	2,850	1,210	78	1,140	240
13-----	46	210	26	128	12,900	4,460	80	950	205
14-----	55	260	39	102	10,300	2,840	80	555	120
15-----	59	310	49	92	3,950	980	80	935	202
16-----	57	350	54	88	2,650	630	92	1,450	360
17-----	63	350	60	76	1,150	236	120	--	1/830
18-----	63	330	56	65	650	114	92	1,300	323
19-----	61	340	56	65	480	84	98	1,330	352
20-----	65	520	91	61	355	58	321	12,000	2/11,200
21-----	63	470	80	57	275	42	337	13,200	2/12,400
22-----	63	400	68	57	260	40	146	8,600	3,390
23-----	63	400	68	59	255	41	141	6,550	2,490
24-----	67	600	108	59	260	41	133	3,800	1,360
25-----	76	1,900	390	63	270	46	175	3,900	1,840
26-----	90	5,300	1,290	127	2,200	2/1,380	194	--	1/7,020
27-----	108	4,700	1,370	281	16,700	12,700	136	13,400	4,920
28-----	100	1,300	351	133	13,400	4,820	105	8,900	2,520
29-----	152	5,830	2/2,620	110	7,200	2,140	110	5,000	1,480
30-----	118	6,450	2,060	98	3,770	997	95	2,600	667
31-----	--	--	--	95	2,350	604	--	--	--
Total--	2,041	--	9,530	2,917	--	43,270	3,549	--	54,310
	July			August			September		
1-----	90	1,400	340	21	201	11	13	125	4
2-----	76	721	148	25	255	17	11	120	4
3-----	67	--	1/67	23	--	1/17	10	122	3
4-----	61	--	1/48	25	308	20	10	155	4
5-----	57	272	42	100	5,800	1,570	8	132	3
6-----	49	267	35	51	4,000	551	7	100	2
7-----	49	256	34	38	--	1/256	7	66	1
8-----	44	240	28	35	--	1/246	7	74	1
9-----	37	200	20	528	14,300	2/20,000	7	75	1
10-----	32	--	1/15	149	9,080	2/3,780	6	79	1
11-----	30	240	19	65	6,400	1,120	11	266	8
12-----	30	589	48	53	12,400	1,770	21	420	24
13-----	34	583	54	44	6,900	820	14	274	10
14-----	72	2,350	457	57	10,500	1,620	11	165	5
15-----	108	5,800	1,690	55	1,360	202	9	188	5
16-----	83	6,860	1,540	42	835	95	9	134	3
17-----	55	3,900	580	37	400	40	9	100	2
18-----	112	10,100	2/3,510	35	258	24	9	86	2
19-----	273	22,000	16,200	33	237	21	8	70	2
20-----	125	12,000	4,050	30	211	17	7	74	1
21-----	125	12,200	4,120	27	261	19	7	115	2
22-----	69	6,700	1,250	26	169	12	7	207	4
23-----	47	--	1/706	24	180	12	6	32	1
24-----	38	7,180	736	22	175	10	6	98	2
25-----	29	--	1/291	20	170	9	8	106	2
26-----	25	1,170	79	19	162	8	7	99	2
27-----	24	424	27	17	146	7	18	150	7
28-----	24	374	24	15	195	8	19	127	7
29-----	23	305	19	15	156	6	18	80	4
30-----	22	--	1/15	14	139	5	14	70	3
31-----	21	218	12	14	131	5	--	--	--
Total--	1,931	--	36,200	1,659	--	32,300	304	--	120

Total discharge for year (second-foot-days) ----- 21,425

Total load for year (tons) ----- 199,900

1/Estimated.

2/Sediment discharge computed by subdividing day.

## WHITE RIVER BASIN--Continued

## WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Apr. 7, 1948-----	11:20 a. m.	55	360	241	46	74	--	96	98	100	--	--			BN	
Apr. 7 -----	11:20 a. m.	55	360	303	60	76	87	94	98	99	100	--	--		BW	
Apr. 15 -----	2:40 p. m.	57	306	201	32	61	82	92	98	100	--	--	--		BN	
June 23-----	11:00 a. m.	141	6,530	7,230	4	10	--	--	99	100	--	--	--		BN	
June 23-----	11:00 a. m.	141	6,530	7,370	60	77	86	97	100	--	--	--	--		BW	
July 28-----	5:00 p. m.	24	390	1,110	30	78	95	96	98	100	--	--	--		BN	
Aug. 18-----	3:00 p. m.	35	240	139	40	73	81	89	92	97	98	100	--		BN	
Sept. 21-----	11:20 a. m.	7	88	167	80	91	92	93	94	95	99	100	--		BN	

WHITE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN WHITE RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1947 to September 1948

Chemical analyses, in parts per million, water near October 1941 to September 1943																						
Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per- cent so- dium		
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total		Non- carbon- ate	
WHITE RIVER NEAR KADOKA																						
Mar. 16, 1948	1,250	7.6	487	45	0.05	34	3.2	76	226	62	6.9	6.9	0.4	3.3	0.14		322	0.44		98	0	63
June 21	2,290	8.2	454	34	.20	11	5.5	100	196	90	4.6	4.6	.9	5.2	.23		496	.67		50	0	81
June 22	5,340	8.3	485	60	.03	11	1.6	105	194	65	22	22	1.0	1.8	.60		374	.51		34	0	87
July 13	1,900	7.9	624	46	.00	12	5	134	266	92	5.0	5.0	.7	.9	.22		446	.61		32	0	90
Aug. 3	1,050	8.2	552	43	.00	7.0	1.0	121	238	78	4.0	4.0	.7	.9	.26		408	.55		22	0	92
Aug. 23	25	8.3	620	53	.00	8.5	1.0	138	250	106	4.0	4.0	.7	3.1	.22		474	.64		25	0	92
WHITE RIVER NEAR OACOMA																						
Mar. 18, 1948	756	7.4	635	20	0.00	68	9.0	67	172	184	12	12	0.3	2.7	0.24		530	0.72		207	66	41
June 22	5,530	7.8	682	43	.05	28	2.9	124	172	191	5.2	5.2	.6	2.3	.20		488	.66		82	0	77
Aug. 30	109	7.9	703	49	.00	28	4.0	125	228	146	12	12	.7	.8	.09		502	.66		86	0	76

## NIOBRARA RIVER BASIN

## NIOBRARA RIVER NEAR GORDON, NEBR.

LOCATION.--At gaging station at bridge on State Highway 27, about 4 miles downstream from Rush Creek, and 11 miles south of Gordon, Sheridan County. DRAINAGE AREA.--2,595 square miles.

RECORDS AVAILABLE.--Chemical analyses: March 1947 to September 1948.

Sediment records: October to September 1948.

EXTREMES, October to September 1948.--Sediment loads: Maximum, 22,900 tons per day June 17; minimum, 7 tons per day Sept. 4.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 24, 1948	145	8.1	319	46	0.02	42	5.3	27	190	22	1.8	0.4	3.3	--	--	250	0.34		127	0	31
July 20	184	7.6	276	45	.05	38	4.2	18	160	14	1.5	.5	1.9	0.07	0.07	213	.29		112	0	26
Aug. 3	176	7.4	261	51	.10	36	6.0	12	152	13	.2	.4	2.5	.00	.00	198	.27		114	0	19
Sept. 29	88	8.3	301	50	.02	34	7.2	19	1/166	12	3.0	.5	2.0	.10	.10	230	.31		114	0	26

1/Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	111	270	81	157	810	343
2-----	--	--	--	114	388	119	145	780	305
3-----	--	--	--	118	415	132	149	1,020	410
4-----	--	--	--	135	460	168	161	1,040	452
5-----	--	--	--	135	410	149	153	950	392
6-----	--	--	--	128	270	93	157	940	398
7-----	--	--	--	111	1,420	426	153	810	335
8-----	99	280	75	102	1,310	361	149	710	286
9-----	105	260	74	138	795	296	145	780	305
10-----	105	232	66	145	755	296	153	760	314
11-----	118	208	66	142	730	280	149	990	398
12-----	118	204	65	128	630	218	157	1,340	568
13-----	111	199	60	118	1,170	373	168	1,390	630
14-----	105	191	54	111	660	198	176	1,300	618
15-----	114	193	59	111	575	172	176	1,140	542
16-----	118	226	72	105	710	201	138	860	320
17-----	111	255	76	118	560	178	108	707	206
18-----	111	258	77	125	1,000	338	121	979	320
19-----	111	244	73	138	1,080	402	128	1,130	390
20-----	111	220	66	128	860	297	111	1,080	324
21-----	111	192	58	140	710	268	128	1,110	384
22-----	114	184	57		930	352	135	1,260	459
23-----	125	228	77		910	344	111	875	262
24-----	128	237	82		800	302	102	994	274
25-----	128	224	77	164	690	261	114	836	257
26-----	118	208	66		660	249	114	1,060	326
27-----	108	196	57		610	231	128	605	209
28-----	108	259	76		520	197	138	706	263
29-----	108	252	73	164	390	147	142	840	322
30-----	108	212	62		370	164	131	787	278
31-----	108	212	62		--	--	120	673	218
Total -	3,360	--	1,630	3,885	--	7,290	4,317	--	11,110
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	130	568	199	100	91	25	142	530	203
2-----	130	278	98	90	78	19	153	690	285
3-----	130	59	21	90	78	19	149	610	245
4-----	120	142	46	90	104	25	150	440	178
5-----	120	180	58	100	39	11	130	315	111
6-----	120	372	121	100	52	14	85	384	88
7-----	130	288	101	100	65	18	80	218	47
8-----	130	525	184	90	65	16	75	306	62
9-----	120	720	233	100	78	21	75	292	59
10-----	110	683	203	90	52	13	70	245	46
11-----	100	595	161	90	52	13	70	333	63
12-----	100	484	131	100	65	18	120	564	183
13-----	100	403	109	100	78	21	200	656	354
14-----	110	428	127	120	91	29	334	1,640	1,480
15-----	110	525	156	150	96	39	602	5,360	1/10,100
16-----	110	653	194	190	99	51	295	3,290	2,620
17-----	110	923	274	270	150	109	188	1,160	589
18-----	110	1,440	428	270	500	364	180	999	485
19-----	110	923	274	200	830	448	206	1,010	562
20-----	110	485	144	180	540	262	193	692	465
21-----	110	364	108	202	300	164	180	799	388
22-----	110	637	189	224	690	417	202	837	457
23-----	110	101	300	215	1,010	586	238	827	531
24-----	110	520	154	164	740	328	228	1,070	659
25-----	110	338	100	176	390	185	238	1,200	771
26-----	100	338	91	188	630	320	210	1,350	765
27-----	100	611	165	197	700	372	224	1,330	804
28-----	100	130	35	180	690	335	193	968	504
29-----	100	130	35	164	580	257	224	768	464
30-----	110	130	39	--	--	--	233	672	423
31-----	110	117	35	--	--	--	197	616	328
Total -	3,480	--	4,510	4,330	--	4,500	5,864	--	24,320

1/Sediment discharge computed by subdividing day.

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	149	616	248	228	864	532	102	140	39
2-----	164	623	276	197	634	337	91	164	40
3-----	128	638	220	180	694	337	91	181	44
4-----	96	525	136	149	1,180	475	118	466	148
5-----	105	525	149	138	1,050	391	102	437	120
6-----	125	540	182	125	594	200	96	285	74
7-----	105	576	163	108	639	188	96	291	75
8-----	138	612	228	111	580	174	94	376	95
9-----	145	658	258	128	534	185	99	400	107
10-----	145	735	288	138	645	240	105	539	153
11-----	142	798	306	145	874	342	105	653	185
12-----	131	687	243	121	989	323	105	460	130
13-----	131	596	211	125	905	305	99	328	88
14-----	149	518	208	131	721	255	102	291	80
15-----	168	677	307	114	540	166	121	361	118
16-----	176	747	355	108	411	120	111	266	80
17-----	193	351	183	102	321	88	1,460	2,950	1/22,900
18-----	228	432	266	94	264	67	620	2,640	1/4,820
19-----	224	437	264	88	125	30	243	1,110	728
20-----	268	695	503	85	129	30	188	660	335
21-----	258	495	345	88	298	71	197	598	318
22-----	268	714	517	102	235	65	184	639	317
23-----	300	1,000	810	102	160	44	176	616	293
24-----	328	990	877	114	312	96	161	487	212
25-----	295	1,010	804	145	300	117	161	448	195
26-----	263	1,260	895	125	156	53	168	431	196
27-----	243	1,650	1,080	105	122	35	176	414	197
28-----	243	1,740	1,140	108	151	44	176	383	182
29-----	243	1,360	892	125	265	89	176	326	155
30-----	238	1,610	1,030	128	252	87	176	273	130
31-----	--	--	--	111	161	48	--	--	--
Total -	5,789	--	13,380	3,868	--	5,530	5,899	--	32,550
	July			August			September		
1-----	153	388	160	153	346	143	75	143	29
2-----	135	456	166	244	1,760	1,160	75	164	33
3-----	128	342	118	206	1,380	768	70	86	16
4-----	111	286	86	157	1,260	534	65	42	7
5-----	96	245	64	168	1,430	649	58	114	18
6-----	85	206	47	184	1,390	691	68	360	66
7-----	82	177	39	153	821	339	82	530	117
8-----	80	169	37	138	629	234	111	707	212
9-----	105	353	100	111	761	228	105	345	98
10-----	135	370	135	121	700	229	88	250	59
11-----	125	655	221	128	635	219	85	238	55
12-----	125	551	186	108	480	140	85	136	31
13-----	181	721	313	108	446	130	80	134	29
14-----	258	1,350	940	111	536	161	75	142	29
15-----	219	770	455	91	356	87	85	179	41
16-----	210	605	343	85	249	57	94	138	35
17-----	180	834	405	80	286	62	102	127	35
18-----	273	2,160	1/1,720	82	192	42	102	135	37
19-----	219	1,630	964	85	126	29	96	104	27
20-----	188	879	446	82	74	16	105	145	41
21-----	172	1,050	488	82	74	16	105	--	2/62
22-----	153	838	346	77	85	18	105	348	99
23-----	145	593	232	77	206	43	168	706	320
24-----	145	338	132	75	240	49	164	--	2/174
25-----	145	317	124	70	238	45	128	336	116
26-----	142	375	144	82	224	50	118	364	116
27-----	149	358	104	96	174	45	108	448	131
28-----	149	317	128	99	194	52	94	424	108
29-----	149	420	169	91	136	33	88	356	85
30-----	153	395	163	882	168	37	88	289	69
31-----	153	272	112	77	122	25	--	--	--
Total -	4,723	--	9,090	3,503	--	6,330	2,872	--	2,300
Total discharge for year (second-foot-days) -----									51,890
Total load for year (tons) -----									122,500
1/Sediment discharge computed by subdividing day.									
2/Estimated.									

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis		
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Apr. 13, 1948	1:45 p. m.	131	550	1,110			4	8	10	23	76	97	99	100		BN
May 7	5:55 p. m.	111	656	1,210			--	7	10	17	37	82	98	100		BN
May 17	4:30 p. m.	99	299	637			--	10	13	22	38	65	91	98		BN
June 4	12:05 p. m.	102	538	1,070			--	12	13	21	44	85	100	--		BN
June 24	4:05 p. m.	145	468	1,570			--	9	14	21	29	74	95	100		BN
July 18	1:40 p. m.	508	3,660	2,710			9	11	16	38	81	98	100	--		BN
July 20	9:45 a. m.	184	879	1,770			19	28	35	42	64	91	99	100		BN
Aug. 3	1:20 p. m.	180	1,220	2,240			8	12	14	20	36	78	96	98		BN
Sept. 14	11:30 a. m.	75	176	332			--	--	11	21	41	83	99	100		BN
Sept. 29	1:00 p. m.	88	188	387			--	15	21	30	53	90	99	100		BN



## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR CODY, NEBR.

LOCATION.--At county bridge a quarter of a mile downstream from gaging station, 3 miles upstream from Medicine Creek, 5 miles downstream from Bear Creek, and 10 miles south of Cody, Cherry County.

RECORDS AVAILABLE.--Chemical analyses: June to September 1948.

Sediment records: April to September 1948.

EXTREMES, April to September 1948.--Sediment loads: Maximum, 58,000 tons per day (estimated) June 18, 1948; minimum, 319 tons per day Aug. 25, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Investigations indicate that practically all the total sediment load is transported in suspension at this contracted section of the river.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 23, 1948-----	503	--	287	46	0.05	37	4.7	13		154	9.6	1.2	0.4	2.4	0.07	215	0.29		112	0	21
July 20 -----	442	--	247	45	.05	33	4.2	12	12	141	5.6	1.3	.4	2.8	.06	197	.27		100	0	21
Aug. 18 -----	238	7.8	243	60	.02	33	3.9	12		140	4.0	2.7	.4	1.0	.05	197	.27		86	0	20
Sept. 25 -----	314	8.2	225	49	.02	26	3.9	20	20	132	10	3.0	.2	1.7	.12	188	.26		81	0	35

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	--	--	--	403	2,120	2,310	283	1,140	871
2-----	--	--	--	398	1,820	1,960	288	1,120	871
3-----	--	--	--	387	2,140	2,240	288	1,080	840
4-----	--	--	--	376	1,590	1,610	278	800	600
5-----	--	--	--	371	1,550	1,550	283	990	757
6-----	--	--	--	340	1,650	1,510	293	960	760
7-----	--	--	--	334	1,540	1,390	263	870	618
8-----	--	--	--	324	1,670	1,460	253	850	580
9-----	376	1,750	1,780	392	1,770	1,870	253	960	588
10-----	366	1,970	1,950	430	2,090	2,430	238	760	488
11-----	366	1,880	1,860	436	2,400	2,820	263	850	604
12-----	361	1,800	1,750	420	1,900	2,150	288	860	669
13-----	366	2,150	2,120	398	1,810	1,940	288	980	762
14-----	350	1,850	1,750	376	1,210	1,230	298	1,130	909
15-----	345	1,760	1,640	340	1,410	1,290	314	1,410	1,200
16-----	340	1,750	1,610	314	1,490	1,260	308	1,150	956
17-----	329	1,640	1,460	303	1,450	1,190	324	1,060	927
18-----	329	1,670	1,480	293	1,400	1,110	1,850	--	1/58,000
19-----	345	1,510	1,410	283	1,310	1,000	899	4,720	10,300
20-----	355	1,530	1,470	268	890	644	555	4,020	6,020
21-----	345	1,550	1,440	273	890	656	464	2,710	3,390
22-----	361	1,570	1,530	273	880	649	497	2,210	2,960
23-----	361	1,580	1,540	314	1,180	1,000	475	2,540	3,260
24-----	382	1,950	2,010	283	1,010	772	425	1,980	2,270
25-----	537	2,600	3,770	293	840	664	387	1,460	1,530
26-----	566	1,810	2,760	345	1,180	1,100	408	1,480	1,630
27-----	549	2,430	3,600	334	1,290	1,160	392	1,630	1,730
28-----	469	3,470	4,390	324	1,500	1,310	387	1,420	1,480
29-----	436	3,180	3,740	329	1,500	1,330	376	1,470	1,490
30-----	408	2,690	2,960	319	1,580	1,360	361	1,450	1,410
31-----	--	--	--	308	1,240	1,030	--	--	--
Total -	--	--	48,020	10,581	--	44,000	12,189	--	108,500
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	334	1,220	1,100	243	750	492	229	720	445
2-----	334	1,180	1,060	273	860	634	229	660	408
3-----	314	1,130	958	433	2,030	2/2,580	234	620	392
4-----	314	1,060	899	345	1,650	1,540	232	620	388
5-----	288	980	762	382	1,480	1,530	229	620	383
6-----	258	900	627	345	1,440	1,340	234	640	404
7-----	263	820	582	329	1,320	1,170	234	760	480
8-----	248	750	502	324	1,230	1,080	243	880	577
9-----	248	700	469	319	1,140	982	273	960	708
10-----	229	--	1/440	314	1,050	890	268	980	709
11-----	253	--	1/510	329	1,310	2/1,270	248	920	616
12-----	268	--	1/560	314	2,860	2,420	234	850	537
13-----	258	790	550	314	1,290	1,090	234	800	505
14-----	329	1,030	2/1,150	314	--	1/890	224	720	436
15-----	469	2,310	2,920	314	--	1/840	210	660	374
16-----	436	1,860	2,190	303	--	1/780	205	690	382
17-----	425	1,640	1,880	293	--	1/700	219	720	426
18-----	420	1,420	1,610	248	800	536	229	720	445
19-----	572	4,880	2/8,200	234	700	442	234	690	436
20-----	436	2,770	3,260	224	660	399	234	690	436
21-----	403	2,340	2,550	229	610	377	238	730	469
22-----	366	1,560	1,540	219	590	349	263	710	604
23-----	345	1,330	1,240	224	560	339	308	900	748
24-----	314	1,020	865	219	550	325	387	1,380	1,440
25-----	293	930	736	219	540	319	324	1,330	1,160
26-----	278	840	630	229	550	340	293	1,320	1,040
27-----	268	730	528	234	590	373	283	1,120	856
28-----	268	700	507	248	840	562	273	1,110	818
29-----	268	990	716	243	770	505	273	1,250	921
30-----	238	980	630	243	670	440	258	960	669
31-----	243	770	505	238	580	373	--	--	--
Total -	9,980	--	40,680	8,739	--	25,910	7,576	--	18,110

Total load for period Apr. 9 to Sept. 30 (tons) ----- 285,200

1/Estimated.

2/Sediment discharge computed by subdividing day.

NIORARA RIVER BASIN--Continued  
NIORARA RIVER NEAR CODY, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500
July 20, 1948	5:00 p. m.	452	1,800	3,280			22	26	34	47	80	94	98	BN
Sept. 8	11:00 a. m.	253	776	1,340			4	6	12	23	65	94	99	BN

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR SPARKS, NEBR.

LOCATION.--At gaging station at bridge on State Highway 7, 2.2 miles downstream from Big Beaver Creek, 5½ miles downstream from Minnechadzu Creek, and 6½ miles southwest of Sparks, Cherry County.

DRAINAGE AREA.--6,406 square miles.

RECORDS AVAILABLE.--Sediment records: May 1947 to September 1948.

EXTREMES, May to September 1947.--Sediment loads: Maximum, 13,100 tons per day June 20; minimum, 675 tons per day Aug. 23.

EXTREMES, 1947-48.--Sediment loads: Maximum, 24,900 tons per day June 19; minimum, not determined.

REMARKS.--Records of discharge for water year October 1946 to September 1947 given in Water-Supply Paper 1086. Records of discharge for water year

October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Dec. 18, 1947 -----	1/850	7.7	209	58	0.02	27	4.0	17		124	17	1.0	0.2	0.0	0.00	182	0.25		84	0	31
June 20, 1948 -----	1,360	7.6	222	67	.17	34	4.0	8.3		134	4.8	1.3	.3	2.3	.05	180	.24		101	0	15
July 19 -----	952	7.8	206	55	.12	28	2.9	11		120	3.2	1.5	.3	.8	.03	182	.25		82	0	22
Sept. 22 -----	760	8.0	211	58	.03	31	2.9	11		127	4.0	2.1	.4	.0	.00	180	.24		89	0	20

1/ Mean daily discharge.

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR SPARKS, NEBR.--Continued

Suspended sediment, water year October 1946 to September 1947

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				--	--	--	877	2,180	5,160
2-----				810	610	1,330	804	1,230	2,670
3-----				756	680	1,390	871	1,110	2,610
4-----				808	740	1,610	905	1,130	2,760
5-----				795	840	1,800	818	970	2,140
6-----				807	810	1,760	853	1,030	2,370
7-----				802	930	2,010	844	890	2,030
8-----				831	1,110	2,490	794	800	1,720
9-----				768	1,060	2,200	1,060	3,290	9,410
10-----				772	640	1,330	1,210	2,240	7,320
11-----				780	890	1,870	1,000	1,090	2,940
12-----				797	1,110	2,390	1,160	1,110	3,480
13-----				878	690	1,640	1,250	1,060	3,580
14-----				873	1,030	2,430	1,240	940	3,150
15-----				904	1,050	2,560	1,200	860	2,790
16-----				862	1,210	2,820	1,360	2,620	1/10,300
17-----				814	910	2,000	1,180	1,430	4,550
18-----				791	1,790	3,820	1,180	1,060	3,380
19-----				772	1,250	2,610	1,540	2,300	1/10,800
20-----				764	1,090	2,250	1,880	2,520	1/13,100
21-----				743	830	1,660	1,530	1,740	7,190
22-----				752	1,540	3,130	1,500	2,450	9,920
23-----				736	1,110	2,210	1,570	2,150	9,110
24-----				717	870	1,680	1,910	2,260	11,600
25-----				714	810	1,560	1,720	1,490	6,920
26-----				707	900	1,720	1,500	990	4,010
27-----				792	1,680	3,590	1,370	920	3,400
28-----				980	2,340	6,190	1,250	820	2,770
29-----				946	1,720	4,390	1,240	1,140	3,820
30-----				850	1,330	3,050	1,280	1,010	3,490
31-----				795	990	2,120	--	--	--
Total -				--	--	71,610	36,896	--	158,500
	July			August			September		
1-----	1,300	820	2,880	628	490	831	664	550	986
2-----	1,290	870	3,030	630	660	1,120	650	660	1,160
3-----	1,200	790	2,560	616	760	1,260	644	600	1,040
4-----	1,070	840	2,430	620	700	1,170	667	590	1,060
5-----	996	720	1,940	602	580	959	660	580	1,030
6-----	947	480	1,230	615	580	963	616	580	965
7-----	868	460	1,080	602	580	943	604	550	897
8-----	834	620	1,400	589	680	1,080	615	490	814
9-----	782	640	1,350	586	720	1,140	626	800	1,350
10-----	792	810	1,730	581	720	1,130	708	830	1,590
11-----	869	780	1,830	564	570	868	773	800	1,670
12-----	821	740	1,640	611	560	924	692	720	1,350
13-----	806	600	1,310	620	600	1,000	694	680	1,270
14-----	765	590	1,220	638	440	758	682	560	1,030
15-----	792	920	1,970	634	510	873	653	700	1,230
16-----	858	1,080	2,500	644	550	956	623	550	925
17-----	860	1,630	3,790	644	650	1,130	636	900	1,550
18-----	765	770	1,590	659	650	1,160	662	400	715
19-----	761	810	1,660	668	640	1,150	606	1,050	1,720
20-----	744	650	1,310	686	510	945	675	900	1,640
21-----	761	810	1,660	673	490	890	737	750	1,490
22-----	663	840	1,500	620	410	686	700	750	1,420
23-----	638	500	861	625	400	675	644	750	1,300
24-----	654	480	848	642	510	884	657	750	1,330
25-----	688	590	1,100	661	610	1,090	675	740	1,350
26-----	706	660	1,260	646	950	1,660	660	630	1,120
27-----	643	690	1,200	635	840	1,440	680	470	863
28-----	650	510	895	636	830	1,430	659	600	1,070
29-----	688	510	947	664	820	1,470	704	640	1,220
30-----	650	620	1,090	637	810	1,390	718	600	1,160
31-----	613	590	977	661	670	1,200	--	--	--
Total -	25,474	--	50,790	19,537	--	33,180	19,984	--	36,320

Total load for period May 2 to Sept. 30 (tons)----- 350,400

1/ Sediment discharge computed by subdividing day.

## MISSOURI RIVER BASIN

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR SPARKS, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	660	612	1,090	840	1,160	2,630	830	1,400	3,140
2-----	650	546	958	830	1,200	2,690	820	1,680	3,720
3-----	710	570	1,090	860	1,290	2,990	770	1,670	3,470
4-----	660	588	1,050	931	1,240	3,120	730	--	1/3,130
5-----	670	708	1,280	880	1,410	3,350	790	1,770	3,770
6-----	680	750	1,380	952	1,940	4,990	780	2,040	4,300
7-----	680	834	1,530	870	2,020	4,740	770	1,900	3,950
8-----	680	666	1,220	840	1,820	4,130	670	1,720	3,110
9-----	670	624	1,130	850	1,820	4,180	730	1,530	3,020
10-----	690	546	1,020	850	2,060	2/5,030	780	1,430	3,010
11-----	690	708	1,320	890	1,890	4,540	720	1,200	2,330
12-----	690	960	1,790	850	1,480	3,400	730	--	1/2,210
13-----	680	774	1,420	810	1,190	2,600	740	1,040	2,080
14-----	680	978	1,800	840	1,230	2,790	840	--	1/2,120
15-----	710	888	1,700	860	1,070	2,480	820	1,170	2,590
16-----	790	1,080	2,300	810	1,170	2,560	770	1,430	2,970
17-----	740	894	1,790	820	1,250	2,770	790	1,730	3,690
18-----	740	1,440	2,880	830	1,250	2,800	850	1,380	3,170
19-----	730	1,190	2,350	850	1,250	2,870	840	1,300	2,950
20-----	700	768	1,450	830	--	1/2,780	860	1,490	3,460
21-----	730	846	1,670	544	--	1/1,820	820	1,360	3,010
22-----	750	966	1,960	524	--	1/1,750	820	1,510	3,340
23-----	800	1,090	2,350	562	1,250	1,900	830	--	1/3,340
24-----	780	1,040	2,190	582	1,430	2,250	810	1,390	3,040
25-----	820	810	1,790	840	1,510	3,420	780	1,400	2,950
26-----	840	1,060	2,400	1,020	1,740	4,790	820	1,480	3,280
27-----	820	906	2,000	984	1,920	5,100	820	1,330	2,940
28-----	820	990	2,190	910	2,070	5,090	790	690	1,470
29-----	820	1,090	2,410	890	1,460	3,510	820	744	1,650
30-----	820	1,080	2,390	820	1,130	2,500	750	690	1,400
31-----	850	1,070	2,460	--	--	--	680	1,560	2/3,100
Total -	22,750	--	54,360	24,769	--	99,570	24,370	--	91,710
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	600	966	2/1,650	760	483	991	962	--	--
2-----	591	846	1,360	750	--	1/972	962	--	--
3-----	780	798	1,680	690	--	1/889	920	--	--
4-----	810	990	2,170	640	--	1/850	910	--	--
5-----	860	1,270	2,950	700	487	920	780	--	--
6-----	880	1,130	2,680	840	--	--	820	--	--
7-----	900	1,470	3,570	750	--	--	860	--	--
8-----	900	1,190	2,890	591	--	--	880	--	--
9-----		1,000	2,430	570	--	--	630	--	--
10-----		1,210	2,940	560	--	--	650	--	--
11-----	800	942	2,030	560	--	--	670	--	--
12-----		798	1,720	560	--	--	515	510	709
13-----		814	1,760	560	720	1,090	942	2,400	6,100
14-----		866	1,870	700	920	1,740	1,400	2,630	9,940
15-----	600	--	1/1,880	780	620	1,310	1,490	1,420	5,710
16-----		--	1/1,370	952	440	1,130	1,800	2,600	2/14,160
17-----		--	1/1,310	984	578	1,540	1,820	2,310	11,400
18-----		--	1/1,230	1,060	585	1,670	1,360	2,560	9,400
19-----	700	715	1,160	1,160	--	1/2,160	1,090	2,140	6,300
20-----		643	1,040	962	--	1/1,600	1,090	1,190	3,500
21-----	780	--	--	880	--	1/1,320	1,040	1,130	3,170
22-----	780	--	--	880	450	1,070	962	1,100	2,860
23-----	770	--	--	920	345	857	920	1,940	4,820
24-----	730	--	--	890	--	1/1,730	920	1,470	3,650
25-----	740	--	--	870	1,190	2,790	890	1,250	3,000
26-----	680	--	--	1,030	1,280	3,560	952	--	1/3,210
27-----	496	--	--	1,140	930	2,860	952	1,270	3,260
28-----	486	716	940	1,040	780	2,190	931	1,250	3,140
29-----	572	667	1,030	1,000	840	2,270	931	1,140	2,860
30-----	720	500	972	--	--	--	920	1,030	2,560
31-----	740	426	851	--	--	--	931	1,080	2,710
Total -	22,535	--	3/52,200	23,779	--	3/42,500	30,900	--	3/118,000

1/Estimated.

3/Includes estimated load for missing days.

2/Sediment discharge computed by subdividing day.

NIORARA RIVER BASIN--Continued

NIORARA RIVER NEAR SPARKS, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	890	1,150	2,760	910	1,150	2,820	696	770	1,450
2-----	870	1,940	4,560	900	1,070	2,600	668	644	1,160
3-----	810	1,330	2,910	870	1,370	3,220	684	518	957
4-----	830	1,260	2,820	860	1,470	3,410	790	559	1,190
5-----	820	1,680	3,720	870	1,140	2,680	734	514	1,020
6-----	931	1,880	4,720	830	956	2,140	713	494	951
7-----	994	1,880	5,050	770	845	1,760	728	436	857
8-----	870	1,460	3,430	770	696	1,450	680	481	883
9-----	840	1,380	3,130	810	1,370	3,000	678	546	1,000
10-----	830	1,320	2,960	952	1,430	3,670	688	450	836
11-----	810	1,280	2,800	910	937	2,300	738	630	1,260
12-----	780	1,760	3,710	870	1,120	2,630	938	1,210	2/3,340
13-----	790	1,640	3,500	850	811	1,860	783	612	1,290
14-----	780	1,260	2,650	800	806	1,740	756	432	882
15-----	770	1,170	2,430	790	790	1,690	820	684	1,510
16-----	760	1,080	2,220	750	873	1,770	797	648	1,390
17-----	760	990	2,030	729	912	1,790	850	624	1,430
18-----	740	960	1,920	675	782	1,420	1,270	2,040	2/15,400
19-----	760	1,110	2,280	676	639	1,170	2,000	4,040	2/24,900
20-----	770	1,060	2,200	633	566	967	1,330	1,490	5,350
21-----	770	915	1,900	663	672	1,200	1,090	944	2,780
22-----	800	870	1,880	675	648	1,180	1,270	1,080	3,700
23-----	770	1,530	3,180	806	1,400	2/3,200	1,160	1,200	3,760
24-----	870	1,500	3,520	797	1,020	2,190	1,060	1,020	2,920
25-----	1,100	1,470	4,370	737	772	1,540	994	1,130	3,030
26-----	1,100	1,180	3,500	685	--	1/1,210	994	1,310	3,520
27-----	1,090	1,200	3,530	786	712	1,510	1,070	1,130	3,260
28-----	1,020	1,200	3,300	792	750	1,600	942	1,300	3,310
29-----	920	980	2,430	884	749	1,790	920	1,410	3,500
30-----	942	966	2,460	796	567	1,220	880	1,100	2,610
31-----	--	--	--	748	714	1,440	--	--	--
Total-	25,787	--	91,870	24,594	--	62,170	27,721	--	99,450
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	800	1,410	3,050	720	656	1,280	584	1,430	2,250
2-----	820	945	2,090	780	1,120	2,360	627	1,250	2,120
3-----	790	1,060	2,260	820	1,140	2,520	597	868	1,400
4-----	760	1,020	2,090	984	1,360	3,610	618	714	1,190
5-----	770	788	1,640	870	1,000	2,350	611	889	1,470
6-----	730	712	1,400	860	864	2,010	656	1,110	1,970
7-----	730	862	1,700	810	806	1,760	666	1,220	2,190
8-----	710	756	1,450	780	526	1,110	702	1,270	2,410
9-----	730	875	1,720	780	715	1,510	704	1,310	2,490
10-----	710	959	1,840	770	819	1,700	688	1,320	2,450
11-----	700	994	1,880	1,190	5,760	2/24,700	712	1,210	2,330
12-----	710	812	1,560	1,310	3,890	2/16,300	656	1,750	3,100
13-----	750	574	1,160	931	2,780	2/7,590	689	943	1,750
14-----	720	686	1,330	880	1,630	3,870	662	910	1,630
15-----	900	1,050	2,550	750	1,080	2,190	665	--	1/1,620
16-----	900	1,060	2,580	730	1,140	2,250	601	--	1/1,340
17-----	931	1,080	2,710	690	748	1,390	617	--	1/1,290
18-----	931	884	2,220	660	880	1,570	647	767	1,340
19-----	931	767	1,930	660	738	1,320	639	1,510	2,610
20-----	973	1,090	2/3,020	630	812	1,380	720	1,250	2,430
21-----	890	884	2,120	630	915	1,560	672	930	1,690
22-----	810	819	1,790	582	1,040	1,630	693	720	1,350
23-----	790	754	1,610	620	888	1,490	959	870	2,250
24-----	740	728	1,450	582	814	1,280	867	996	2,330
25-----	730	949	1,870	591	837	1,340	944	1,280	3,260
26-----	720	748	1,450	600	842	1,360	792	1,390	2,970
27-----	720	630	1,220	610	870	1,430	755	1,120	2,280
28-----	750	630	1,280	600	973	1,580	756	1,020	2,080
29-----	780	910	1,920	620	847	1,420	744	908	1,820
30-----	710	1,090	2,090	591	768	1,260	768	1,030	2,140
31-----	710	916	1,760	571	1,420	2,190	--	--	--
Total-	24,346	--	58,740	23,202	--	99,310	21,011	--	61,550
Total discharge for year (second-foot-days)									295,764
Total load for year (tons)									931,400

1/Estimated.

2/Sediment discharge computed by subdividing day.

## NIOBRARA RIVER BASIN--Continued

## NIOBRARA RIVER NEAR SPARKS, NEBR.--Continued

Particle-size analyses of suspended sediment, water years October 1946 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Instantaneous discharge (second-feet)	Suspended sediment												Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
June 9, 1947	10:39 a. m.	1,380	2,820	2,640			15	20	28	39	50	70	100			BN
June 9	2:21 p. m.	984	4,700	3,950		8	11	12	17	30	48	88	97	100	--	BN
June 19	7:47 p. m.	2,040	2,240	2,110			--	7	14	31	58	91	98	100	100	BN
Oct. 24	9:23 a. m.	710	1,090	--			--	--	--	5	24	82	100	--	--	S
Mar. 20, 1948	12:50 p. m.	1,100	1,180	2,310			10	13	17	23	37	95	99	100	100	BN
May 25	11:57 a. m.	790	596	1,890			--	7	9	17	45	97	99	100	100	BN
May 28	7:00 a. m.	840	796	1,930			--	5	5	12	30	40	98	99	100	BN
June 12	4:32 p. m.	770	1,800	2,970			--	--	43	52	61	71	94	99	100	BN
June 14	4:00 p. m.	750	394	963			1	5	10	14	20	44	99	100	100	BN
June 19	7:19 a. m.	2,460	5,020	2,960			34	40	47	57	71	95	99	100	100	BN
June 19	10:55 a. m.	1,960	3,750	8,390			33	42	48	61	74	96	100	--	--	BN
July 19	12:00 m.	952	477	1,060			--	8	10	17	25	95	99	100	100	BN
July 21	9:40 a. m.	931	964	1,850			--	--	12	15	33	67	99	100	--	BN
Aug. 12	6:46 a. m.	3,250	6,420	4,050			--	--	21	27	43	60	90	99	100	BN
Aug. 27	5:00 p. m.	610	691	1,440			--	9	16	27	52	96	100	--	--	BN
Sept. 22	11:15 a. m.	750	594	1,300			--	7	8	12	26	85	97	100	100	BN



NIOBRARA RIVER BASIN--Continued  
LONG PINE CREEK NEAR RIVERVIEW, NEBR.

LOCATION.---At gaging station at county highway bridge, about a mile downstream from Bone Creek, and 5½ miles southwest of Riverview, Keya Paha County. DRAINAGE AREA.---390 square miles.  
RECORDS AVAILABLE.---Sediment records: April to September 1948.  
EXTREMES. 1947-48.---Sediment loads: Maximum, 690 tons per day July 12; minimum, 14 tons per day June 10.  
REMARKS.---Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
June 29, 1948-----	99	7.9	152	57	0.03	22	2.0	8.0	92	92	1.6	1.2	0.2	1.4	0.06	146	0.20	63	0	22
July 21-----	100	8.0	151	57	.05	21	2.1	12	92	92	8.0	.8	.3	1.5	.02	146	.20	61	0	30
Sept. 1-----	93	7.3	158	21	.00	20	3.0	14	92	92	14	.2	.2	1.8	.00	152	.21	62	0	32
Sept. 17-----	89	8.1	156	58	.02	22	2.3	9.1	92	92	4.0	2.8	.3	.0	.00	147	.20	64	0	24

## NIOBRARA RIVER BASIN--Continued

## LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	111	315	94	96	76	20
2-----	--	--	--	111	255	76	95	66	17
3-----	--	--	--	110	231	69	95	58	15
4-----	--	--	--	104	213	60	95	67	17
5-----	--	--	--	106	306	87	95	82	21
6-----	--	--	--	111	324	97	95	66	17
7-----	--	--	--	106	285	82	95	69	18
8-----	--	--	--	109	228	67	93	70	18
9-----	--	--	--	111	225	67	93	65	16
10-----	--	--	--	114	240	74	96	55	14
11-----	129	350	122	117	234	74	104	522	147
12-----	130	398	140	114	228	70	145	1,720	673
13-----	129	501	174	104	258	72	117	160	51
14-----	130	600	211	106	189	54	104	135	38
15-----	126	283	96	103	180	50	104	150	42
16-----	124	293	98	99	180	48	104	164	46
17-----	120	282	91	96	180	47	110	141	42
18-----	120	260	84	96	180	47	116	85	27
19-----	117	269	85	95	177	45	118	91	29
20-----	114	236	73	95	153	39	120	124	40
21-----	111	233	70	94	150	38	114	236	73
22-----	111	238	71	94	150	38	116	299	94
23-----	109	234	69	107	2,190	633	110	132	39
24-----	114	522	161	102	285	78		107	32
25-----	114	--	1/197	98	201	53		106	31
26-----	110	386	115	96	177	46	105	206	58
27-----	109	331	97	96	132	34		251	71
28-----	109	319	94	96	114	30		118	33
29-----	109	292	86	98	117	31	100	111	30
30-----	111	318	95	96	109	28	98	109	29
31-----	--	--	--	96	86	22	--	--	--
Total -	2,346	--	2,230	3,191	--	2,350	3,163	--	1,800
Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	98	116	31	96	182	47	89	228	55
2-----	100	119	32	98	211	56	91	216	53
3-----	95	78	20	100	221	60	90	211	51
4-----	98	90	24	96	203	53	88	190	45
5-----	98	88	23	94	218	55	89	187	45
6-----	96	73	19	94	198	50	87	216	51
7-----	94	69	18	98	195	52	93	286	72
8-----	94	67	17	95	205	53	90	331	80
9-----	95	58	15	93	193	48	88	266	63
10-----	96	65	17	100	426	2/132	87	243	57
11-----	94	462	2/152	100	971	262	87	270	63
12-----	117	1,980	2/690	107	592	2/178	83	236	53
13-----	116	750	235	99	748	200	83	359	80
14-----	109	336	99	94	518	131	81	278	61
15-----	104	348	98	95	409	105	81	254	56
16-----	106	239	68	95	363	93	79	218	46
17-----	104	238	67	93	317	80	83	206	46
18-----	107	315	91	90	251	61	86	206	48
19-----	106	285	82	89	227	55	81	187	41
20-----	104	263	79	89	209	50	78	212	45
21-----	102	261	72	88	189	45	79	226	48
22-----	103	226	63	88	186	44	79	206	44
23-----	100	222	60	87	171	40	125	1,940	655
24-----	100	207	56	88	195	46	100	700	189
25-----	102	219	60	89	179	43	95	526	135
26-----	100	250	68	86	151	35	94	427	108
27-----	100	227	61	89	168	40	89	391	94
28-----	99	237	63	89	152	37	91	395	97
29-----	99	280	75	88	153	36	90	453	110
30-----	93	191	48	87	186	44	88	444	105
31-----	84	173	44	86	230	53	--	--	--
Total -	3,123	--	2,550	2,880	--	2,280	2,644	--	2,700
Total load for period Apr. 11 to Sept. 30 (tons)-----13,910									

1/Estimated.

2/Sediment discharge computed by subdividing day.

NIOBRARA RIVER BASIN--Continued  
 LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Instantaneous discharge (second-feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters								2.000		
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
April 6, 1948	3:35 p. m.	109	294	563				6	11	20	37	86	98	BN	
April 24	1:55 p. m.	117	234	456				16	20	29	40	85	98	BN	
May 21	4:00 p. m.	96	238	462				2	2	6	8	54	92	BN	
Aug. 7	10:45 a. m.	98	189	357				18	22	29	38	70	92	BN	
Sept. 1	1:45 p. m.	93	176	395				10	12	16	18	66	95	BN	
Sept. 17	1:40 p. m.	89	165	341				20	26	36	47	90	99	BN	

NIOBRARA RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN NIOBRARA RIVER BASIN

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	
																Parts per million	Tons per acre-foot	Total	Non-carbonate		
NIOBRARA RIVER NEAR SPENCER, NEBR.																					
June 21, 1948 ----	2,250	7.6	270	50	0.07	44	2.8	13		151	18	2.0	0.3	3.2	0.08	214	0.29	121	0	18	
July 8 -----	887	7.5	287	63	.08	36	2.0	20		150	12	3.0	.5	1.6	.04	214	.29	98	0	31	
ANTELOPE CREEK NEAR GORDON, NEBR.																					
Dec. 11, 1947 ----	1/--	8.3	546	52	0.04	64	14	40		2/291	52	7.0	0.5	1.1	0.00	381	0.52	217	0	29	
July 7, 1948 ----	0.2	8.4	493	35	.02	53	12	46		2/279	40	7.0	.3	.5	.15	360	.49	182	0	35	
Aug. 4 -----	.3	7.6	453	44	.02	50	10	39		244	40	6.0	.5	.0	.08	307	.42	166	0	34	
SNAKE CREEK NEAR BURGE, NEBR.																					
Dec. 9, 1947 ----	258	7.4	170	57	0.02	24	9.0	1.0		96	18	0.6	0.3	0.2	0.00	168	0.23	99	20	2	
June 20, 1948 ----	278	7.7	164	56	.02	22	3.3	9.9		96	3.2	1.4	.3	6.5	.01	148	.20	68	0	24	
July 14 -----	213	7.8	176	61	.04	23	2.9	7.4		96	4.0	1.0	.3	.4	--	192	.26	69	0	19	
Aug. 10 -----	208	8.0	170	53	.02	23	3.0	8.4		96	5.6	1.7	.4	.0	.01	161	.22	70	0	21	
Sept. 23 -----	360	7.4	156	53	.03	20	2.9	9.8		84	10	2.0	.4	.0	.00	143	.19	62	0	26	
GORDON CREEK NEAR SIMEON, NEBR.																					
Dec. 24, 1947 ----	0.1	7.6	205	50	0.08	25	3.0	15		117	7.4	1.0	0.5	0.6	0.00	156	0.21	75	0	30	
June 30, 1948 ----	.3	7.3	263	36	.00	36	4.5	23		165	18	2.6	.2	1.4	.11	214	.29	108	0	32	
MINNECHADUA CREEK AT VALENTINE, NEBR.																					
Nov. 18, 1947 ----	886	7.9	342	50	0.02	58	7.0	7.2		204	19	0.2	0.2	2.1	0.00	250	0.34	174	7	8	
June 22, 1948 ----	91	7.8	304	58	.03	49	6.2	12		199	5.6	1.5	.5	2.0	.06	246	.33	148	0	15	
Aug. 15 -----	89	7.4	274	27	.00	42	4.8	10		170	5.6	.2	.4	1.4	.01	210	.29	124	0	15	
PLUM CREEK NEAR MEADVILLE, NEBR.																					
Oct. 31, 1947 ----	85	7.9	173	59	0.02	25	3.7	12		105	16	1.8	0.2	0.9	0.0	144	0.20	78	0	26	
June 25, 1948 ----	124	7.5	242	57	.00	34	3.5	18		151	8.0	2.4	.4	1.1	.09	216	.29	99	0	28	
July 21 -----	74	7.9	177	61	.00	25	2.0	12		108	4.0	2.4	.3	.4	.07	168	.23	71	0	27	
Aug. 16 -----	88	--	181	26	.00	24	2.5	15		109	9.6	.6	.4	.8	.0	174	.24	70	0	31	

1/Discharge not available.

2/Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

## KEYAPAPA RIVER NEAR HIDDEN TIMBER, S. DAK.

Nov. 18, 1947	1/---	8.4	409	42	0.02	48	1.3	48	3/248	18	3.0	0.5	1.7	0.03	294	0.40	125	0	45
June 23, 1948	95	7.3	366	33	.05	34	.3	59	236	12	3.5	.5	23	.10	356	.46	166	0	60
July 14	8.0	7.3	414	51	.04	62	6.3	24	266	8.8	2.0	.5	1.0	.16	310	.42	161	0	22
Aug. 6	7.0	8.0	386	49	.06	55	5.3	29	238	44.0	3.0	.5	1.0	.06	286	.40	159	0	28
Aug. 24	4.2	7.9	383	50	.04	55	5.5	23	248	3.2	2.0	.3	.7	.14	296	.40	160	0	24

## KEYAPAPA RIVER AT WEWELA, S. DAK.

June 21, 1948	79	7.7	396	61	0.05	52	7.5	34	252	23	2.0	0.4	1.3	0.10	288	0.39	166	0	32
July 14	34	7.5	405	38	.06	58	6.1	20	244	6.4	2.0	.6	1.8	.04	300	.41	170	0	20
Aug. 5	28	7.9	392	46	.00	51	12	8.8	236	1.6	.2	.5	1.9	.10	281	.38	177	0	11
Aug. 24	12	8.3	438	52	.00	56	8.5	26	4/278	4.0	.8	.6	.0	.11	310	.42	175	0	26

## VERDIGREE CREEK NEAR VERDIGREE, NEBR.

Nov. 2, 1947	107	7.5	308	43	0.05	46	9.0	12	177	19	4.8	0.3	6.0	0.00	256	0.35	152	0	14
Apr. 21, 1948	76	7.7	320	41	.05	38	8.5	25	172	34	1.0	.2	7.2	.02	236	.32	130	0	30
May 6	132	7.5	301	42	.00	48	5.0	8.7	174	8.0	3.5	.0	6.8	.10	264	.36	140	0	13
May 19	80	7.7	301	46	.02	49	7.5	20	178	44	.8	.3	4.6	.10	230	.31	133	7	22
Aug. 11	3,280	7.0	275	28	.30	42	5.0	11	156	19	.2	.4	1.0	.00	194	.26	125	0	16
Sept. 23	76	7.8	270	44	.02	41	5.5	8.7	150	12	3.2	.3	3.9	.01	199	.27	125	2	13

1/Discharge not available.

2/Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).3/Includes equivalent of 13 parts per million of carbonate (CO<sub>3</sub>).

## MISSOURI RIVER BASIN

## NIOBRARA RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN NIOBRARA RIVER BASIN--Continued

Periodic determination of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
PLUM CREEK NEAR MEADVILLE, NEBR.			
Apr. 8, 1948 -----	91	83	20
June 25 -----	120	485	157
July 21 -----	74	218	44
Sept. 12 -----	163	12,600	5,550
VERDIGRE RIVER AT VERDIGRE, NEBR.			
Apr. 21, 1948 -----	94.3	2,080	530
May 6 -----	132	1,420	506
May 19 -----	80.2	748	162
June 2 -----	70.1	1,200	227
June 10 -----	135	3,860	1,410
June 21 -----	121	1,470	480
July 7 -----	61.1	544	90
July 19 -----	173	5,280	2,470
Aug. 3 -----	97.2	1,360	357
Aug. 18 -----	108	1,340	391
Aug. 31 -----	56.1	1,060	161
Sept. 15 -----	53.9	1,270	185
Sept. 28 -----	74.8	1,280	259

## PLATTE RIVER BASIN

## NORTH PLATTE RIVER BELOW CASPER, WYO.

LOCATION.--Five hundred feet upstream from gaging station, 6½ miles east of Casper, Natrona County, and 7½ miles downstream from Casper Creek.

DRAINAGE AREA.--12,600 square miles.

RECORDS AVAILABLE.--Sediment records: April 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 33,700 tons per day July 6; minimum, less than 1 ton per day many days during winter months.

EXTREMES, April 1947 to September 1948.--Sediment loads: Maximum, 62,500 tons per day May 19, 1947; minimum, less than 1 ton per day many days during winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Suspended sediment, water year October 1947 to September 1948									
	October			November			December		
Day	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	144	9	3	90	13	3	85	4	0.9
2-----	138	8	3	88	8	2	85	--	--
3-----	126	6	2	88	--	1/1	72	--	--
4-----	123	6	2	88	--	1/1	70	--	--
5-----	117	10	3	90	--	1/1	75	--	--
6-----	114	10	3	93	29	7	80	--	--
7-----	111	11	3	80	--	--	82	--	--
8-----	108	15	4	88	--	--	63	--	--
9-----	105	15	4	108	--	--	59	--	--
10-----	102	12	3	90	--	--	60	--	--
11-----	105	22	6	78	--	--	61	--	--
12-----	105	28	8	93	--	--	62	--	--
13-----	105	18	5	70	--	--	68	--	--
14-----	96	11	3	72	--	--	74	--	--
15-----	96	8	2	88	--	--	62	--	--
16-----	93	4	1	85	--	--	68	--	--
17-----	90	9	2	80	--	--	74	--	--
18-----	88	14	3	72	--	--	76	--	--
19-----	85	11	3	96	--	--	70	--	--
20-----	85	9	2	80	--	--	70	--	--
21-----	85	10	2	61	--	--	70	--	--
22-----	102	11	3	52	--	--	72	--	--
23-----	114	9	3	68	--	--	70	--	--
24-----	105	--	1/3	74	--	--	72	3	.7
25-----	99	13	3	82	--	--	70	--	--
26-----	99	13	3	78	--	--	72	--	--
27-----	93	10	3	80	--	--	72	--	--
28-----	93	15	4	76	--	--	75	--	--
29-----	90	14	3	74	--	--	70	--	--
30-----	90	21	5	74	--	--	80	--	--
31-----	90	19	5	--	--	--	56	--	--
Total -	3,196	--	102	2,436	--	2/60	2,195	--	1/20

1/Estimated.

2/Includes estimated loads for missing days.

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	58	--	--	59	--	--	70	44	8
2-----	62	--	--	57	--	--	68	--	--
3-----	64	--	--	82	--	--	70	--	--
4-----	86	--	--	68	--	--	78	--	--
5-----	66	--	--	52	--	--	70	--	--
6-----	72	--	--	55	12	2	63	--	--
7-----	74	--	--	55	--	--	65	--	--
8-----	70	--	--	54	--	--	85	--	--
9-----	70	--	--	60	--	--	48	--	--
10-----	66	--	--	54	--	--	58	--	--
11-----	66	--	--	54	--	--	80	--	--
12-----	61	3	0.5	54	--	--	64	--	--
13-----	90	--	--	55	--	--	70	--	--
14-----	65	--	--	57	--	--	82	--	--
15-----	75	--	--	59	--	--	123	76	21
16-----	68	--	--	61	--	--	150	--	--
17-----	75	--	--	63	18	3	190	--	--
18-----	61	--	--	85	--	--	190	--	--
19-----	65	--	--	111	--	--	250	--	--
20-----	63	--	--	111	--	--	364	--	--
21-----	68	--	--	102	--	--	340	--	--
22-----	65	--	--	96	--	--	240	--	--
23-----	63	6	1	108	--	--	204	--	--
24-----	63	--	--	65	--	--	370	--	--
25-----	65	--	--	70	--	--	644	--	--
26-----	74	--	--	85	--	--	644	--	--
27-----	75	--	--	85	--	--	370	--	--
28-----	75	--	--	59	--	--	199	--	--
29-----	102	--	--	75	--	--	141	--	--
30-----	102	--	--	--	--	--	120	--	--
31-----	75	--	--	--	--	--	114	--	--
Total -	2,184	--	2/30	2,051	--	2/150	5,605	--	2/3,400
Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	141	--	--	135	33	12	3,230	250	2,180
2-----	226	739	318	162	30	13	3,660	400	3,960
3-----	111	--	--	132	35	12	3,700	240	2,400
4-----	93	--	--	102	24	7	3,320	300	2,690
5-----	99	--	--	90	15	4	3,260	90	791
6-----	102	--	--	80	10	2	3,300	105	935
7-----	90	--	--	70	14	3	3,300	100	890
8-----	88	--	--	63	8	1	3,300	98	874
9-----	82	--	--	57	7	1	3,720	158	1,590
10-----	78	--	--	53	6	.9	4,480	480	5,800
11-----	72	--	--	53	5	.7	4,880	650	8,560
12-----	72	--	--	53	4	.6	4,920	320	4,250
13-----	75	--	--	53	5	.7	4,980	312	4,200
14-----	72	--	--	274	734	3/1,840	4,980	225	3,030
15-----	70	--	--	2,070	3,760	21,000	5,300	268	3,830
16-----	75	--	--	4,060	2,570	28,200	5,300	212	3,040
17-----	75	--	--	4,240	1,370	15,600	5,300	220	3,150
18-----	78	--	--	5,060	1,050	14,400	3,780	173	1,770
19-----	82	--	--	4,780	530	6,840	2,800	108	816
20-----	96	--	--	4,340	330	3,870	2,290	80	494
21-----	105	10	3	4,420	280	3,340	2,180	98	576
22-----	90	18	4	4,780	340	4,390	2,360	700	4,460
23-----	105	20	6	4,760	300	3,860	1,880	3,620	18,400
24-----	129	26	9	4,760	250	3,220	1,290	2,810	9,790
25-----	150	33	13	3,930	180	1,910	1,050	1,450	4,110
26-----	138	41	15	3,230	130	1,130	835	620	1,400
27-----	111	27	8	2,830	150	1,140	835	558	1,260
28-----	99	19	5	3,180	240	2,060	727	484	950
29-----	93	32	8	3,010	220	1,790	692	263	491
30-----	96	28	7	2,320	325	2,040	676	130	238
31-----	--	--	--	3,070	600	4,970	--	--	--
Total -	2,993	--	2/1,600	66,217	--	121,700	92,325	--	96,920

2/Includes estimated loads for missing days.

3/Sediment discharge computed by subdividing day.



## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	Mean dis- charge (second- feet)	July		August			September		
		Suspended sediment		Mean dis- charge (second- feet)	Suspended sediment		Mean dis- charge (second- feet)	Suspended sediment	
		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day
1-----	660	90	160	5,550	127	1,900	4,860	79	1,040
2-----	1,320	890	3/4,350	5,530	135	2,020	4,860	50	656
3-----	3,070	1,770	14,700	5,220	233	3,280	4,840	60	784
4-----	3,610	850	8,290	4,700	94	1,190	4,820	60	781
5-----	4,120	1,000	11,100	3,990	83	894	4,800	81	1,050
6-----	5,100	2,450	33,700	3,630	81	794	4,750	84	1,080
7-----	5,160	880	12,300	3,200	137	1,190	4,390	43	510
8-----	5,220	220	3,100	3,170	60	514	3,500	35	331
9-----	5,700	650	10,000	3,150	57	485	3,100	22	184
10-----	5,740	310	4,800	3,130	70	592	2,940	26	206
11-----	5,760	340	5,290	3,130	46	389	2,880	16	124
12-----	5,780	172	2,680	4,100	213	3/2,360	2,460	16	106
13-----	5,760	220	3,420	4,230	122	1,390	2,330	16	101
14-----	5,740	195	3,020	4,280	102	1,180	1,980	14	75
15-----	5,000	132	1,780	4,800	187	2,420	1,360	15	55
16-----	4,760	140	1,800	4,840	116	1,510	1,270	10	34
17-----	4,300	90	1,040	4,860	145	1,900	1,260	11	37
18-----	3,840	188	1,950	4,880	126	1,660	1,250	7	24
19-----	3,800	73	749	4,880	83	1,090	1,270	16	55
20-----	4,320	100	1,170	4,860	70	920	1,280	42	145
21-----	4,760	135	1,730	4,860	85	1,120	1,250	28	94
22-----	5,180	155	2,160	4,860	104	1,370	1,600	28	121
23-----	5,490	200	2,960	4,860	89	1,170	1,850	28	140
24-----	5,510	178	2,650	4,860	78	1,020	1,490	21	84
25-----	5,530	199	2,980	4,860	77	1,010	854	14	32
26-----	5,530	215	3,220	4,860	88	1,160	710	13	25
27-----	5,550	134	2,010	4,860	82	1,080	295	6	5
28-----	5,490	160	2,370	4,860	66	866	230	4	2
29-----	4,620	170	3/2,390	4,860	62	814	212	4	2
30-----	5,570	137	2,060	4,860	70	919	190	2	1
31-----	5,550	137	2,050	4,860	70	919	--	--	--
Total -	147,540	--	152,000	139,590	--	39,130	68,881	--	7,880

Total discharge for year (second-foot-days) ----- 536,213  
 Total load for year (tons)----- 423,000

3/Sediment discharge computed by subdividing day.

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Instantaneous discharge (second-feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters								2. 000		
					0. 002	0. 004	0. 008	0. 016	0. 031	0. 062	0. 125	0. 250			0. 500
May 15, 1948-----	12:40 p. m.	2, 540	3, 630	4, 700		4	12	38	78	97	99	100	--		BN
May 19-----	8:30 a. m.	4, 720	521	838	18	33	33	46	58	70	85	93	95		BN
Aug. 4-----	10:30 a. m.	4, 820	77	218	11	22	22	33	43	52	64	76	100		BN

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER NEAR DOUGLAS, WYO.

LOCATION.--At gaging station, half a mile downstream from Bedtick Creek, 3 miles upstream from Wagonhound Creek, and 4.5 miles south of Douglas, Converse County.

DRAINAGE AREA.--14,300 square miles.

RECORDS AVAILABLE.--Sediment records: April 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 80,200 tons per day Aug. 3; minimum, not determined.

EXTREMES, April 1947 to September 1948.--Sediment loads: Maximum, 95,700 tons per day May 20, 1947; minimum, not determined.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	301	9	7	230			190		
2-----	280	9	7	221			175		
3-----	262	8	6	215	--	1/8	165		
4-----	245	9	6	212			165		
5-----	236	4	3	203	12	7	165		
6-----	221	5	3	206			165		
7-----	209	10	6	191			165		
8-----	203	15	8	212			150		
9-----	203	9	5	227	--	1/10	135		
10-----	200			224			115		
11-----	203			233			115	--	1/12
12-----	194			209			125		
13-----	194			170	16	7	140		
14-----	191	--	1/6	180	22	11	155		
15-----	194			217	--	1/15	160		
16-----	191			210	15	8	150		
17-----	185			185			155		
18-----	180			160			160		
19-----	178	15	7	160			160		
20-----	175	--	1/5	140			155		
21-----	168	10	4	120			160		
22-----	172			110			165	15	7
23-----	221	--	1/10	140			160	--	1/6
24-----	239			160	--	1/12	165	--	1/7
25-----	248			195			165	15	7
26-----	239	17	11	200			170	13	6
27-----	230			190			175	21	10
28-----	233			185			175	21	10
29-----	230	--	1/10	180			170	16	7
30-----	227			175			170	--	1/6
31-----	230			--	--	--	140	22	8
Total -	6,682	--	222	5,660	--	318	4,880	--	326

1/Estimated.

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER NEAR DOUGLAS, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	120	7	2	145			260	--	1/9
2-----	145	--	1/3	150	--	1/6	250	12	8
3-----	155	9	4	155			240		
4-----	175	19	9	160			190		
5-----	185	49	24	165	14	6	170		
6-----	195	48	25	165			210		
7-----	210			170			235		
8-----	220	--	1/25	165			230		
9-----	200			165			210	--	1/15
10-----	170	39	18	165			190		
11-----	150	29	12	160	--	1/8	185		
12-----	120	14	5	160			200		
13-----	110	--		160			220		
14-----	125	--		165			270		
15-----	140	--		175			350		
16-----	125	--		190			430	215	250
17-----	120	--		230	162	101	450	410	498
18-----	115	--		270			480	1,350	1,750
19-----	120	--		250			520	650	912
20-----	115	--		230			600	875	1,420
21-----	130	--	1/5	210			700	730	1,380
22-----	140	13		220			820	680	1,510
23-----	150	--		260	--	1/100	1,000	1,020	2,750
24-----	155	--		260			455	1,400	1,720
25-----	145	--		265			412	810	900
26-----	135	--		275			660	1,100	1,960
27-----	130	--		290			840	1,040	2,360
28-----	125	--		295			702	1,100	2,080
29-----	130	--		270			450	750	911
30-----	140	--		--	--	--	332	347	311
31-----	140	--		--	--	--	284	175	134
Total -	4,535	--	272	5,940	--	1,420	12,545	--	21,060
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	284	128	98	1,080	380	1,110	3,260	1,360	12,000
2-----	284	107	82	907	148	362	3,380	449	4,100
3-----	340	210	193	751	170	344	3,650	357	3,520
4-----	343	180	167	624	112	188	3,600	256	2,480
5-----	298	178	143	582	115	181	3,300	195	1,740
6-----	301	95	77	582	92	145	3,290	178	1,580
7-----	304	90	74	524	118	167	3,290	147	1,310
8-----	290	73	57	502	63	85	3,260	147	1,290
9-----	266	65	47	558	40	60	3,290	140	1,240
10-----	256	82	57	534	40	58	3,620	225	2,200
11-----	273	90	66	465	42	53	4,210	400	4,550
12-----	284	80	61	422	48	55	4,600	475	5,900
13-----	280	65	49	399	25	27	4,660	371	4,660
14-----	262	50	35	394	22	23	4,680	644	8,140
15-----	256	30	21	390	22	23	4,760	594	7,640
16-----	270	44	32	2,040	1,750	2/13,700	5,030	355	4,820
17-----	329	42	37	4,030	2,950	32,100	5,120	310	4,290
18-----	426	110	127	4,420	1,420	16,900	5,070	270	3,700
19-----	576	183	285	5,280	1,470	21,000	3,470	200	1,870
20-----	612	150	248	4,920	775	10,300	2,910	136	1,070
21-----	512	71	98	4,600	528	6,550	2,470	73	487
22-----	552	100	149	4,640	440	5,510	2,390	60	387
23-----	636	143	246	4,920	400	5,310	2,550	150	1,030
24-----	816	175	386	4,920	345	4,590	2,120	1,450	8,300
25-----	793	193	414	4,840	300	3,920	1,740	1,910	8,970
26-----	702	142	269	3,880	248	2,600	1,430	930	3,590
27-----	630	97	165	3,410	482	4,440	1,440	3,440	13,400
28-----	552	77	115	3,050	300	2,470	1,020	780	2,140
29-----	588	--	1/342	3,360	334	3,030	916	350	865
30-----	856	300	693	3,200	305	2,640	848	375	859
31-----	--	--	--	2,670	836	6,020	--	--	--
Total -	13,171	--	4,830	72,894	--	144,000	95,374	--	118,100

1/Estimated.

2/Sediment discharge computed by subdividing day.

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER NEAR DOUGLAS, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	793	380	814	5,280	172	2,460	4,920	396	5,260
2-----	744	200	401	5,360	349	5,050	4,920	216	2,870
3-----	1,080	642	2/2,780	6,440	4,670	2/80,200	4,920	130	1,730
4-----	2,740	1,640	12,100	4,880	1,080	14,200	4,880	119	1,570
5-----	3,240	1,190	10,400	4,320	406	4,740	4,880	131	1,720
6-----	3,770	940	9,560	3,800	300	3,080	4,860	151	1,980
7-----	4,480	975	11,800	3,530	195	1,860	4,880	166	2,190
8-----	4,600	725	9,000	3,230	1,350	11,800	4,300	280	3,250
9-----	4,720	700	8,910	3,170	268	2,290	3,580	83	802
10-----	5,190	660	9,250	3,110	119	1,000	3,170	35	300
11-----	5,310	520	7,450	3,080	114	948	3,000	40	324
12-----	5,380	370	5,380	3,120	158	1,330	2,900	18	141
13-----	5,480	790	11,700	4,140	264	2,960	2,550	26	179
14-----	5,480	856	12,700	4,190	214	2,420	2,440	32	211
15-----	5,480	312	4,610	4,420	185	2,210	2,210	45	268
16-----	4,540	266	3,260	4,860	252	3,310	1,730	26	121
17-----	4,460	378	4,550	4,880	228	3,000	1,590	36	155
18-----	4,080	1,110	2/13,400	4,900	238	3,150	1,540	36	150
19-----	3,660	811	8,010	4,880	212	2,800	1,520	23	94
20-----	3,640	245	2,410	4,860	190	2,490	1,540	30	125
21-----	4,040	595	6,490	4,940	192	2,560	1,490	26	104
22-----	4,420	270	3,220	4,960	195	2,610	1,450	24	94
23-----	4,920	325	4,320	4,940	211	2,810	1,480	51	204
24-----	5,160	1,100	15,300	4,920	195	2,590	1,790	18	87
25-----	5,210	260	3,660	4,940	184	2,450	1,630	32	141
26-----	5,210	216	3,040	5,010	154	2,080	1,270	18	62
27-----	5,190	244	3,420	5,050	147	2,000	916	30	74
28-----	5,260	212	3,010	5,030	176	2,390	558	15	23
29-----	4,760	198	2,540	4,890	147	1,980	378	16	16
30-----	5,100	218	3,000	4,960	122	1,630	346	5	5
31-----	5,240	193	2,730	4,960	258	3,460	--	--	--
Total -	133,377	--	199,200	141,150	--	177,900	77,638	--	24,250

Total discharge for year (second-foot-days) -----

573,846

Total load for year (tons) -----

691,900

2/Sediment discharge computed by subdividing day.

PLATTE RIVER BASIN--Continued  
NORTH PLATTE RIVER NEAR DOUGLAS, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Instantaneous discharge (second-feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
May 19, 1948 -----	1:30 p. m.	5,260	1,410	1,000		20	34	48	64	77	85	91	94		BN
June 1 -----	4:15 p. m.	3,340	968	733		28	53	75	88	92	94	98	99		BN
Aug. 4 -----	2:00 p. m.	4,960	619	1,510		16	26	38	50	64	84	90	96		BN

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER NEAR CASSA, WYO.

LOCATION.--Four hundred feet upstream from gaging station, 1½ miles south of Cassa, Platte County, 4½ miles downstream from Horseshoe Creek, and 6 miles upstream from high-water line of Guernsey Reservoir.

DRAINAGE AREA.--15,700 square miles.

RECORDS AVAILABLE.--Sediment records: March 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 54,000 tons per day Aug. 3; minimum, 2 tons per day Nov. 22, Jan. 1.

EXTREMES, March 1947 to September 1948.--Sediment loads: Maximum, 65,500 tons per day July 16, 1947; minimum, 2 tons per day Nov. 22, 1947, and Jan. 1, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	422	8	9	296	9	7	250	39	26
2-----	385	10	10	296	12	10	260	132	93
3-----	365	9	9	296	9	7	230	38	24
4-----	346	6	6	292	9	7	220	22	13
5-----	332	5	4	292	16	13	210	32	18
6-----	319	7	6	292	7	6	215	26	15
7-----	306	11	9	292	14	11	220	30	18
8-----	296	21	17	283	10	8	220	23	14
9-----	288	29	23	301	13	11	195	22	12
10-----	288	6	5	314	20	17	170	18	8
11-----	288	6	5	288	33	26	170	10	5
12-----	283	6	5	306	37	31	185	13	6
13-----	278	4	3	288	30	23	195	18	9
14-----	278	6	5	265	22	16	210	16	9
15-----	301	6	5	257	16	11	225	22	13
16-----	292	6	5	283	16	12	210	14	8
17-----	283	6	5	253	12	8	215	14	8
18-----	274	15	11	265	16	11	215	19	11
19-----	270	4	3	233	14	9	220	22	13
20-----	257	7	5	178	10	5	220	15	9
21-----	257	6	4	170	13	6	220	22	13
22-----	265	6	4	155	4	2	220	26	15
23-----	288	10	8	190	6	3	230	20	12
24-----	296	7	6	220	10	6	230	15	9
25-----	314	32	27	260	10	7	240	9	6
26-----	324	90	79	280	11	8	240	14	9
27-----	319	36	31	270	8	6	245	14	9
28-----	310	15	13	265	16	11	250	5	3
29-----	301	14	11	260	98	69	240	4	3
30-----	301	13	11	245	55	36	230	14	9
31-----	296	13	10	--	--	--	200	8	4
Total -	9,422	--	354	7,885	--	403	6,800	--	424

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	180	4	2	200	21	11	360		--
2-----	200	6	3	205	14	8	340	108	99
3-----	210	6	3	215	10	6	330		--
4-----	240	6	4	220	--	1/6	290		--
5-----	250	7	5	225	14	9	260		--
6-----	270	7	5	230	16	10	280		--
7-----	280	16	12	225	--	1/8	300		--
8-----	290	56	44	220	--	1/10	320		--
9-----	280	106	80	225	--	1/12	290		--
10-----	260	84	59	230	46	28	270		--
11-----	210	46	26	230	--	--	260		--
12-----	175	27	13	220	--	--	280		--
13-----	160	18	8	225	--	--	310		--
14-----	170	23	11	230	--	--	350		--
15-----	185	32	16	250	--	--	440		--
16-----	195	34	18	290	--	--	500		--
17-----	170	46	21	330	19	17	620		--
18-----	170	16	7	350	400	378	640		--
19-----	165	34	15	330	740	660	680		--
20-----	165	41	18	300	200	162	760		--
21-----	170	51	23	280	180	136	900		--
22-----	180	20	10	300	190	154	1,100		--
23-----	200	34	18	340	--	--	1,600		--
24-----	210	32	18	350	--	--	1,100		--
25-----	200	44	24	350	--	--	840		--
26-----	190	18	9	360	--	--	700		--
27-----	180	14	7	370	--	--	1,000		--
28-----	170	15	7	380	--	--	1,400		--
29-----	180	18	9	370	--	--	1,200		--
30-----	185	25	12	--	--	--	680		--
31-----	190	23	12	--	--	--	520		--
Total -	6,280	--	519	8,050	--	2/2,750	18,920	--	2/26,200
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	444	--	--	1,420	--	--	2,710	895	3/8,640
2-----	427	136	157	1,500	--	--	3,180	1,580	13,600
3-----	400	--	--	1,300	--	--	3,340	706	6,360
4-----	422	--	--	1,130	--	--	3,580	713	8,900
5-----	502	--	--	972	--	--	3,400	562	5,160
6-----	472	--	--	930	78	196	3,200	432	3,740
7-----	472	--	--	880	66	157	3,200	305	2,640
8-----	466	--	--	787	56	119	3,180	284	2,440
9-----	449	--	--	760	48	99	3,160	253	2,160
10-----	432	--	--	760	44	90	3,300	242	2,160
11-----	444	--	--	733	41	81	3,800	418	4,290
12-----	472	--	--	646	30	52	4,360	821	9,660
13-----	466	--	--	583	28	44	4,560	933	11,500
14-----	444	--	--	534	27	39	4,640	866	10,800
15-----	427	--	--	508	24	33	4,620	985	12,300
16-----	432	--	--	490	16	21	4,950	1,100	14,700
17-----	496	--	--	2,520	2,690	3/24,600	5,060	816	11,100
18-----	638	--	--	3,840	3,800	39,400	5,110	634	8,740
19-----	850	--	--	4,600	2,800	34,800	4,480	528	6,390
20-----	1,030	331	920	4,780	1,540	19,900	3,180	311	2,670
21-----	1,000	--	--	4,400	1,260	14,900	2,770	209	1,560
22-----	920	--	--	4,240	860	9,800	2,440	165	1,080
23-----	994	--	--	4,420	610	9,650	2,640	790	5,640
24-----	1,200	--	--	4,540	780	9,550	2,620	394	2,790
25-----	1,360	--	--	4,520	705	8,600	1,980	828	4,430
26-----	1,290	--	--	4,120	540	6,000	1,660	1,640	7,350
27-----	1,190	--	--	3,520	550	5,240	1,430	1,690	6,530
28-----	1,040	--	--	3,420	2,350	3/23,100	1,430	4,210	16,300
29-----	1,134	--	--	2,930	750	5,940	1,100	1,730	5,150
30-----	1,110	--	--	3,150	450	3,830	1,000	486	1,310
31-----	--	--	--	2,880	375	2,920	--	--	--
Total -	21,253	--	2/8,400	71,813	--	2/222,400	96,080	--	196,100

1/Estimated.

2/Includes estimated load for missing days.

3/Sediment discharge computed by subdividing day.



## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	920	372	925	5,220	388	5,460	4,890	178	2,350
2-----	870	367	862	5,370	890	12,900	4,860	180	2,360
3-----	841	238	540	6,320	2,960	3/54,000	4,840	145	1,890
4-----	1,310	761	3/4,230	5,500	3,420	3/51,600	4,840	138	1,800
5-----	3,070	2,860	23,700	4,890	1,120	14,800	4,820	155	2,020
6-----	3,540	2,100	20,000	4,320	460	5,360	4,780	142	1,830
7-----	4,220	1,590	18,100	3,880	300	3,140	4,930	152	2,020
8-----	4,620	1,340	16,700	3,580	200	1,930	4,690	272	3,440
9-----	4,690	870	11,000	3,380	570	5,200	4,040	223	2,430
10-----	4,970	785	10,500	3,300	223	1,990	3,520	105	998
11-----	5,280	816	11,600	3,280	184	1,630	3,130	83	702
12-----	5,300	691	9,890	3,240	189	1,660	3,040	77	632
13-----	5,350	624	9,010	3,540	271	2,590	2,860	58	448
14-----	5,370	500	7,260	4,200	490	5,550	2,520	54	368
15-----	5,410	437	6,390	4,200	500	5,670	2,430	65	426
16-----	5,130	426	5,900	4,560	440	5,420	2,030	61	330
17-----	4,560	365	4,490	4,730	385	4,920	1,590	60	258
18-----	4,500	308	3,740	4,780	310	4,000	1,500	59	239
19-----	3,960	695	7,440	4,820	250	3,250	1,480	52	208
20-----	3,740	420	4,240	4,820	250	3,250	1,510	135	550
21-----	3,880	353	3,700	4,860	252	3,310	1,480	125	500
22-----	4,340	336	3,940	4,820	278	3,620	1,450	56	220
23-----	4,710	336	4,280	4,800	350	4,540	1,410	44	168
24-----	5,130	452	6,270	4,780	280	3,620	1,680	61	277
25-----	5,260	517	7,340	4,750	247	3,170	1,880	86	436
26-----	5,260	430	6,100	4,820	285	3,710	1,620	67	294
27-----	5,240	328	4,640	4,860	228	3,000	1,250	75	253
28-----	5,260	316	4,490	4,890	240	3,160	994	79	212
29-----	5,240	319	4,500	4,910	227	3,010	688	20	37
30-----	4,780	328	4,230	4,930	250	3,330	520	25	36
31-----	5,190	351	4,920	4,910	190	2,520	--	--	--
Total -	131,944	--	230,900	141,260	--	231,300	81,272	--	27,730

Total discharge for year (second-foot-days) ----- 600,976

Total load for year (tons) ----- 947,500

3/Sediment discharge computed by subdividing day.

PLATTE RIVER BASIN--Continued  
NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Instantaneous discharge (second-foot)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Apr. 20, 1948	2:30 p. m.	1,050	331	1,140	22	38	58	80	90	93	98	99	100		BN
May 19	5:00 p. m.	4,780	2,400	3,300	10	24	36	55	74	89	96	98	99		BN
June 1	6:25 p. m.	2,790	1,520	2,360	10	33	63	64	66	69	72	76	85		BN
Aug. 4	6:30 p. m.	5,220	3,010	8,130	4	12	59	89	91	94	97	98	98		BN
Sept. 8	2:55 p. m.	4,640	248	703	18	26	34	38	43	44	62	77	84		BN

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.

LOCATION.--Three hundred feet downstream from gaging station which is three-quarters of a mile downstream from Guernsey Dam, and 1 mile northwest of Guernsey, Platte County.

DRAINAGE AREA.--16,200 square miles.

RECORDS AVAILABLE.--Sediment records: April 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 796 tons per day May 20; minimum, less than 1 ton per day some days during fall and winter months.

EXTREMES, April 1947 to September 1948.--Sediment loads: Maximum, 16,600 tons per day July 16, 1947; minimum, less than 1 ton per day during fall and winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Suspended sediment, water year October 1947 to September 1948

Day	Mean discharge (second-foot)	October		November			December		
		Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	18		--	51	--	--	81	--	1/10
2-----	18		--	26	--	--	101	--	1/10
3-----	18		--	46	--	--	121	31	10
4-----	18		--	42	8	0.9	120	26	8
5-----	18		--	99	--	--	87	26	6
6-----	18	15	0.7	120	--	--	57	--	--
7-----	18		--	122	--	--	146	--	--
8-----	18		--	115	--	--	118	--	--
9-----	18		--	120	--	--	122	--	--
10-----	18		--	122	--	--	143	21	8
11-----	18		--	121	--	--	142	19	7
12-----	18		--	121	--	--	181	18	9
13-----	18		--	121	--	--	193	15	8
14-----	18		--	121	14	5	194	10	5
15-----	18		--	115	--	--	185	8	4
16-----	18		--	117	--	--	145	10	4
17-----	18		--	121	--	--	143	14	5
18-----	18		--	125	--	--	115	18	6
19-----	18		--	122	--	--	140	10	4
20-----	18		--	122	--	--	141	6	2
21-----	18		--	123	--	--	129	3	1
22-----	18		--	125	--	--	141	2	.8
23-----	18		--	134	--	--	142	1	.4
24-----	18		--	123	--	--	142	--	--
25-----	34		--	51	--	--	100	--	--
26-----	83		--	122	--	--	106	--	--
27-----	54		--	121	--	--	119	--	--
28-----	46		--	121	--	--	120	--	--
29-----	42		--	125	--	--	141	6	2
30-----	43		--	126	8	3	142	4	2
31-----	47		--	--	--	--	162	--	--
Total -	781		2/23	3,240	--	2/120	4,117	--	2/150

1/Estimated.

2/Includes estimated loads for missing days.

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	162	--	--	206	--	--	414	--	--
2-----	141	--	--	206	--	--	399	9	10
3-----	141	--	--	207	--	--	397	--	--
4-----	112	--	--	207	6	3	395	--	--
5-----	150	--	--	207	--	--	399	--	--
6-----	141	--	--	206	--	--	97	--	--
7-----	266	--	--	206	--	--	399	--	--
8-----	266	--	--	206	--	--	398	--	--
9-----	267	--	--	206	--	--	380	--	--
10-----	314	--	--	206	--	--	376	--	--
11-----	413	--	--	207	--	--	371	--	--
12-----	266	--	--	206	--	--	372	--	--
13-----	267	1	0.7	206	--	--	376	--	--
14-----	328	--	--	206	--	--	374	--	--
15-----	328	--	--	206	--	--	375	--	--
16-----	328	--	--	206	--	--	375	--	--
17-----	330	--	--	207	9	5	449	7	8
18-----	329	--	--	208	--	--	701	--	--
19-----	329	--	--	219	--	--	1,030	--	--
20-----	332	--	--	208	--	--	1,050	--	--
21-----	334	5	5	209	--	--	1,090	--	--
22-----	335	2	2	207	--	--	1,260	1	3
23-----	336	--	--	207	--	--	1,040	--	1/2
24-----	271	--	--	335	--	--	1,180	2	6
25-----	307	--	--	350	--	--	1,200	4	13
26-----	207	--	--	350	8	8	1,060	4	11
27-----	219	--	--	414	--	--	1,070	4	12
28-----	220	--	--	409	--	--	1,050	4	11
29-----	206	--	--	411	--	--	886	11	26
30-----	206	--	--	--	--	--	830	10	22
31-----	207	--	--	--	--	--	958	7	18
Total -	8,058	--	2/56	7,034	--	2/150	21,151	--	2/290
Day	April			May			June		
	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	1,030	6	17	1,010	--	1/35	3,280	24	212
2-----	1,080	9	26	1,010	--	1/35	3,160	20	171
3-----	1,050	--	1/25	998	18	48	3,010	16	130
4-----	1,040	--	1/24	998	15	40	3,060	18	149
5-----	1,050	8	23	1,010	13	35	3,050	--	--
6-----	1,070	8	23	1,010	15	41	3,000	--	--
7-----	1,040	10	28	1,050	12	34	3,210	--	--
8-----	1,080	10	29	1,080	--	1/35	3,650	--	--
9-----	1,080	9	26	1,080	--	1/35	4,100	11	122
10-----	1,090	--	1/26	1,260	20	68	4,300	--	1/150
11-----	1,080	--	1/30	1,530	22	91	4,320	14	163
12-----	1,080	12	35	1,570	--	1/100	4,320	--	1/160
13-----	1,080	--	1/34	1,620	28	123	4,300	--	1/200
14-----	1,100	11	33	1,800	26	126	4,240	20	229
15-----	1,100	10	30	1,860	--	1/115	4,280	22	254
16-----	1,110	12	36	1,900	--	1/110	4,170	21	236
17-----	1,100	--	1/35	2,030	67	318	3,280	--	--
18-----	1,110	--	1/35	3,220	59	513	2,580	--	--
19-----	1,110	15	45	3,720	55	552	2,290	--	--
20-----	1,100	12	36	4,040	73	796	2,120	--	--
21-----	1,110	9	27	4,260	55	633	2,150	14	81
22-----	1,110	8	24	4,190	--	1/500	1,940	--	1/75
23-----	1,100	11	33	4,060	--	1/400	1,510	17	69
24-----	1,090	--	1/32	3,520	36	342	1,230	7	23
25-----	1,100	--	1/30	2,840	35	268	1,090	7	21
26-----	1,110	24	72	2,710	27	198	1,090	--	1/15
27-----	1,100	--	1/70	2,890	18	140	1,080	3	9
28-----	1,040	19	53	2,860	17	131	1,090	--	1/10
29-----	1,010	--	1/40	2,740	23	170	1,310	5	18
30-----	1,010	12	33	3,000	23	186	1,620	2	9
31-----	--	--	--	3,060	26	215	--	--	--
Total -	32,360	--	1,010	69,926	--	6,430	83,830	--	2/3,410

1/Estimated.

2/Includes estimated loads for missing days.

## PLATTE RIVER BASIN--Continued

## NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,540	2	14	4,840	--	1/300	4,870	12	151
2-----	3,290	2	18	4,780	22	284	4,650	16	201
3-----	3,290	--	1/18	4,540	--	1/250	4,610	19	237
4-----	3,340	--	1/18	4,280	21	243	4,560	--	--
5-----	3,800	--	1/30	4,130	--	1/220	4,480	--	--
6-----	4,320	5	58	3,780	24	245	4,340	--	--
7-----	4,780	16	206	3,490	24	226	3,740	--	--
8-----	4,800	18	233	3,490	--	1/150	3,260	17	150
9-----	4,870	18	237	3,610	11	107	3,160	19	162
10-----	4,950	--	1/240	3,850	10	104	3,080	17	141
11-----	4,930	--	1/250	4,350	10	117	2,890	--	--
12-----	4,930	26	346	4,590	9	112	2,860	--	--
13-----	4,930	22	292	4,670	13	164	2,860	--	--
14-----	4,610	--	1/290	4,670	--	1/140	2,900	--	--
15-----	3,840	27	280	4,670	--	1/130	2,870	--	--
16-----	3,520	23	219	4,690	10	127	2,890	--	--
17-----	3,470	--	1/200	4,820	18	234	2,900	--	--
18-----	3,490	--	1/200	4,840	17	222	2,900	--	--
19-----	3,800	20	205	4,820	15	195	2,930	--	--
20-----	4,170	20	225	4,820	18	234	2,900	8	63
21-----	4,560	18	222	4,820	--	1/200	2,690	9	65
22-----	4,780	23	297	4,820	--	1/200	2,430	10	66
23-----	4,890	--	1/300	4,840	15	196	2,100	--	1/64
24-----	4,960	--	1/300	4,840	18	235	1,800	13	63
25-----	4,930	--	1/300	4,840	23	300	1,670	--	1/50
26-----	4,840	--	1/300	4,800	22	286	1,560	--	1/40
27-----	4,800	22	285	4,760	--	1/260	1,190	18	58
28-----	4,840	20	261	4,710	--	1/220	566	14	21
29-----	4,870	--	1/260	4,690	--	1/190	350	--	1/10
30-----	4,870	30	394	4,690	13	165	56	6	--
31-----	4,850	--	1/350	4,670	12	151	--	--	--
Total -	134,860	--	6,850	140,210	--	6,210	83,862	--	2/3,100
Total discharge for year (second-foot-days)									589,429
Total load for year (tons)									27,800

1/Estimated.

2/Includes estimated loads for missing days.

## PLATTE RIVER BASIN--Continued

## SOUTH PLATTE RIVER AT JULESBURG, COLO.

LOCATION --At bridge on State Highway 51, half a mile east of Julesburg Sedgwick County, and 4 miles upstream from Colorado-Nebraska State line.

DRAINAGE AREA --22,800 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1945 to April 1946, September 1946 to October 1948.

EXTREMES, 1947-48 --Dissolved solids: Maximum, 1,490 parts per million Jan. 1; minimum, 935 parts per million Mar. 17-19.

Total hardness: Maximum, 713 parts per million Jan. 1; minimum, 474 parts per million May 1-31.

Water temperatures: Maximum, 84° F. Aug. 8, 15; minimum, freezing point on several days in December, January, February, and March.

EXTREMES, 1945-48 --Dissolved solids: Maximum, 1,550 parts per million Oct. 11-13, 20, 1945; minimum, 686 parts per million June 21-30, 1947.

Total hardness: Maximum, 770 parts per million Jan. 1-10, 1947; minimum, 173 parts per million Mar. 1-12, 1947.

Water temperatures: Maximum, 84° F. Aug. 8, 15, 1948; minimum, freezing point on many days in winter months.

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent so-dium
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
Oct. 1, 1947																				
Channel 4 1/4	8.6	8.3	1,530	43	0.04	176	43	154		2/282	607	58	0.7	3.4	--	1,230	1.67	29	616	384
Oct. 1 Channel 2	140	8.3	1,620	40	.04	178	48	165		3/268	666	60	.7	2.2	--	1,290	1.75	456	641	36
Oct. 1 Channel 1 1/4	--	8.2	1,610	38	.04	174	47	171		264	664	62	.8	3.2	--	1,290	1.75	--	627	411
Oct. 3 Ch. 2	124	8.2	1,500	44	.04	162	43	154		276	581	56	.7	3.9	--	1,180	1.60	395	581	37
Oct. 11-Nov. 10	446	7.8	1,770	36	.05	178	48	161	18	311	677	64	.7	2.8	0.18	1,340	1.82	1,610	641	34
Oct. 15 Ch. 2 1/4	144	8.3	1,660	30	.10	176	46	144		3/260	608	65	.6	3.6	--	1,200	1.63	467	628	415
Oct. 15 Ch. 4 1/4	7.8	8.3	1,550	27	.06	168	39	177		3/256	564	55	.6	1.8	--	1,210	1.65	25	575	283
Oct. 15 Ch. 1 1/4	--	8.2	1,650	28	.06	170	45	157		272	608	65	.6	3.2	--	1,210	1.65	25	609	386
Oct. 21 Ch. 2 1/4	560	8.4	1,580	22	.06	162	47	121		3/200	596	52	.6	2.9	--	1,100	1.50	43	593	429
Nov. 1 Ch. 4 1/4	60	8.1	1,590	24	.10	183	52	162		320	652	55	.6	3.9	--	1,290	1.75	209	670	408
Nov. 1 Ch. 1 1/4	--	8.2	1,740	24	.10	185	53	171		316	680	58	.6	3.3	--	1,330	1.81	--	680	421
Nov. 1 Ch. 9	544	8.0	1,730	34	.05	186	49	169	14	332	691	60	.6	2.6	.16	1,370	1.86	2,010	686	35
Nov. 15 Ch. 4 1/4	69	8.1	1,750	24	.10	182	54	187		280	640	58	.6	2.8	--	1,240	1.89	231	676	446
Nov. 15 Ch. 2 1/4	571	8.2	1,710	22	--	184	52	140		376	656	60	.6	3.5	--	1,350	1.84	2,080	673	36
Nov. 15 Ch. 1 1/4	--	8.3	1,720	22	--	182	52	137		392	668	55	.6	3.7	--	1,370	1.86	--	668	350
Nov. 22 Ch. 2 1/4	410	7.7	1,610	28	.10	174	50	167		328	650	54	.5	1.4	--	1,270	1.73	1,410	665	36

1/Not included in weighted average. Daily samples from channel 2, the main channel.

2/Includes equivalents of 14 parts per million of carbonate (CO<sub>3</sub>).

3/Includes equivalents of 8 parts per million of carbonate (CO<sub>3</sub>).

Dec. 1 Channel 4 1/	51	7.6	1,690	34	.08	184	51	184	336	678	59	.6	2.6	--	1,360	1.85	187	668	392	37
Dec. 1 Channel 2 1/	510	7.5	1,710	33	.06	187	51	186	340	686	59	.5	4.3	--	1,380	1.88	1,900	676	397	38
Dec. 1 Channel 1 1/	550	7.5	1,710	33	.06	183	52	189	340	689	57	.6	4.2	--	1,380	1.88	670	391	391	38
Dec 10-30 -----		8.0	1,790	36	.02	187	47	167	337	694	59	.6	4.1	0.24	1,390	1.89	2,060	660	384	34
Dec. 15 Ch. 4 1/----	52	7.4	1,730	41	.06	183	51	190	352	675	59	.6	4.8	--	1,380	1.88	194	666	377	38
Dec. 15 Ch. 2 1/----	510	7.5	1,750	45	.04	186	53	190	360	686	57	.6	3.9	--	1,400	1.90	1,930	682	387	38
Dec. 15 Ch. 1 1/----		7.4	1,720	40	.06	192	48	196	356	694	59	.6	3.9	--	1,410	1.92	676	384	384	39
Dec. 31																				
Jan. 20, 1948 -----	557	7.9	1,770	30	.05	186	50	165	322	694	58	.7	3.1	.24	1,360	1.85	2,050	670	406	34
Jan. 1 Ch. 1 1/----		7.5	1,780	40	.06	195	55	208	364	747	61	.7	2.5	--	1,490	2.03	--	713	415	39
Jan. 1 Ch. 4 1/----	53	7.7	1,770	37	.06	191	50	216	364	734	61	.7	.6	--	1,470	2.00	210	682	384	41
Jan. 1 Ch. 2 1/----	510	7.7	1,570	33	.06	176	48	193	330	677	52	.7	.3	--	1,340	1.82	1,580	636	365	39
Jan. 15 Ch. 4 1/----	45	7.6	1,820	28	.20	191	48	147	304	632	58	.6	4.3	--	1,260	1.71	153	674	425	32
Jan. 15 Ch. 2 1/----	410	7.6	1,830	31	.40	186	50	168	304	668	60	.6	4.7	--	1,320	1.80	1,460	670	421	35
Jan. 15 Ch. 1 1/----		8.0	1,640	26	.30	180	49	157	304	676	58	.6	4.0	--	1,320	1.80	676	427	35	
Jan. 21-23 -----	602	8.2	1,640	26	.05	186	48	156	106	675	57	.8	7.2	--	1,170	1.59	1,900	512	330	38
Jan. 24-Feb. 8 -----	662	8.0	1,780	28	.04	190	53	170	316	709	61	.9	4.5	.05	1,380	1.88	2,470	692	433	34
Feb. 1 Ch. 2 1/----	520	7.7	1,690	27	.30	197	52	166	320	688	58	.6	6.1	--	1,360	1.85	1,910	705	443	34
Feb. 1 Ch. 4 1/----	46	7.7	1,730	27	.16	199	52	179	328	708	62	.6	5.7	--	1,400	1.90	1,740	710	441	35
Feb. 9-17 -----	1,080	8.2	1,640	23	.05	175	49	149	294	647	57	.8	5.2	.15	1,270	1.73	3,700	638	397	33
Feb. 15 Ch. 4 1/----	168	7.5	1,600	26	.20	175	49	163	296	636	58	.6	6.0	--	1,260	1.71	572	638	395	36
Feb. 15 Ch. 2 1/----	882	7.6	1,570	24	.20	173	51	144	300	600	55	.6	6.1	--	1,200	1.63	2,860	641	395	33
Feb. 15 Ch. 1																				
7:10 a.m. 1/-----	--	7.2	1,510	23	.80	157	49	144	320	548	50	.7	1.0	--	1,130	1.54	--	593	331	34
Feb. 15 Ch. 1																				
3:40 p.m. 1/-----	--	7.5	1,570	24	.30	168	49	158	300	608	55	.6	6.7	--	1,220	1.66	--	621	375	36

1/Not included in weighted average. Daily samples from channel 2, the main channel.

PLATTE RIVER BASIN --Continued  
SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent sodium-carbon-ate
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non-carbon-ate	
Feb. 18-24, 1948 ----	1,710	8.2	1,470	22	0.05	152	45	131	11	273	556	48	0.8	4.7	0.16	1,110	1.51	5,120	564	340	33
Feb. 25-Mar. 2 ----	1,620	8.2	1,570	21	.12	157	52	140	4.4	260	592	48	.9	5.0	.19	1,160	1.58	5,070	606	376	33
Mar. 3-5 ----	1,790	8.5	1,340	18	.21	130	42	121	4.4	4,232	505	42	.8	6.6	--	1,986	1.34	4,770	497	307	34
Mar. 6-16 ----	1,540	8.0	1,530	22	.40	134	49	139	11	277	574	50	1.0	6.7	.17	1,150	1.56	5,090	586	359	34
Mar. 15 ----																					
Channel 2 1/- ----	1,320	8.2	1,440	22	.04	157	58	126		280	572	50	.9	7.3	--	1,130	1.54	4,030	630	400	30
Mar. 15 ----																					
Channel 4 1/- ----	272	8.3	1,440	25	.04	157	55	132		4,266	568	50	.8	8.6	--	1,140	1.55	837	618	383	32
Mar. 17-19 ----	2,030	8.2	1,330	20	.07	125	42	119	4.8	228	458	46	.8	5.2	--	935	1.27	5,120	486	299	35
Mar. 20 ----	2,130	8.3	1,370	23	.04	149	51	114		5,268	518	44	.8	6.6	--	1,040	1.41	5,860	581	361	30
Mar. 21-31 ----	1,800	8.3	1,410	24	.30	141	45	116	2.0	5,238	514	43	.8	5.3	--	1,010	1.37	4,910	537	325	32
Apr. 1-30 ----	859	8.2	1,480	23	.00	150	46	116	.8	270	524	49	.8	4.5	--	1,050	1.43	2,440	563	342	31
May 1-31 ----	288	8.2	1,260	26	.00	129	37	100	1.2	238	426	44	.8	2.9	--	1,000	1.36	778	474	279	31
June 1-16 ----	168	8.2	1,450	34	.00	149	40	135	3.6	248	492	52	.7	2.6	--	1,020	1.39	463	536	333	35
June 17-30 ----	655	8.2	1,530	32	.06	157	51	162	8.0	270	648	58	.4	2.0	.21	1,280	1.74	2,260	601	380	37
July 1-31 ----	194	8.3	1,570	33	.08	157	50	155	9.2	5,254	640	60	.4	1.4	.24	1,260	1.71	660	597	389	36
Aug. 1-22 ----	43	8.1	1,550	36	.06	150	46	141	7.2	238	574	57	.9	2.7	.21	1,140	1.55	132	563	351	35
Sept. 5-30 ----	43	8.1	1,570	33	.06	166	46	146	6.0	262	588	59	.9	2.9	.24	1,180	1.60	137	503	388	34
Weighted average 1/	593	--	1,570	27	0.07	160	47	141	8.8	282	595	53	0.8	4.3	0.18	1,180	1.60	1,890	593	362	33

1/Not included in weighted average. Daily samples from channel 2, the main channel.

4/Includes equivalents of 16 parts per million of carbonate (CO<sub>3</sub>).

5/Includes equivalents of 12 parts per million of carbonate (CO<sub>3</sub>).

6/Includes equivalents of 6 parts per million of carbonate (CO<sub>3</sub>).

7/Weighted average for period sampled only.



Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	45	39	32	33	33	43	52	62	80	69	--
2	55	47	39	32	32	32	44	55	63	71	70	--
3	61	--	32	33	33	33	--	50	65	70	--	--
4	61	--	32	34	32	33	--	48	66	75	59	--
5	70	44	32	34	33	32	--	50	66	77	59	71
6	58	39	--	34	32	32	--	49	68	--	58	63
7	57	34	33	38	32	--	--	49	65	73	71	57
8	57	41	34	39	33	32	--	50	66	78	84	56
9	59	42	33	39	33	32	45	49	65	69	79	58
10	61	37	32	38	32	32	46	49	64	70	64	56
11	61	38	32	40	--	32	47	49	63	--	--	63
12	58	40	32	35	--	32	45	48	64	68	--	--
13	57	38	34	33	--	36	44	49	65	65	65	56
14	58	39	37	33	32	44	45	51	63	70	70	57
15	58	37	33	34	34	39	52	52	60	78	84	58
16	63	37	--	33	34	39	56	52	60	71	64	58
17	65	38	34	33	34	38	57	52	62	72	65	59
18	56	36	35	33	33	39	53	58	63	79	63	61
19	57	40	34	33	33	39	50	56	60	69	65	62
20	52	41	35	33	32	40	48	56	62	71	64	56
21	53	33	33	33	34	45	47	57	60	73	66	59
22	52	--	36	33	36	43	49	54	61	80	70	57
23	46	33	33	33	34	44	46	56	60	81	--	--
24	48	34	37	48	34	47	50	55	62	76	--	61
25	49	36	40	34	38	41	49	53	64	68	--	60
26	47	35	38	32	40	38	49	61	65	72	--	62
27	36	37	32	32	42	39	50	60	67	69	--	52
28	37	39	32	32	38	47	51	59	65	67	--	59
29	38	36	32	32	36	45	53	59	--	64	--	51
30	41	34	32	32	--	47	52	58	70	59	--	50
31	--	--	34	32	--	46	--	61	--	67	--	--
Average	56	38	35	34	34	38	49	53	64	72	--	58

PLATTE RIVER BASIN--Continued  
WOOD RIVER NEAR RIVERDALE, NEBR.

LOCATION --At gaging station at bridge on State Highway 40, 1½ miles northwest of Riverdale, Buffalo County.  
DRAINAGE AREA --379 square miles.

RECORDS AVAILABLE.--Sediment records: March 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 6,100 tons per day July 29; minimum, less than 0.1 ton per day on many days.

EXTREMES, March 1947 to September 1948.--Sediment loads: Maximum, 356,000 tons per day June 22, 1947; minimum, less than 0.1 ton per day on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 18, 1948 -----	42	7.1	280	28	0.80	40	7.2	7.5	163	5.6	3.0	0.2	0.25	1.8	0.00	184	0.25		0	0	11
July 31 -----	310	7.3	181	22	.24	26	3.7	13	124	5.6	2.2	.4	.22	1.0	--	164	.22		80	0	27
Sept. 25 -----	.9	7.3	540	39	.02	89	14	8.8	350	3.2	5.7	.2	.49	.0	.06	358	.49		280	0	6

## PLATTE RIVER BASIN--Continued

## WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.9			2.2			3.0	15	
2-----	1.2			2.2			3.0	20	
3-----	1.2	68	0.2	2.6			3.0	--	1/0.2
4-----	1.2			2.2			3.0	--	
5-----	.9			2.2			3.0	--	
6-----	.7			2.2	41	0.3	3.0		
7-----	.2			2.2			3.0		
8-----	.5			2.4			2.8	46	.4
9-----	.6	66	.1	2.4			2.8		
10-----	.5			2.4			2.6		
11-----	.5			2.2			2.8		
12-----	1.8	57	.3	2.2			2.6		
13-----	2.0			2.2	--		2.6		
14-----	2.2	--	1/.3	2.4	--		2.6		
15-----	2.0			2.4	38	1/.2	2.6		
16-----	1.2			2.6	--		2.4	31	.2
17-----	1.2			2.4	--		2.6		
18-----	1.6	63	.3	2.4			2.4		
19-----	1.6			2.6			2.6		
20-----	1.8			2.6	32	.2	2.6		
21-----	2.0			2.4			2.8		
22-----	2.0			2.2			3.0		
23-----	2.0			2.2			2.8		
24-----	2.4	52	.3	2.4			2.8	20	.2
25-----	2.6			2.4			2.8		
26-----	2.4			2.4	20	.1	3.0		
27-----	2.0			2.6			3.0		
28-----	2.2	44	.3	2.6			3.4		
29-----	2.2			2.8			3.4	--	1/.2
30-----	2.2			2.8			3.0		
31-----	2.0			--	--	--	3.0		
Total -	47.8	--	7.6	71.8	--	6.4	88.0	--	7.2
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3.0	75	0.6	4			100	270	73
2-----	3.0	60	.5	3.7			60	120	19
3-----	3.4	35	.3	3.7			12	132	4.3
4-----	3.4	12	.1	4.1	30	0.3	10	100	2.7
5-----	3.7	9	.1	4.1			8	99	2.1
6-----	4.4	11	.1	4.1				97	
7-----	12	70	2.3	4.4				--	
8-----	51	--	1/44	4.4	--	1/.5		--	
9-----	44	--	1/37	4.4			5	--	
10-----	26	--	1/19	4.4				70	1/1.1
11-----	50	--	1/46	4.4				68	
12-----	37	--	1/28	4.4				65	
13-----	19	--	1/9.7	4.8	34	.4		60	
14-----	17	135	6.2	4.8			104	1,100	2/1,020
15-----	10	112	3.0	4.8			687	--	1/3,620
16-----	8	95	2.1	10	60	1.6	1,100	1,200	3,560
17-----	8	85	1.8	18	125	6.1	1,440	1,050	4,080
18-----	7	78	1.5	13	90	3.2	544	1,840	2,410
19-----	6	--	1/1.0	9.4	80	2.0	142	2,050	786
20-----	6	--	1/.8	6.6	67	1.2	73	1,400	276
21-----				7.2	56	1.1	45	850	103
22-----				5.9	45	.7	24	--	1/36
23-----				6.2	32	.5	15	--	1/14
24-----				14	27	1.0	9.4	245	6.2
25-----				15	57	2.3	5.9	--	1/2.7
26-----				48	185	24	5.2		
27-----	4	31	.3	105	450	128	4.1		
28-----				137	470	174	4.1	65	.8
29-----				325	580	509	4.1		
30-----				--	--	--	4.1		
31-----				--	--	--	4.1		
Total -	365.9	--	207	784.8	--	860	4,445.0	--	16,030

1/Estimated.

2/Sediment discharge computed by subdividing day.

## PLATTE RIVER BASIN--Continued

## WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	Mean discharge (second-feet)	April		Mean discharge (second-feet)	May		Mean discharge (second-feet)	June	
		Suspended sediment			Suspended sediment			Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4.1	128	1.4	3.0	92	0.8	2.6	110	0.7
2-----	3.7			3.4			2.6		
3-----	3.7			4.4			2.2		
4-----	4.1			3.0			2.2		
5-----	4.4						2.2		
6-----	4.1	117	1.3	3	78	.6	2.2	96	.6
7-----	4.1						2.2		
8-----	4.1						2.4		
9-----	4.1			3.0			2.4		
10-----	4.1			3.7			2.2		
11-----	4.1	117	1.3	3.0	70	.5	2.2	96	.6
12-----	4.1			3.7			2.2		
13-----	4.1			4.4			2.2		
14-----	4.1			4.1			2.0		
15-----	3.7			4.4			2.0		
16-----	3.7	146	1.1	4.4	86	1.0	1.8	96	.6
17-----	3.7			4.8			4.7		
18-----	4.1			4.8			47		
19-----	4.1			2.8			19		
20-----	4.1			2.8			6.2		
21-----	4.1	146	1.1	2.6	70	.5	31	96	.6
22-----	4.1			2.2			25		
23-----	3.0			2.6			27		
24-----	2.0			2.4			226		
25-----	2.2			2.4			102		
26-----	2.0	146	1.1	2.2	115	.8	38	96	.6
27-----	2.6			2.4			116		
28-----	2.8			2.6			443		
29-----	2.6			2.4			166		
30-----	2.8			3.0			34		
31-----	--	--	--	2.8	--	--	--	--	--
Total-	108.5	--	38.0	99.3	--	23.5	1,320.5	--	13,130
		July		August		September			
		Mean concentration (ppm)	Tons per day						
1-----	13	800	28	119	3,190	2/1,260	0.6	140	0.2
2-----	7.2	--	1/8.2	88	4,150	2/1,120	.6	132	.2
3-----	4.4	--	1/3.0	49	--	1/384	.6	--	1/.2
4-----	3.7	145	1.4	24	--	1/57	.6	--	1/.2
5-----	3.7	120	1.2	21	--	1/31	.6	--	1/.2
6-----	3.4	77	.8	25	--	1/28	.6	74	.2
7-----	3.1			14	--	1/9.8	.8		
8-----	2.8			10	--	1/5.7	.7		
9-----	3.4			7.2	--	1/3.7	.7		
10-----	4.8			6.2	--	1/3.0	.8		
11-----	4.8	77	.8	6.2	--	1/2.8	.8	74	.2
12-----	4.8			7.7	--	1/3.3	.8		
13-----	4.4			26	--	1/119	.8		
14-----	4.4			144	--	1/1.630	.8		
15-----	3.4			73	--	1/434	.8		
16-----	4.1	150	2.1	37	--	1/180	.8	73	.2
17-----	5.2			12	1,160	38	.8		
18-----	4.4			5.9	600	9.6	.8		
19-----	10			3.4	350	3.2	.6		
20-----	11			3.0	--	1/1.5	.9		
21-----	32	--	1/396	2.8	--	1/1.0	1.4	--	1/.1
22-----	26	--	1/168	2.4	--	1/6	.6	--	
23-----	8.8	1,100	26	.4	--	1/1.1	.5	--	
24-----	4.4	--	1/9.5	.9	63	.2	.6	--	
25-----	3.7	--	1/6.0	.7	60	.1	.6	76	
26-----	2.8	--	1/3.4	.6	55	.1	.4	--	1/.1
27-----	2.4	270	1.7	9.2	--	1/5.0	.4	--	
28-----	6.0	--	1/55	5.2	--	1/3.7	.5	--	
29-----	457	6,000	2/6,100	1.8	--	1/.9	.6	--	
30-----	190	3,640	2/1,610	.9	162	.4	.6	--	
31-----	253	4,740	2/3,090	.6	150	.2	--	--	--
Total-	1,092.1	--	11,540	707.7	--	5,340	20.7	--	5.0
Total discharge for year (second-foot-days)-----									9,151.5
Total load for year (tons)-----									47,200

1/Estimated.

2/Sediment discharge computed by subdividing day.

PLATTE RIVER BASIN--Continued  
WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment														Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	* Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
Mar. 16, 1948	9:25 a. m.	896	814	635	37	48	69	78	87	94	97	99	100			BW	
Mar. 16	2:45 p. m.	1,220	1,280	809	23	36	53	68	82	92	98	99	100			BW	
Mar. 16	5:20 p. m.	1,460	1,300	1,030	27	40	55	70	81	87	92	97	100			BW	
Mar. 18	11:20 a. m.	42.1	6,290	3,770	32	62	94	98	100	--	--	--	--			BN	
June 18	11:20 a. m.	42.1	6,290	1,860	52	77	93	99	100	--	--	--	--			BW	
June 18	5:45 p. m.	17	3,240	1,800	63	79	94	98	99	100	--	--	--			BN	
June 20	3:45 p. m.	5.5	1,020	720	60	95	98	--	99	100	--	--	--			BN	
June 24	9:15 a. m.	222	6,840	2,350	35	50	69	82	93	98	99	100	--			BN	
June 24	9:15 a. m.	222	6,840	2,360	44	58	73	82	92	98	99	100	--			BN	
June 24	3:05 p. m.	279	4,760	1,510	48	58	73	81	90	98	99	100	--			BN	
June 24	3:05 p. m.	279	4,760	1,630	47	61	74	81	92	98	99	100	--			BW	
June 24	6:10 p. m.	293	3,180	2,130	45	61	72	80	90	98	100	--	--			BN	
June 25	7:35 a. m.	120	1,860	1,900	63	80	88	94	98	100	--	--	--			BN	
June 27	7:30 a. m.	32.8	2,470	1,970	45	71	96	100	--	--	--	--	--			BN	
June 27	4:30 p. m.	170	4,060	3,220	29	52	75	85	95	99	100	--	--			BN	
June 27	7:35 p. m.	218	6,680	2,610	42	60	80	90	97	99	100	--	--			BN	
June 27	7:35 p. m.	218	6,680	2,630	58	74	85	92	98	99	100	--	--			BWC	
June 28	7:20 a. m.	369	4,200	3,300	52	61	84	92	94	97	99	100	--			BN	
June 28	12:10 p. m.	427	3,680	2,700	--	--	86	91	96	98	99	100	--			BN	
June 28	7:40 p. m.	592	2,780	2,180	70	83	89	92	96	98	99	100	--			BN	
June 29	7:20 a. m.	166	2,420	1,920	55	80	92	96	99	99	100	--	--			BN	
June 30	8:10 p. m.	24	1,300	652	40	66	96	98	98	99	100	--	--			BN	
July 23	6:25 p. m.	6.6	870	637	62	84	89	92	96	97	98	100	--			BN	
July 29	8:10 a. m.	494	7,630	2,810	21	33	50	70	76	96	99	100	--			BN	
July 29	8:10 a. m.	494	7,630	2,840	41	50	64	76	88	98	100	--	--			BWC	

PLATTE RIVER BASIN--Continued  
WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
July 29, 1948	9:45 a. m.	536	6,780	2,310	27	43	62	77	94	99	100	--	--	--	--	BN
July 29	9:45 a. m.	536	6,780	2,430	44	57	72	84	95	98	99	100	--	--	--	BWC
July 29	1:20 p. m.	544	3,800	2,600	44	62	81	90	97	100	--	--	--	--	--	BN
July 29	7:15 p. m.	614	2,890	1,740	49	70	88	93	98	99	100	--	--	--	--	BN
July 30																
July 30	4:35 p. m.	114	4,560	3,550	23	37	88	96	99	99	100	--	--	--	--	BN
July 31	8:50 a. m.	240	5,180	3,830	27	47	79	93	99	100	--	--	--	--	--	BN
July 31	4:10 p. m.	304	2,760	1,560	47	67	85	93	98	100	--	--	--	--	--	BN
July 31	8:00 p. m.	310	3,220	--	39	60	79	88	95	98	99	--	--	--	--	BN
Aug. 2	3:00 p. m.	74	4,240	4,160	38	54	76	90	100	--	--	--	--	--	--	BN
Aug. 17	3:15 p. m.	10	1,030	708	67	86	96	--	99	100	--	--	--	--	--	BN

## PLATTE RIVER BASIN--Continued

## MIDDLE LOUP RIVER AT DUNNING, NEBR.

LOCATION.--Fifty feet upstream from gaging station at county bridge at north limits of Dunning, Blaine County, and 1½ miles upstream from Dismal River.

DRAINAGE AREA.--1,760 square miles of which about 80 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Sediment records: April 1946 to September 1948.

EXTREMES, April to September 1946.--Sediment loads: Maximum, 1,220 tons per day June 19 and Sept. 29; minimum, 391 tons per day July 30.

EXTREMES, water year 1946-47.--Sediment loads: Maximum, 2,770 tons per day June 12; minimum, 120 tons per day Feb. 13.

EXTREMES, water year 1947-48.--Sediment loads: Maximum, 2,610 tons per day Jan. 23; minimum, 122 tons per day Feb. 8.

EXTREMES, 1946-48.--Sediment loads: Maximum, 2,770 tons per day June 12, 1947; minimum, 120 tons per day, Feb. 13, 1947.

REMARKS.--Records of water discharge for water years October 1945 to September 1948 given in Water Supply Papers 1056, 1086, and 1116.

## Monthly and annual summary of water and suspended-sediment discharge, water years October 1945 to September 1948

Month	Water discharge (second- foot-days)	Runoff (acre-feet)	Load (tons)	Suspended sediment			Concentration, ppm.	
				Daily load, tons			Weighted mean	Maximum daily
				Mean	Maximum	Minimum		
1946								
January -----	--	--	--	--	--	--	--	--
February -----	--	--	--	--	--	--	--	--
March -----	--	--	--	--	--	--	--	--
April (11-30) -----	7,643	15,160	16,770	839	1,160	514	813	1,140
May -----	11,542	22,890	25,430	820	1,150	463	816	1,050
June -----	10,346	20,520	19,300	643	1,220	455	691	1,100
July -----	10,131	20,090	15,420	497	629	391	564	730
August -----	10,767	21,360	19,220	620	780	459	661	845
September -----	11,538	22,890	24,440	815	1,220	478	784	1,200
Apr. 11 to Sept. 30, 1946 -----	61,967	122,900	120,600	697	1,220	391	721	1,200
October -----	13,513	26,800	37,210	1,200	2,010	535	1,020	1,180
November -----	11,786	23,380	32,480	1,080	1,700	708	1,020	--
December -----	12,641	25,070	1/40,000	1,300	2,620	--	1,200	--
Calendar year 1946 --	141,877	281,400	--	--	--	--	--	--
January -----	12,070	23,940	1/14,000	450	1,480	--	430	--
February -----	10,472	20,770	21,060	752	1,380	120	745	1,590
March -----	12,424	24,640	40,470	1,310	1,720	851	1,210	1,560
April -----	12,292	24,380	41,750	1,390	2,530	658	1,260	2,120
May -----	11,565	22,940	28,660	942	1,760	467	918	1,800
June -----	13,556	26,890	39,870	1,330	2,770	563	1,090	1,960
July -----	11,193	22,290	18,930	611	1,010	338	626	995
August -----	10,563	20,950	14,460	466	767	332	507	794
September -----	10,899	21,620	21,330	711	1,300	337	725	1,140
Water year 1946-47 --	142,974	283,600	1/350,200	960	2,770	120	907	--
October -----	11,493	22,800	21,910	707	1,190	343	706	1,160
November -----	10,909	21,640	30,250	1,008	1,840	704	1,030	1,940
December -----	11,231	22,280	30,480	983	1,350	705	1,000	1,420
Calendar year 1947 --	138,667	275,000	1/323,200	885	2,770	120	863	2,120
January -----	12,404	24,600	36,860	1,189	2,610	135	1,100	2,260
February -----	10,731	21,280	20,800	717	1,960	122	718	1,660
March -----	12,014	23,830	41,520	1,339	2,550	478	1,280	2,620
April -----	11,430	22,870	28,700	957	1,780	575	930	1,580
May -----	10,943	21,710	14,830	478	801	328	502	815
June -----	10,260	20,350	17,640	588	1,090	352	637	1,160
July -----	11,180	22,180	19,400	626	1,310	397	643	1,040
August -----	11,100	22,020	19,350	624	1,160	406	646	1,160
September -----	10,850	21,520	16,850	652	929	383	575	930
Water year 1947-48 --	134,545	266,900	298,600	816	2,610	122	822	2,620

1/Includes estimated loads for missing days.

PLATTE RIVER BASIN--Continued  
MIDDLE LOUP RIVER AT DUNNING, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Suspended sediment											Methods of analysis
					Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 11, 1948-----	11:24 a. m.	347	734	1, 140				5	5	10	21	66	92			BN
May 25 -----	6:25 p. m.	325	480	831				8	9	14	39	94	99			BN
June 2 -----	3:25 p. m.	333	514	966				6	9	13	26	78	98			BN
June 3 -----	7:10 a. m.	347	614	1, 060				6	8	15	30	66	92			BN
June 15 -----	8:45 a. m.	350	574	1, 040				10	13	18	30	80	93			BN
July 30 -----	6:35 p. m.	367	393	791				13	14	20	32	84	98			BN
Aug. 10 -----	4:00 p. m.	361	398	842				10	12	18	30	72	96			BN
Sept. 21-----	4:45 p. m.	370	784	766				6	8	11	26	71	93			BN



## PLATTE RIVER BASIN--Continued

## MIDDLE LOUP RIVER AT ST. PAUL, NEBR.

LOCATION --At bridge on U. S. Highway 281 at St. Paul, Howard County, 600 feet downstream from gaging station, and 6 miles upstream from confluence with North Loup River.

DRAINAGE AREA --7,720 square miles of which only 3,200 square miles contribute directly to surface runoff.

RECORDS AVAILABLE. --Sediment records: April 1946 to September 1948.

EXTREMES, 1947-48. --Sediment loads: Maximum, 450,000 tons per day (estimated) Mar. 16; minimum, not determined.

EXTREMES, 1946-48. --Sediment loads: Maximum, 1,600,000 tons per day June 23, 1947; minimum, 63 tons per day Jan. 31, 1947.

REMARKS. --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 8, 1948-----	941	8.3	272	62	0.08	38	4.9	12		1/162	3.2	1.0	0.2	3.2	0.01	230	0.31		115		18
June 22-----	3,880	8.3	191	34	.07	23	2.0	16		103	8.8	1.0		5.4	--	165	.22		66	0	34
July 20-----	2,020	7.5	235	33	.08	34	4.4	9.2		138	5.6	1.0	.3	2.3	.04	182	.25		103	0	16
July 29-----	2,990	7.1	157	31	.02	29	2.9	8.2		92	6.4	1.0	.1	1.3	.12	129	.18		67	0	21
Aug. 13-----	5,070	7.5	174	28	.02	22	2.0	12		101	3.2	1.0	.1	1.4	.03	142	.19		63	0	29

1/Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	981	480	1,270	1,110	658	1,970	1,360	1,450	5,320
2-----	971	580	1,520	1,080	620	1,810	1,320	--	1/5,420
3-----	863	530	1,230	1,030	470	1,310	1,260	--	1/5,000
4-----	816	485	1,070	1,120	435	1,320	970	1,250	3,270
5-----	788	480	1,020	1,360	845	3,100	640	940	1,620
6-----	762	380	782	1,290	890	3,100	590	--	--
7-----	727	342	671	1,280	900	3,110	650	--	--
8-----	844	412	939	1,280	--	--	710	--	--
9-----	863	390	909	1,190	--	--	710	--	--
10-----	780	388	817	1,150	--	--	700	--	--
11-----	727	407	799	1,140	--	--	660	--	--
12-----	788	415	883	1,120	--	--	750	1,750	3,540
13-----	844	--	1/1,060	981	--	--	800	--	1/3,720
14-----	911	535	1,320	1,030	--	--	880	1,690	4,020
15-----	863	590	1,370	951	--	--	1,020	--	1/4,350
16-----	788	458	974	941	--	--	1,060	--	1/4,240
17-----	816	--	1/991	921	--	--	1,120	--	1/4,080
18-----	882	478	1,140	1,120	--	--	1,150	1,250	3,880
19-----	891	470	1,130	1,140	1,350	4,160	1,130	--	--
20-----	931	402	1,010	1,160	1,190	3,730	1,080	--	--
21-----	941	--	1/1,010	1,220	--	1/3,950	1,140	--	--
22-----	835	400	902	1,290	--	1/6,100	1,100	--	--
23-----	901	428	1,040	1,090	3,800	11,200	1,080	--	--
24-----	1,010	570	1,550	970	3,800	9,950	1,240	1,610	5,390
25-----	1,030	720	2,000	980	--	1/6,350	1,300	--	--
26-----	981	480	1,220	1,130	2,220	6,770	1,330	--	--
27-----	1,080	637	1,860	1,370	1,800	6,660	1,380	--	--
28-----	1,060	815	2,330	1,160	1,380	4,320	1,800	--	--
29-----	951	470	1,210	1,340	11,200	4,340	1,780	--	--
30-----	991	450	1,200	1,380	--	1/4,770	1,430	--	--
31-----	941	507	1,290	--	--	--	870	--	--
Total -	27,557	--	36,520	34,224	--	2/117,000	33,010	--	2/148,000
Day	January			February			March		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	820	--	--	590	--	--	3,080	--	--
2-----	740	--	--	640	--	--	1,640	4,700	20,800
3-----	720	--	--	730	--	--	1,530	--	--
4-----	930	--	--	840	--	--	1,580	--	--
5-----	1,560	--	--	880	--	--	1,380	--	--
6-----	2,310	--	--	910	--	--	1,330	--	--
7-----	2,460	--	--	880	--	--	1,040	--	--
8-----	1,710	1,300	6,020	840	--	--	890	--	--
9-----	1,720	--	--	880	--	--	860	--	--
10-----	1,410	--	--	880	--	--	670	--	--
11-----	1,400	--	--	570	--	--	670	--	--
12-----	1,290	--	--	620	--	--	690	--	--
13-----	1,180	--	--	770	140	291	750	--	--
14-----	910	--	--	820	--	--	860	--	--
15-----	770	--	--	700	--	--	3,500	--	--
16-----	560	--	--	750	--	--	16,000	--	--
17-----	540	--	--	1,030	--	--	10,900	--	--
18-----	560	--	--	1,400	580	2,190	5,200	7,240	102,000
19-----	620	--	--	2,190	--	--	3,440	--	--
20-----	650	--	--	2,030	--	--	3,180	--	--
21-----	680	--	--	1,660	--	--	2,530	--	--
22-----	940	--	--	1,450	--	--	1,930	--	--
23-----	990	--	--	1,340	--	--	1,780	--	--
24-----	990	--	--	1,150	210	652	1,560	--	--
25-----	930	--	--	1,170	--	--	1,580	1,170	4,990
26-----	810	--	--	1,700	--	--	1,560	--	--
27-----	630	--	--	4,000	--	--	1,480	--	--
28-----	710	--	--	9,000	--	--	1,310	--	--
29-----	700	--	--	6,000	--	--	1,160	--	--
30-----	620	--	--	--	--	--	1,060	1,300	3,720
31-----	690	--	--	--	--	--	1,160	1,650	5,170
Total -	31,550	--	2/112,000	46,420	--	2/560,000	76,300	--	2/1,300,000

1/Estimated.

2/Includes estimated loads for missing days.

## PLATTE RIVER BASIN--Continued

## MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948 --Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,170	1,770	5,590	1,030	480	1,330	971	670	1,760
2-----	1,200	1,620	5,250	1,050	630	1,790	616	550	1,210
3-----	1,040	1,400	3,930	1,280	1,140	3,940	702	480	910
4-----	971	1,450	3,800	1,090	620	1,820	671	430	779
5-----	1,080	1,250	3,640	961	630	1,630	671	460	833
6-----	1,020	1,200	3,300	1,150	965	3,000	671	460	833
7-----	1,090	1,670	4,910	1,190	1,020	3,280	771	1,040	2,160
8-----	1,090	1,150	3,380	931	560	1,410	931	2,160	5,430
9-----	1,040	1,300	3,650	825	470	1,050	762	1,180	2,430
10-----	961	1,180	3,060	853	600	1,380	871	540	978
11-----	1,010	940	2,560	1,010	970	2,650	640	350	605
12-----	1,060	840	2,400	921	760	1,890	727	690	1,350
13-----	1,080	800	2,330	844	570	1,300	835	920	2,070
14-----	1,020	820	2,260	736	450	894	941	1,250	3,180
15-----	1,010	950	2,590	736	380	755	806	620	1,350
16-----	911	650	1,600	727	330	648	762	470	967
17-----	911	620	1,530	727	310	608	991	1,220	3,260
18-----	921	750	1,870	679	420	772	1,690	4,300	19,600
19-----	951	1,130	2,900	625	400	675	1,320	2,570	9,160
20-----	961	1,280	3,320	556	280	420	1,320	1,700	6,060
21-----	1,080	840	2,450	543	270	396	1,510	2,100	8,560
22-----	1,020	840	2,310	531	320	459	4,130	7,680	3/85,300
23-----	951	840	2,160	597	520	838	2,830	5,500	3/43,600
24-----	921	570	1,420	648	380	665	2,140	4,790	3/29,500
25-----	1,040	650	1,830	710	390	748	1,860	2,600	13,100
26-----	1,190	1,270	4,080	780	700	1,470	2,610	3,350	3/30,000
27-----	1,120	800	2,420	788	570	1,210	7,460	9,100	3/191,000
28-----	1,190	1,000	3,210	745	390	784	4,680	6,740	3/88,400
29-----	1,030	590	1,640	727	530	1,040	2,220	3,500	21,000
30-----	941	510	1,300	911	--	2,240	1,360	2,150	7,890
31-----	--	--	--	991	660	1,770	--	--	--
Total -	30,980	--	86,690	25,892	--	42,860	48,469	--	583,300

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	991	1,550	4,150	2,060	2,750	15,300	562	340	516
2-----	835	1,170	2,640	2,240	4,950	29,900	562	290	440
3-----	797	1,080	2,320	2,300	7,460	46,300	569	310	476
4-----	762	650	1,340	1,550	4,000	16,700	562	325	493
5-----	719	530	1,030	1,370	2,200	8,140	537	340	493
6-----	719	460	893	1,240	1,400	4,690	543	410	601
7-----	687	410	761	1,140	1,050	3,230	604	645	1,050
8-----	632	480	819	1,360	2,350	8,630	788	1,150	2,450
9-----	702	530	1,000	1,410	2,950	11,200	941	760	1,930
10-----	762	530	1,090	1,310	2,650	9,370	780	485	1,020
11-----	719	580	1,130	1,150	2,070	6,430	736	425	844
12-----	702	380	720	1,490	2,030	3/8,540	687	410	761
13-----	694	420	787	3,720	9,280	3/94,700	655	425	752
14-----	710	380	728	2,070	5,580	3/31,900	663	425	761
15-----	648	320	560	2,300	4,880	3/30,600	625	335	565
16-----	663	330	591	1,820	4,730	3/23,700	576	255	397
17-----	702	350	663	1,880	3,180	16,100	550	340	505
18-----	814	398	3/924	1,330	2,160	7,760	556	410	615
19-----	3,110	8,990	3/77,800	1,280	1,890	6,530	569	460	707
20-----	1,840	5,260	3/26,600	951	1,050	2,700	576	510	793
21-----	1,290	2,900	3/10,200	882	910	2,170	611	530	874
22-----	981	1,850	4,900	853	760	1,750	655	490	867
23-----	806	1,200	2,610	816	585	1,290	702	445	843
24-----	754	870	1,770	788	420	893	687	420	779
25-----	687	550	1,020	663	340	609	727	405	795
26-----	679	450	825	590	425	677	806	560	1,220
27-----	632	480	819	618	460	768	797	615	1,320
28-----	620	788	3/1,550	671	465	842	745	600	1,210
29-----	3,980	8,850	3/102,000	648	462	808	745	580	1,170
30-----	3,620	7,110	3/72,000	648	440	770	745	560	1,130
31-----	2,720	4,000	29,400	604	340	554	--	--	--
Total -	34,977	--	353,600	41,752	--	393,600	19,861	--	26,400

Total discharge for year (second-foot-days)-----450,992

Total load for year (tons)-----3,760,000

3/Sediment discharge computed by subdividing day.

PLATTE RIVER BASIN--Continued  
MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
May 9, 1948	2:40 p. m.	885	444	1,050	--	--	10	18	20	45	66	90	99		BN
May 19	7:45 a. m.	682	383	833	--	--	18	23	33	47	61	95	--		BN
June 8	2:45 p. m.	872	2,780	6,640	--	29	51	70	77	82	87	93	--		BN
June 15	9:00 a. m.	806	592	1,380	--	--	16	26	41	55	63	96	--		BN
June 18	7:30 a. m.	1,660	4,440	9,690	--	32	48	58	62	76	87	95	99		BN
June 18	6:00 p. m.	1,780	4,670	5,290	--	30	45	58	67	77	84	95	99		BN
June 21	7:30 a. m.	1,340	1,130	2,850	--	--	23	28	34	45	57	94	--		BN
July 6	3:30 p. m.	762	462	1,070	--	--	23	31	44	56	66	86	--		BN
July 16	7:50 a. m.	648	821	1,880	--	--	16	24	39	61	70	94	--		BN
July 29	1:15 p. m.	3,340	6,720	9,390	17	24	35	45	56	81	92	98	--		BN
July 29	5:00 p. m.	6,990	8,810	2,860	13	19	26	37	51	76	88	94	--		BN
July 29	7:20 p. m.	5,730	9,820	4,070	20	26	37	46	59	78	87	96	--		BN
July 30	11:25 a. m.	3,090	7,440	9,800	13	24	44	50	60	70	76	93	--		BN
July 31	7:50 a. m.	2,850	4,110	6,240	18	33	55	63	70	80	86	98	--		BN
Aug. 1	9:40 a. m.	2,000	2,540	7,520	22	32	48	55	62	70	76	86	--		BN
Aug. 2	8:15 a. m.	1,970	3,550	9,980	16	30	50	61	70	78	81	96	--		BN
Aug. 3	2:570	2,570	7,390	10,100	16	27	38	46	55	71	81	90	--		BN
Aug. 4	7:50 a. m.	1,690	4,050	11,700	13	24	45	50	55	64	67	87	--		BN
Aug. 6	1:15 p. m.	1,230	1,270	2,970	16	23	31	37	43	53	62	95	--		BN
Aug. 7	8:00 a. m.	1,150	1,000	2,750	14	18	24	30	34	47	51	86	--		BN
Aug. 8	10:30 a. m.	1,520	2,980	7,060	12	20	26	34	41	56	67	75	--		BN
Aug. 9	7:55 a. m.	1,510	3,060	8,110	15	29	38	52	63	73	77	92	--		BN
Aug. 12	8:00 a. m.	1,360	1,680	5,130	15	25	31	41	53	69	77	92	--		BN
Aug. 14	7:45 a. m.	2,100	3,990	12,800	20	32	38	45	54	67	78	82	--		BN
Aug. 17	7:45 a. m.	2,140	3,260	9,460	17	26	42	48	56	70	80	96	--		BN
Aug. 25	12:00 m.	663	338	821	--	--	37	41	55	70	76	97	--		BN
Sept. 5	5:10 p. m.	537	344	871	--	--	23	29	42	59	68	90	--		BN
Sept. 9	1:20 p. m.	901	663	1,700	--	--	17	22	37	59	69	95	--		BN
Sept. 16	4:20 p. m.	597	288	808	--	--	3	14	26	45	53	82	--		BN

## PLATTE RIVER BASIN--Continued

## SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.

LOCATION.--At gaging station at county highway bridge, 0.8 mile northeast of St. Michael, Buffalo County, and 5 miles upstream from Sweet Creek. DRAINAGE AREA.--2 560 square miles of which only about 1 650 square miles contribute directly to surface runoff. RECORDS AVAILABLE.--Sediment records: June 1946 to September 1948. EXTREMES, 1947-48.--Sediment loads: Maximum, 99 200 tons per day June 27; minimum, 22 tons per day Jan. 27. EXTREMES, 1946-48.--Sediment loads: Maximum, 672 000 tons per day June 22, 1947; minimum, 22 tons per day Jan. 27, 1948. REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
June 22, 1948 -----	1,190	8.5	285	38	0.04	40	6.0	8.8		1/158	4.0	1.3	0.8	7.1	--	218	0.30		124	0
July 18 -----	2,000	7.1	264	34	.18	39	6.0	9.0		158	8.0	1.0	.4	1.6	0.06	206	.28		122	0
July 29 -----	1,900	7.2	268	36	.30	32	5.5	16		152	11	.2	.3	.8	.07	204	.28		102	0
																				25

1/Includes equivalent of 11 parts per million of carbonate (CO<sub>3</sub>).

## PLATTE RIVER BASIN--Continued

## SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	146	210	83	162	173	76	198	282	151
2-----	144	228	89	162	187	82	190	274	141
3-----	144	223	87	162	178	78	188	330	168
4-----	151	219	89	193	254	132	190	47524	244
5-----	148	220	88	186	242	122	220	538	320
6-----	146	225	89	186	208	104	190	450	231
7-----	142	216	83	193	463	241	190	470	241
8-----	148	203	81	193	421	219	170	620	285
9-----	146	208	82	188	366	186	120	790	256
10-----	144	199	77	193	313	163	110	1,460	434
11-----	144	183	71	193	258	134	110	625	186
12-----	140	197	74	193	330	172	110	312	93
13-----	142	200	77	196	448	237	160	292	126
14-----	142	200	77	198	380	203	170	198	91
15-----	148	200	80	200	319	172	180	200	97
16-----	151	190	77	200	319	172	180	108	52
17-----	151	154	63	203	277	152	190	115	59
18-----	146	133	52	198	315	168	200	155	84
19-----	146	155	61	200	337	182	200	152	82
20-----	148	173	69	206	374	208	220	325	193
21-----	140	248	94	214	315	182	240	362	235
22-----	144	201	78	214	750	433	240	190	123
23-----	148	180	72	219	880	520	230	127	79
24-----	142	180	69	222	590	354	240	137	69
25-----	142	180	69	230	405	252	250	138	93
26-----	142	180	69	225	400	243	240	500	324
27-----	142	225	86	208	395	222	250	395	267
28-----	146	242	95	190	410	210	250	510	344
29-----	146	176	69	190	308	158	260	470	330
30-----	148	207	83	190	290	149	240	188	122
31-----	148	166	66	--	--	--	170	154	71
Total -	4,505	--	2,400	5,907	--	5,930	6,096	--	5,610
Day	January			February			March		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	210	107	61	190	999	99	766	750	1,550
2-----	230	128	79	210	95	54	418	360	406
3-----	200	75	40	220	114	68	395	500	533
4-----	240	120	78	230	80	50	270	875	638
5-----	260	132	93	230	82	51	216	975	569
6-----	280	220	166	230	64	40	230	975	605
7-----	260	455	319	230	64	40	233	650	409
8-----	230	535	332	230	82	51	250	550	371
9-----	270	748	545	230	80	50	252	550	374
10-----	300	573	464	220	72	43	164	390	173
11-----	270	--	1/299	220	69	41	160	125	54
12-----	230	282	175	230	93	58	160	136	59
13-----	170	185	85	210	78	44	180	459	223
14-----	140	195	74	190	62	32	225	480	292
15-----	170	470	216	210	64	36	2,590	2,760	2/28,000
16-----	140	360	136	280	98	74	5,840	4,560	2/70,900
17-----	140	200	76	350	190	180	3,640	6,040	59,400
18-----	140	115	43	500	260	351	1,910	4,320	22,300
19-----	130	148	52	480	198	257	1,010	2,360	6,440
20-----	140	370	140	500	172	232	745	1,220	2,450
21-----	190	665	341	430	168	195	575	748	1,160
22-----	180	840	408	340	184	169	490	675	893
23-----	170	460	211	270	170	124	414	626	700
24-----	170	190	87	220	145	86	376	558	566
25-----	150	93	38	250	133	90	334	551	497
26-----	140	63	24	280	218	165	330	710	633
27-----	140	57	22	1,100	1,200	2/4,060	323	695	606
28-----	170	90	41	1,570	2,700	11,400	301	630	512
29-----	170	130	60	1,150	1,680	5,220	285	517	398
30-----	170	103	47	--	--	--	285	446	345
31-----	170	78	36	--	--	--	285	427	329
Total -	5,970	--	4,790	11,000	--	23,310	23,652	--	202,400

1/Estimated.

2/Sediment discharge computed by subdividing day.

## PLATTE RIVER BASIN--Continued

## SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	285	449	346	219	188	111	219	690	408
2-----	261	362	255	211	162	92	196	365	193
3-----	244	378	249	233	323	203	180	250	122
4-----	216	428	250	233	326	205	171	170	78
5-----	216	362	211	203	304	167	171	152	70
6-----	211	298	170	222	297	178	171	300	139
7-----	206	285	159	214	268	155	341	11,500	2/10,600
8-----	216	275	160	214	219	127	183	3,650	1,800
9-----	216	243	142	200	168	91	153	950	392
10-----	208	243	136	200	135	73	144	430	167
11-----	219	400	237	200	140	76	140	380	144
12-----	227	340	208	196	176	93	176	780	371
13-----	233	287	181	198	186	99	203	1,250	685
14-----	225	286	174	198	176	94	188	800	406
15-----	225	261	159	190	184	94	173	410	192
16-----	225	292	177	190	183	94	169	346	158
17-----	225	251	152	183	185	91	203	1,800	987
18-----	209	306	173	171	204	94	225	3,800	2,310
19-----	208	252	142	164	347	154	198	1,200	642
20-----	208	212	119	155	299	125	236	800	510
21-----	211	230	131	155	176	74	337	3,700	3,370
22-----	211	285	162	148	188	75	907	7,830	2/23,700
23-----	211	277	158	155	195	82	844	8,000	18,200
24-----	211	325	185	148	191	76	820	7,000	15,500
25-----	214	358	207	151	207	84	590	3,100	4,940
26-----	216	336	196	151	195	80	471	2,500	3,180
27-----	208	242	136	148	185	74	2,330	14,600	2/99,200
28-----	214	175	101	151	180	73	1,570	8,400	35,600
29-----	214	130	75	146	185	73	796	3,750	8,060
30-----	214	162	94	216	630	367	537	--	1/2,320
31-----	--	--	--	227	700	429	--	--	--
Total -	6,607	--	5,240	5,790	--	3,900	13,042	--	234,400
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	351	900	853	542	3,520	5,150	116	280	88
2-----	214	760	439	696	4,450	8,360	114	302	93
3-----	178	530	255	625	5,700	9,620	114	305	94
4-----	166	455	204	391	3,700	3,910	114	302	93
5-----	157	436	185	307	2,230	1,850	106	--	1/86
6-----	146	378	149	261	1,140	803	118	300	96
7-----	142	344	132	244	800	527	122	300	99
8-----	137	320	118	340	2,750	2,520	131	400	141
9-----	140	336	127	418	5,450	6,150	133	590	212
10-----	142	338	130	467	5,300	6,680	131	520	184
11-----	144	380	148	334	3,200	2,890	125	360	122
12-----	144	387	150	347	4,350	4,080	125	345	116
13-----	146	330	130	1,120	7,450	2/31,100	120	345	112
14-----	146	272	107	844	5,650	12,900	116	260	81
15-----	146	286	113	947	7,840	2/24,800	114	240	74
16-----	142	289	111	874	7,000	16,500	104	285	80
17-----	137	268	99	546	4,100	6,040	101	215	59
18-----	770	5,700	2/22,300	488	3,600	4,740	101	165	45
19-----	2,050	12,800	2/72,000	298	1,700	1,370	106	195	56
20-----	982	5,950	15,800	225	940	571	112	210	64
21-----	450	4,200	5,100	199	470	253	118	215	68
22-----	250	2,470	1,670	178	500	240	118	190	61
23-----	214	1,420	820	157	365	155	127	210	72
24-----	173	855	399	148	330	132	127	217	74
25-----	153	585	242	137	312	115	131	280	99
26-----	142	540	207	131	325	115	116	255	80
27-----	131	495	175	140	405	153	120	195	63
28-----	125	495	167	140	410	155	120	200	65
29-----	1,380	9,930	2/49,900	140	390	147	122	260	86
30-----	1,280	7,000	24,200	129	340	118	125	235	79
31-----	796	4,000	8,600	122	300	99	--	--	--
Total -	11,674	--	11,935	11,935	--	151,500	3,547	--	2,740

Total discharge for year (second-foot-days) ----- 109,725  
 Total load for year (tons)----- 847,200

1/Estimated.

2/Sediment discharge computed by subdividing day.

## PLATTE RIVER BASIN--Continued

## SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment												Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Mar. 16, 1948	9:15 a.m.	6,330	3,760	2,140	--	35	44	51	62	68	74	86	95		BW
Mar. 16	11:05 a.m.	6,350	3,090	2,200	22	30	38	47	62	68	75	95	99		BW
Mar. 16	12:55 p.m.	6,150	5,640	5,430	--	15	21	27	34	46	57	84	100		BW
May 6	12:20 p.m.	203	202	427	--	5	20	84	97	90	91	96	99		EN
May 17	11:35 a.m.	180	184	350	--	--	12	28	51	80	82	91	96		EN
May 26	11:20 a.m.	148	173	273	--	--	7	30	67	83	90	94	97		EN
June 7	7:30 a.m.	276	7,280	4,990	11	21	58	86	92	95	98	99	100		EN
June 7	11:30 a.m.	450	11,100	3,650	9	23	52	73	88	97	99	100	--		EN
June 7	1:05 p.m.	387	17,300	9,470	18	31	41	48	54	60	61	72	92		BW
June 7	1:30 p.m.	387	11,800	2,790	18	35	60	78	89	97	99	100	--		EN
June 7	4:30 p.m.	294	10,400	3,370	13	33	64	81	92	96	97	99	100		EN
June 18	11:55 a.m.	241	4,900	3,330	15	33	74	89	94	97	97	99	100		EN
June 18	7:30 p.m.	219	2,610	1,760	22	44	82	96	99	99	100	--	--		EN
June 22	6:30 a.m.	344	1,900	1,340	27	38	53	62	74	85	92	96	98		EN
June 22	11:30 a.m.	735	5,180	3,460	12	23	36	44	59	78	86	95	98		EN
June 22	12:27 p.m.	874	10,600	3,570	32	45	58	71	83	92	97	99	100		BW
June 22	6:15 p.m.	1,420	9,510	5,730	10	19	31	43	59	81	94	99	100		EN
June 22	8:00 p.m.	1,420	12,000	4,200	20	29	38	47	62	80	95	99	100		EN
June 22	8:00 p.m.	1,420	12,000	4,210	24	32	41	50	63	83	97	99	100		BW
June 24	9:00 a.m.	952	9,760	6,900	11	20	45	58	68	82	92	98	100		EN
June 24	1:35 p.m.	910	6,440	8,120	11	20	56	63	70	86	92	98	99		EN
June 24	1:35 p.m.	910	6,440	7,980	31	44	55	62	69	83	94	99	100		BW
June 24	4:10 p.m.	838	4,330	2,990	21	41	58	65	75	90	96	99	100		EN
June 27	5:30 a.m.	2,270	13,300	5,550	17	24	35	47	65	87	96	99	100		BW
June 27	8:45 a.m.	3,050	19,400	6,100	23	28	41	48	58	73	81	93	98		BW
June 27	2:10 p.m.	2,760	15,400	4,690	21	29	34	41	48	61	73	90	98		BW
June 27	4:20 p.m.	2,470	20,200	5,710	10	16	32	38	45	60	73	91	98		EN
June 27	4:20 p.m.	2,470	20,200	5,810	18	23	31	37	43	56	70	88	96		BW



June 28	8:50 a. m.	1,700	9,110	6,500	12	22	45	55	62	74	83	94	99	BN
July 6	10:10 a. m.	135	271	735	--	--	19	40	73	94	93	99	100	BN
July 18	9:00 a. m.	162	361	866	--	--	47	60	81	89	86	99	100	BN
July 18	7:30 p. m.	2,000	12,000	8,320	5	12	47	37	67	89	97	99	100	BN
July 19	9:00 a. m.	2,200	12,400	9,540	6	14	39	50	62	86	95	98	99	BN
July 19	6:15 p. m.	1,860	10,300	8,110	9	19	39	44	53	70	78	91	99	BN
July 21	11:00 a. m.	1,467	4,330	5,360	4	30	77	82	88	93	97	99	100	BN
July 28	10:30 a. m.	127	357	640	--	--	27	46	72	88	95	100	--	BN
July 29	8:00 a. m.	790	7,850	5,250	4	6	12	24	51	76	93	98	100	BN
July 29	7:00 p. m.	2,200	13,600	8,590	8	16	36	45	58	81	83	90	98	BN
Aug. 3	6:20 p. m.	585	5,120	10,500	6	14	61	73	79	92	96	98	99	BN
Aug. 9	10:30 a. m.	455	5,310	6,870	29	44	56	67	78	91	94	97	99	BN
Aug. 9	11:45 a. m.	450	5,340	3,340	22	37	55	67	80	91	94	97	99	BN
Aug. 13	6:30 p. m.	1,460	9,140	6,470	19	31	45	54	67	90	98	99	100	BN
Aug. 15	4:15 p. m.	1,530	10,300	6,650	13	24	40	52	68	86	92	98	100	BN
Aug. 15	5:20 p. m.	1,430	14,200	9,980	8	15	24	32	42	66	77	91	98	BN
Aug. 15	7:05 p. m.	1,330	11,300	6,510	13	25	43	53	65	84	89	96	99	BN
Aug. 17	6:15 p. m.	505	3,540	8,310	20	35	60	71	78	86	89	97	99	BN
Aug. 25	3:25 p. m.	135	322	753	--	--	38	53	79	94	97	99	100	BN
Sept. 1	9:40 a. m.	116	298	487	--	--	52	65	82	93	97	99	100	BN
Sept. 17	10:30 a. m.	101	178	383	--	--	50	65	83	91	96	98	99	BN
Sept. 23	3:50 p. m.	118	210	425	--	--	44	56	74	88	93	98	99	BN

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## NORTH LOUP RIVER NEAR ST. PAUL, NEBR.

LOCATION.--At bridge on U. S. Highway 281, 3 miles north of St. Paul, Howard County.

DRAINAGE AREA.--4,460 square miles of which only 1,270 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Sediment records: April 1946 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 364,000 tons per day June 17; minimum, not determined.

EXTREMES, 1946-48.--Sediment loads: Maximum, 463,000 tons per day June 22, 1947; minimum, 52 tons per day Aug. 9, 1947.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	724	320	626	850	1,220	2,800	990	415	1,110
2-----	742	340	681	870	470	1,100	1,000	--	1/1,090
3-----	751	255	517	890	425	1,020	940	--	1/1,040
4-----	751	245	497	940	450	1,140	660	--	1/988
5-----	715	--	1/463	1,000	470	1,270	410	560	620
6-----	662	245	438	1,050	490	1,390	380	--	--
7-----	653	295	520	1,010	498	1,360	560	--	--
8-----	636	310	532	980	500	1,320	600	--	--
9-----	636	300	515	930	502	1,260	730	--	--
10-----	636	305	524	890	505	1,210	830	--	--
11-----	636	315	541	850	510	1,170	850	490	1,120
12-----	636	320	550	890	515	1,240	860	--	1/1,670
13-----	653	330	582	890	525	1,260	900	--	1/2,310
14-----	662	340	608	890	635	1,530	970	815	2,130
15-----	670	345	624	910	760	1,870	1,100	--	1/2,050
16-----	715	355	685	890	810	1,950	1,100	--	1/1,750
17-----	715	--	1/695	860	780	1,810	1,050	--	1/1,420
18-----	715	355	685	860	710	1,650	1,000	430	1,160
19-----	697	--	1/565	870	615	1,440	1,050	--	1/1,250
20-----	715	260	502	910	535	1,310	1,050	--	1/1,310
21-----	715	258	498	1,030	780	2,170	1,100	--	1/1,440
22-----	715	255	492	970	--	1/2,490	1,150	--	1/1,580
23-----	715	250	483	760	1,060	2,180	1,200	--	1/1,720
24-----	706	250	477	730	1,230	2,420	1,250	555	1,870
25-----	706	335	639	710	--	1/1,650	1,300	--	--
26-----	706	405	772	910	630	1,550	1,400	--	--
27-----	706	380	724	900	580	1,410	1,450	--	--
28-----	715	330	637	880	535	1,270	1,450	--	--
29-----	742	284	569	970	495	1,300	1,450	--	--
30-----	780	280	590	1,000	--	1/1,230	1,250	--	--
31-----	1,190	2,180	7,000	--	--	--	780	--	--
Total -	22,116	--	24,230	27,090	--	46,770	30,790	--	2/48,200

1/Estimated.

2/Includes estimated loads for missing days.

## PLATTE RIVER BASIN--Continued

## NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	170	--	--	710	--	--	1,650	--	--
2-----	210	--	--	740	--	--	1,150	543	1,690
3-----	310	--	--	800	--	--	1,100	--	--
4-----	750	--	--	840	--	--	1,000	--	--
5-----	1,050	--	--	870	260	611	960	--	--
6-----	1,200	--	--	870	--	--	890	--	--
7-----	1,150	--	--	860	--	--	810	--	--
8-----	1,150	536	1,660	870	--	--	920	--	--
9-----	1,250	--	--	800	--	--	880	--	--
10-----	1,250	--	--	640	--	--	730	--	--
11-----	1,150	--	--	540	--	--	620	--	--
12-----	1,100	--	--	540	--	--	550	--	--
13-----	1,000	554	1,500	480	--	--	690	--	--
14-----	790	--	--	480	--	--	2,100	--	--
15-----	740	--	--	530	--	--	5,550	--	--
16-----	650	--	--	640	--	--	4,040	--	--
17-----	600	--	--	1,150	--	--	2,740	--	--
18-----	540	--	--	1,800	--	--	1,840	--	--
19-----	500	--	--	1,550	--	--	1,520	--	--
20-----	540	--	--	1,400	--	--	1,280	--	--
21-----	640	--	--	1,300	--	--	1,250	--	--
22-----	620	--	--	1,300	--	--	1,200	--	--
23-----	640	--	--	1,100	--	--	1,150	--	--
24-----	590	--	--	1,000	--	--	1,100	723	2,150
25-----	490	--	--	1,050	--	--	1,040	--	--
26-----	480	--	--	1,100	199	591	1,170	--	--
27-----	520	--	--	3,700	--	--	1,100	--	--
28-----	650	170	298	5,200	--	--	1,030	--	--
29-----	680	--	--	2,600	--	--	970	--	--
30-----	630	--	--	--	--	--	1,010	--	--
31-----	680	--	--	--	--	--	1,080	835	2,430
Total -	22,720	--	2/22,900	35,460	--	2/365,000	43,120	--	2/754,000
Day	April			May			June		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	1,060	635	2,390	780	300	632	585	340	537
2-----	1,030	675	1,880	780	340	716	553	335	500
3-----	1,000	560	1,510	800	358	773	513	310	429
4-----	1,000	510	1,380	830	425	952	482	380	495
5-----	1,000	490	1,320	780	405	853	452	380	464
6-----	950	540	1,390	840	600	1,360	452	290	354
7-----	920	645	1,600	960	710	1,840	452	335	409
8-----	930	730	1,830	850	605	1,390	445	250	300
9-----	860	620	1,440	770	497	1,030	423	210	240
10-----	860	695	1,610	760	455	934	354	195	186
11-----	760	632	1,300	760	560	1,150	308	195	162
12-----	760	565	1,160	706	500	953	452	720	879
13-----	780	500	1,050	644	345	800	505	1,050	1,430
14-----	800	540	1,170	594	225	360	561	580	879
15-----	810	490	1,070	561	220	333	553	330	493
16-----	770	405	842	545	247	363	1,170	2,550	3/17,200
17-----	742	380	761	529	210	300	7,530	16,500	3/364,000
18-----	742	435	871	490	175	232	2,140	4,900	3/30,900
19-----	742	460	922	452	160	195	1,220	1,390	4,580
20-----	724	482	942	430	185	215	1,220	1,490	4,910
21-----	742	505	1,012	381	150	154	1,600	2,580	3/12,600
22-----	760	465	954	367	145	144	2,280	6,890	3/42,500
23-----	760	435	893	423	190	217	1,860	3,380	17,000
24-----	697	365	724	529	305	436	1,500	1,800	7,280
25-----	890	879	2,110	529	287	410	1,280	880	2,990
26-----	910	710	1,740	569	290	446	1,800	4,950	3/47,600
27-----	860	540	1,250	610	345	568	2,440	12,700	3/88,800
28-----	940	744	1,890	594	312	500	1,270	2,700	9,260
29-----	880	530	1,260	569	255	392	1,100	1,000	2,970
30-----	800	320	690	636	--	1/618	1,020	705	1,940
31-----	--	--	--	670	415	751	--	--	--
Total -	25,479	--	38,960	19,738	--	19,820	36,480	--	662,300

1/Estimated.

2/Includes estimated loads for missing days.

3/Sediment discharge computed by subdividing day.

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	930	535	1,340	940	3,210	3/11,000	347	170	159
2-----	830	455	1,020	1,340	9,450	34,200	259	155	108
3-----	751	420	852	1,734	7,950	37,200	235	180	114
4-----	662	390	697	1,090	3,200	9,420	230	215	134
5-----	619	390	652	790	1,400	2,990	202	155	85
6-----	569	385	592	715	600	1,160	196	175	93
7-----	545	390	574	770	2,010	3/4,970	218	225	132
8-----	553	550	821	1,100	7,680	3/24,400	452	840	1,030
9-----	1,030	2,960	3/11,600	770	1,050	2,180	529	550	786
10-----	1,020	3,320	3/10,500	760	780	1,600	569	520	799
11-----	577	900	1,400	724	1,910	3,730	569	438	673
12-----	537	540	783	2,990	17,000	3/147,000	569	420	645
13-----	513	430	596	3,770	11,500	3/124,000	553	375	580
14-----	490	420	556	2,460	4,000	26,600	513	330	457
15-----	468	395	499	3,620	11,400	3/114,000	475	310	397
16-----	445	370	444	2,090	4,000	22,600	468	275	347
17-----	445	305	366	1,270	1,400	4,800	452	292	356
18-----	513	400	554	960	650	1,680	445	340	409
19-----	553	448	669	751	505	1,020	430	355	412
20-----	585	450	711	715	475	917	409	402	444
21-----	529	420	600	670	500	904	388	--	1/445
22-----	475	380	487	653	455	802	482	415	540
23-----	430	260	302	644	400	696	561	460	697
24-----	438	310	367	628	380	644	577	475	740
25-----	438	280	331	521	290	408	602	455	740
26-----	416	270	303	505	325	443	636	430	738
27-----	402	235	255	529	365	521	670	495	895
28-----	361	790	3/1,250	505	335	457	697	515	969
29-----	1,710	11,900	3/54,200	505	315	430	644	490	852
30-----	1,350	4,080	3/16,200	460	230	286	602	515	837
31-----	860	1,300	3,020	402	180	195	--	--	--
Total -	20,044	--	112,500	35,377	--	581,300	13,979	--	15,590

Total discharge for year (second-foot-days) ----- 332,393

Total load for year (tons) ----- 2,692,000

1/Estimated.

3/Sediment discharge computed by subdividing day.

## PLATTE RIVER BASIN--Continued

## NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
May 24, 1948	3:20 p. m.	545	366	898	--	--	30	35	62	86	90	95	98	BN
June 1	4:15 p. m.	577	363	839	--	--	--	40	55	72	78	83	90	BN
June 8	11:30 a. m.	445	220	534	--	--	--	34	52	68	76	87	97	BN
June 12	1:15 p. m.	468	546	1,460	--	--	--	22	44	70	79	87	92	BN
June 13	9:10 a. m.	490	1,060	2,480	18	30	47	68	74	80	83	90	94	BN
June 14	6:00 p. m.	569	443	1,080	--	--	--	28	39	58	68	76	88	BN
June 15	1:45 p. m.	561	333	897	--	--	--	28	44	60	64	74	86	BN
June 16	5:40 p. m.	930	322	763	--	--	--	36	50	76	84	87	94	BN
June 18	1:10 p. m.	1,840	3,810	4,520	28	40	62	72	80	91	96	98	100	BN
June 18	1:10 p. m.	1,840	3,810	4,440	40	52	63	75	82	93	98	99	100	BW
June 18	6:40 p. m.	1,640	3,020	3,410	30	42	59	67	77	87	90	95	99	BN
June 18	6:40 p. m.	1,640	3,020	3,210	41	52	62	70	80	90	94	98	99	BW
June 19	1:00 p. m.	1,240	1,380	3,270	16	25	39	54	66	80	86	94	97	BN
June 21	5:40 p. m.	1,390	1,320	3,090	13	20	32	46	59	78	86	92	96	BN
June 22	6:20 p. m.	2,880	9,720	4,940	9	16	22	29	42	70	78	86	94	BN
June 22	6:20 p. m.	2,880	9,720	4,900	12	18	23	30	42	75	82	90	95	BW
June 23	7:50 a. m.	1,810	3,290	3,740	20	30	40	48	62	83	90	95	98	BN
June 23	7:50 a. m.	1,810	3,290	4,020	22	32	40	46	58	80	90	96	98	BW
June 27	4:55 p. m.	1,740	12,600	7,910	10	20	40	52	68	86	92	96	98	BN
June 27	4:55 p. m.	1,740	12,600	7,690	23	32	42	53	60	88	94	98	100	BW
July 9	6:15 p. m.	850	3,740	4,820	5	9	14	22	40	70	75	86	94	BN
July 9	6:15 p. m.	850	3,740	4,680	10	13	17	25	44	68	82	90	95	BW
July 20	5:55 p. m.	561	522	1,300	--	--	--	32	50	70	74	80	86	BN
July 29	11:50 a. m.	1,860	13,900	8,730	11	18	30	44	63	95	96	99	100	BN
July 29	6:45 p. m.	2,200	11,500	7,310	12	21	34	48	62	84	94	98	100	BN

PLATTE RIVER BASIN--Continued  
 NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued  
 Particle-size analyses of suspended sediment, water year October 1947 to September 1948--Continued  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment												Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
July 29, 1948	6:45 p. m.	2,200	11,500	7,550	19	31	42	52	67	87	98	98	100			BW
Aug. 2	6:00 p. m.	1,280	8,330	10,700	10	19	40	58	72	94	96	98	100			BN
Aug. 2	6:00 p. m.	1,280	8,330	10,800	24	36	50	66	82	92	96	98	100			BW
Aug. 3	6:00 p. m.	1,610	5,630	18	27	40	50	62	85	94	97	99				BN
Aug. 3	6:00 p. m.	1,610	4,040	5,460	24	33	44	53	64	88	93	96	99			BW
Aug. 8	11:15 a. m.	1,240	10,400	5,210	16	24	38	54	76	94	98	100	--			BN
Aug. 8	11:15 a. m.	1,240	10,400	5,410	20	28	42	60	76	93	97	99	100			BW
Aug. 12	1:15 p. m.	3,330	20,200	7,460	12	19	28	42	59	86	96	99	100			BN
Aug. 12	1:15 p. m.	3,330	20,200	7,170	16	24	34	46	62	88	96	99	100			BW
Aug. 13	7:00 p. m.	3,370	6,520	8,160	18	24	33	41	47	88	94	98	99			BN
Aug. 15	4:45 p. m.	3,860	10,800	6,980	11	18	24	32	48	86	94	97	98			BN
Aug. 16	4:45 p. m.	1,870	2,930	3,920	25	35	46	56	66	86	94	100	--			BN
Aug. 17	6:10 p. m.	1,210	1,130	1,170	--	--	--	40	52	69	78	83	92			BN
Aug. 25	4:45 p. m.	498	282	785	--	--	--	44	60	74	81	86	93			BN
Aug. 25	5:15 p. m.	488	253	806	--	--	--	40	52	72	82	89	93			BN
Sept. 5	4:45 p. m.	202	166	4,230	--	--	--	37	50	68	71	78	91			BN

PLATTE RIVER BASIN--Continued  
BEAVER CREEK AT LORETTO, NEBR.

LOCATION.--At gaging station at county highway bridge at west edge of Loretto, Boone County.  
DRAINAGE AREA.--311 square miles.  
RECORDS AVAILABLE.--Sediment records: June 1946 to September 1948.  
EXTREMES, 1947-48.--Sediment loads: Maximum, 7,720 tons per day June 22; minimum, 1.0 ton per day Feb. 6, 7, 9.  
EXTREMES, 1946-48.--Sediment loads: Maximum, 7,900 tons per day June 10, 1947; minimum, 1.0 ton per day Feb. 6, 7, 9, 1948.  
REMARKS.--Records of discharge for water year 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per cent sodium carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 22, 1948-----	311	8.5	175	19	0.40	26	3.8	7.4	1/102	10	0.2	0.5	0.5	1.2	--	150	0.20		80	0	17
July 29 -----	419	7.0	157	16	.50	20	3.0	9.3	.89	6.4	1.5	1.5	.3	.0	0.00	120	.16		62	0	25
Aug. 1 -----	55	7.6	233	42	.16	35	4.4	8.8	145	4.0	.2	.4	.4	.7	--	188	.26		105	0	15

1/Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## BEAVER CREEK AT LORETTO, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	37	65	6.5	51	230	32	53	65	9.3
2-----	38	80	8.2	47	135	17	52	65	9.1
3-----	37	70	7.0	46	110	14	52	70	9.8
4-----	37	80	8.0	50	140	19	43	85	9.9
5-----	37	70	7.0	60	465	75	42	95	11
6-----	36	80	7.8	53	110	16	60	90	15
7-----	34	105	9.6	50	200	27	62	90	15
8-----	35	85	8.0	50	95	13	54	90	13
9-----	36	95	9.2	49	40	5.0	55	100	15
10-----	37	100	10	50	70	9.5	55	95	14
11-----	37	90	9.0	49	80	11	55	90	13
12-----	38	100	10	48	80	10	50	90	12
13-----	38	80	8.2	48	70	9.0	50	90	12
14-----	39	100	11	50	75	10	50	90	12
15-----	38	105	11	53	75	11	60	80	13
16-----	39	95	10	55	65	9.7	50	85	11
17-----	39	85	9.0	54	55	8.0	50	90	12
18-----	38	55	5.6	54	60	8.7	50	85	11
19-----	38	70	7.2	56	95	14	55	85	11
20-----	38	85	8.7	60	95	15	55	75	11
21-----	38	70	7.2	66	130	23	60	80	13
22-----	38	75	7.7	63	165	28	60	75	12
23-----	39	65	6.8	58	185	30	60	80	13
24-----	42	80	9.1	56	250	38	60	75	12
25-----	41	90	10	59	190	30	59	70	11
26-----	41	70	7.7	58	100	16	61	70	12
27-----	41	55	6.1	56	90	14	63	82	14
28-----	41	55	6.1	56	105	16	64	70	12
29-----	41	60	6.6	55	75	11	62	80	13
30-----	48	170	22	54	70	10	57	80	12
31-----	64	410	71	--	--	--	45	55	6.7
Total -	1,220	--	331	1,614	--	550	1,704	--	370
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	50	40	5.4	40	20	2.2	118	660	210
2-----	60	50	8.1	40	20	2.2	93	415	104
3-----	65	65	11	35	30	2.8	77	270	56
4-----	67	75	14	35	15	1.4	69	200	37
5-----	68	110	20	35	15	1.4	68	210	39
6-----	66	70	12	30	12	1.0	66	180	32
7-----	68	100	18	30	12	1.0	64	160	28
8-----	101	360	98	30	15	1.2	62	150	25
9-----	142	1,040	398	25	15	1.0	60	170	28
10-----	75	320	65	30	15	1.2	55	180	27
11-----	70	190	36	35	15	1.4	60	180	29
12-----	68	155	28	25	25	1.7	72	180	35
13-----	60	--	1/16	35	120	11	93	1,550	2/488
14-----	49	70	9.3	55	195	29	293	2,590	2/1,910
15-----	40	70	7.6	88	265	63	276	2,470	2/2,020
16-----	35	70	6.6	134	330	119	144	1,150	447
17-----	30	70	5.7	398	936	2/1,020	101	600	164
18-----	35	60	5.7	327	386	2/366	90	455	111
19-----	30	90	7.3	211	150	85	92	430	107
20-----	30	85	6.9	120	160	52	92	385	96
21-----	30	40	3.2	84	180	41	90	360	87
22-----	35	20	1.9	80	200	43	84	290	66
23-----	30	30	2.4	74	220	44	79	390	83
24-----	35	25	2.4	72	210	41	75	240	49
25-----	40	30	3.2	78	220	46	74	185	37
26-----	35	30	2.8	113	593	2/211	73	170	34
27-----	40	20	2.2	547	2,310	2/5,620	69	160	30
28-----	40	25	2.7	612	2,660	2/4,820	68	170	31
29-----	40	25	2.7	201	1,180	2/658	68	170	31
30-----	40	20	2.2	--	--	--	68	175	32
31-----	40	20	2.2	--	--	--	67	190	34
Total -	1,614	--	806	3,619	--	11,290	2,860	--	6,510

1/Estimated.

2/Sediment discharge computed by subdividing day.



## PLATTE RIVER BASIN--Continued

## BEAVER CREEK AT LORETTO, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	66	205	37	51	230	32	39	335	35
2-----	64	190	33	50	190	26	38	310	32
3-----	64	165	29	50	180	24	36	310	30
4-----	62	160	27	48	145	19	35	285	27
5-----	61	165	27	50	180	24	34	290	27
6-----	61	180	30	56	290	44	34	290	27
7-----	63	220	37	61	260	43	34	310	28
8-----	64	240	41	46	250	31	33	290	26
9-----	61	180	30	50	330	45	32	240	21
10-----	60	145	23	52	355	50	32	200	17
11-----	58	110	17	52	360	51	31	200	17
12-----	58	120	19	51	370	51	39	330	35
13-----	57	100	15	50	375	51	54	450	66
14-----	56	80	12	48	365	47	45	360	44
15-----	55	110	16	45	340	41	42	290	33
16-----	54	115	17	43	275	32	42	250	28
17-----	52	120	17	42	220	25	44	260	31
18-----	52	160	22	41	280	31	49	320	42
19-----	51	150	21	40	305	33	46	290	36
20-----	50	--	1/16	38	315	32	51	310	43
21-----	50	--	1/16	38	260	27	76	1,375	2/408
22-----	51	140	19	40	300	32	240	11,200	2/7,720
23-----	65	240	42	182	6,790	2/3,590	99	2,600	695
24-----	66	350	62	60	1,780	2/296	71	1,000	192
25-----	64	320	55	45	800	97	62	800	134
26-----	65	340	60	42	540	61	57	1,000	154
27-----	63	370	63	40	420	45	64	1,000	173
28-----	56	190	29	38	310	32	65	750	132
29-----	53	190	27	37	300	30	57	500	77
30-----	52	230	32	39	290	31	50	370	50
31-----	--	--	--	40	290	31	--	--	--
Total -	1,754	--	891	1,565	--	5,000	1,631	--	10,380
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	46	330	41	59	700	112	31	230	19
2-----	40	295	32	122	3,230	2/1,200	31	230	19
3-----	37	250	25	93	1,610	2/458	32	235	20
4-----	36	250	24	65	600	105	32	190	16
5-----	36	295	29	59	440	70	31	185	15
6-----	34	265	24	58	500	78	32	190	16
7-----	31	190	16	82	1,450	321	34	220	20
8-----	32	501	2/62	67	700	127	37	240	24
9-----	70	3,220	2/643	59	450	72	38	190	19
10-----	42	650	74	56	400	60	37	150	15
11-----	39	550	58	208	3,050	2/1,910	36	150	15
12-----	38	450	46	90	1,600	389	36	170	17
13-----	37	370	37	74	950	190	35	190	18
14-----	36	300	29	82	2,280	2/598	35	155	15
15-----	44	1,200	143	334	3,140	2/2,770	34	160	15
16-----	46	1,300	161	143	1,540	2/618	32	160	14
17-----	81	4,230	2/976	82	900	199	32	155	13
18-----	55	1,200	178	68	700	129	32	150	13
19-----	55	700	104	62	570	95	32	155	13
20-----	58	1,000	157	55	420	62	33	130	12
21-----	50	700	94	49	370	49	36	170	17
22-----	45	500	61	47	390	49	38	165	17
23-----	43	400	46	44	320	38	37	180	18
24-----	43	300	35	41	320	35	40	250	27
25-----	42	350	40	39	270	28	41	190	21
26-----	42	400	45	38	220	23	39	145	15
27-----	41	350	39	36	200	19	38	170	17
28-----	45	350	43	37	290	29	37	150	15
29-----	409	6,290	2/6,620	35	300	28	37	160	16
30-----	180	3,590	2/1,860	33	250	22	38	150	15
31-----	71	1,100	211	32	255	22	--	--	--
Total -	1,884	--	11,950	2,349	--	9,900	1,053	--	506

Total discharge for year (second-foot-days) ----- 22,867

Total load for year (tons) ----- 58,480

1/Estimated.

2/Sediment discharge computed by subdividing day.

PLATTE RIVER BASIN--Continued  
BEAVER CREEK AT LORETTO, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500
May 18, 1948	2:25 p. m.	42	281	592	--	22	41	66	89	96	99	100	BN	
June 2	12:45 p. m.	39	292	507	--	26	39	62	89	98	100	--	BN	
June 13	5:45 p. m.	52	517	363	--	22	34	48	77	93	98	100	BN	
June 21	2:20 p. m.	76	682	1,390	--	18	22	36	60	94	98	100	BN	
June 22	8:25 a. m.	302	15,500	4,640	26	36	53	70	88	97	100	--	BN	
June 22	12:30 p. m.	310	11,200	8,250	24	38	52	66	77	94	98	100	BN	
June 22	6:00 p. m.	230	7,050	4,640	24	38	53	66	79	95	99	100	BN	
June 24	1:15 p. m.	70	7,845	1,460	11	16	25	38	64	93	99	100	BN	
July 17	7:20 p. m.	64	3,100	1,730	16	32	48	61	78	95	99	100	BN	
July 20	6:00 p. m.	61	1,190	775	10	10	15	28	52	89	99	100	BN	
July 29	1:50 p. m.	427	3,210	6,910	34	50	64	73	80	95	98	100	BN	
July 29	2:45 p. m.	461	3,050	5,740	38	51	63	72	80	93	98	100	BN	
July 29	5:10 p. m.	501	2,660	5,230	42	56	69	76	83	92	96	100	BN	
Aug. 3	11:40 a. m.	86	1,160	2,140	15	26	34	44	60	94	100	--	BN	
Aug. 15	8:50 a. m.	359	3,360	2,300	28	43	57	70	84	96	100	--	BN	
Aug. 15	4:30 p. m.	390	2,670	1,920	38	53	65	74	82	95	98	100	BN	
Aug. 15	7:40 p. m.	368	2,380	1,730	42	52	64	73	82	96	99	100	BN	
Aug. 17	12:35 p. m.	60	798	1,650	--	12	21	31	50	94	100	--	BN	
Aug. 31	11:30 a. m.	32	218	385	--	7	17	36	57	90	96	100	BN	

PLATTE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN

Chemical analyses in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-cent so-dium carbonate	
																Parts per million	Tons per acre-foot	Total	Non-carbonate		
KINGSLEY RESERVOIR ON NORTH PLATTE RIVER, NEBR.																					
June 5, 1948 -----		8.2	657	20	0.02	52	19	62		226	120	20	0.4	1.1	0.10	458	0.82		208	20	39
PLATTE RIVER NEAR COZAD, NEBR.																					
June 4, 1948 -----	10	7.9	752	31	0.02	75	25	64		216	208	24	0.6	0.7	0.10	560	0.76		290	113	32
PLATTE RIVER NEAR ODESSA, NEBR.																					
June 4, 1948 -----	10	8.0	920	23	0.05	80	32	90		194	306	33	0.7	0.2	0.16	700	0.95		331	172	37
SOUTH PLATTE RIVER NEAR KERSEY, COLO.																					
June 11, 1948 -----	1,620	7.3	742	14	0.00	64	30	57		161	224	26	0.6	3.4	0.11	540	0.73		283	151	30
July 12 -----	99	7.5	1,630	17	.02	164	70	133		300	648	38	1.1	1.1	--	1,230	1.67		697	451	29
Sept. 13 -----	174	7.6	1,680	16	.02	157	76	159	5.6	306	684	40	1.6	4.1	.27	1,300	1.77		704	453	33
ELKHORN RIVER AT EWING, NEBR.																					
Aug. 12, 1948, 7:15 a.m. -----	92	7.7	186	39	0.00	26	3.0	9.1		106	8.0	0.2	0.2	1.5	0.10	172	0.23		77	0	20
Aug. 12, 5:50 p.m. -	67	7.3	185	40	.13	26	2.9	6.7		102	3.2	1.5	.3	1.9	--	176	.24		77	0	16

## MISSOURI RIVER BASIN

## PLATTE RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1947 to September 1948

Date	Instantaneous water discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
BATES CREEK NEAR ALCOVA, WYO.			
Mar. 31, 1948 -----	26	1,840	129
Apr. 19 -----	99	5,100	1,360
Apr. 21 -----	68	1,420	261
May 5 -----	8.6	66	1.5
CASPER CREEK AT CASPER, WYO.			
Mar. 25, 1948 -----	134	2,140	774
Mar. 31 -----	8.1	274	6.0
MIDDLE LOUP RIVER AT ARCADIA, NEBR.			
July 19, 1948 -----	947	714	830
Sept. 14 -----	495	514	687
Sept. 24 -----	602	612	995
SOUTH LOUP RIVER NEAR CUMRO, NEBR.			
July 19, 1948 -----	600	5,680	9,200
Sept. 25 -----	107	241	70
NORTH LOUP RIVER AT BREWSTER, NEBR.			
July 19, 1948 -----	337	293	267
Sept. 14 -----	279	312	235
Sept. 24 -----	356	521	501
SHELL CREEK NEAR COLUMBUS, NEBR.			
Aug. 11, 1948 -----	382	453	467
Aug. 26 -----	6.4	186	3.2
Sept. 23 -----	4.2	51	.6
ELKHORN RIVER AT EWING, NEBR.			
Aug. 12, 1948 -----	92	170	42
Sept. 23 -----	48	68	9
ELKHORN RIVER AT NORFOLK, NEBR.			
Aug. 11, 1948 -----	1/2,650	6,160	44,100
Aug. 12 -----	1/1,700	3,440	15,800
ELKHORN RIVER AT WATERLOO, NEBR.			
July 23, 1948 -----	1,150	4,360	13,540
July 26 -----	497	600	805
July 31 -----	1,500	8,170	33,090
Aug. 13 -----	7,730	6,240	130,200
Aug. 16 -----	2,030	2,910	15,950
Sept. 1 -----	538	352	511
Sept. 15 -----	475	220	282
Sept. 21 -----	410	215	238
Sept. 28 -----	848	1,520	3,480
Sept. 30 -----	548	566	837

1/Mean daily discharge

## KANSAS RIVER BASIN

## ARIKAREE RIVER AT HAIGLER, NEBR.

LOCATION.--At bridge on U.S. Highway 34, a quarter of a mile upstream from gaging station, three quarters of a mile upstream from confluence with North Fork Republican River, and 1 mile northwest of Haigler, Dundy County.

DRAINAGE AREA.--1,460 square miles of which only 1,330 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Sediment records: March 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 90,000 tons per day June 16; minimum, not determined.

EXTREMES, March 1947-September 1948.--Sediment loads: Maximum, 90,000 tons per day June 16, 1948; minimum, 0 tons per day on many days in August and September 1947.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent non-sodium carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
July 27, 1948-----	3.1	7.8	1,360	56	0.02	167	58	105	288	245	590	21	1.4	1.2	0.21	1,140	1.55		655	419	26
Sept. 27-----	3.1	7.8	972	44	.02	87	38	81			318	9.0	1.2	.9	.27	770	1.05		373	172	32

## KANSAS RIVER BASIN--Continued

## ARIKAREE RIVER AT HAIGLER, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	11	--	1/2	5.2	72	1	2.0		
2-----	9.2	42	1	6.4	67	1	1.8		
3-----	6.7			7.4	73	1	1.8		
4-----	5.8			8.1	80	2	2		
5-----	2.9			7.8	83	2	2		
6-----	3.1			6	--	1/2	2		
7-----	3.4			4	--	1/3	2		
8-----	3.1			5	207	3	2		
9-----	2.9			3	150	1	2		
10-----	2.7			2	104	--	2		
11-----	2.4			2	110	--	1		
12-----	2.9			2.0			2	64	--
13-----	2.9			2.0			2		
14-----	2.9	41	--	1.8			2		
15-----	2.9			1.6			2		
16-----	3.1			1.8	176	--	2		
17-----	3.4			2.0			2		
18-----	2.9			2.2			2		
19-----	2.9			2.9			2		
20-----	2.7			2.4			3		
21-----	2.2			2			3		
22-----	2.0			2			3		
23-----	2.0			2			3	132	1
24-----	2.7			2			4	254	3
25-----	4.3			2.2	59	--	5.8	314	5
26-----	5.8	183	3	1.8			9.6	328	9
27-----	5.8	218	3	1.6			14	310	12
28-----	3.7	--	1/1	2.0			16	252	11
29-----	3.4	46	--	1.8			19	280	14
30-----	4.0	133	1	2.2			10	--	1/6
31-----	4.9	83	1	--	--	--	4	143	2
Total-	120.6	--	2/21	95.2	--	2/29	131.0	--	2/71
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1			1			7	323	6
2-----	1			1			6	170	3
3-----	1	201	--	1			8	1,070	23
4-----	1			2			9	--	1/10
5-----	3	271	2	2	88	--	8	140	3
6-----	5	443	6	3			8	174	4
7-----	6	579	9	4			10	125	3
8-----	9	555	13	8	--	1/1	14	145	5
9-----	8	365	8	11	107	3	20	157	8
10-----	7	268	5	12	98	3	16	146	6
11-----	6	200	3	10	100	3	13	125	4
12-----	5	174	2	4	95	1	15	112	5
13-----	5			3	118	--	32	163	14
14-----	4			3	110	--	58	--	1/85
15-----	4			5	400	5	170	--	1/1,000
16-----	4			7	240	5	106	1,580	452
17-----	3	49	--	13	800	28	40	1,580	171
18-----	4			25	570	38	27	480	35
19-----	5			45	895	109	29	439	34
20-----	5			40	1,380	149	26	409	29
21-----	6			32	1,360	118	20	255	14
22-----	6	95	2	42	1,230	139	20	264	14
23-----	6	244	4	62	1,090	182	22	288	17
24-----	5	247	3	34	615	56	19	262	13
25-----	4	95	1	40	462	50	18	315	15
26-----	4			45	485	59	22	365	22
27-----	3			45	725	88	36	442	43
28-----	2	65	--	33	750	67	44	332	39
29-----	1			20	258	14	35	295	28
30-----	1			--	--	--	26	253	18
31-----	1			--	--	--	18	240	12
Total-	126	--	2/67	553	--	2/1,120	902	--	2,140

1/Estimated.

2/Includes days of sediment discharge less than 1.0 ton.

KANSAS RIVER BASIN--Continued  
ARIKAREE RIVER AT HAIGLER, NEBR.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	16	374	16	20	798	43	33	252	22
2-----	17	330	15	48	567	73	23	192	12
3-----	16	215	9	69	305	57	16	218	9
4-----	13	133	5	39	240	25	19	253	13
5-----	14	127	5	23	118	7	23	290	18
6-----	14	100	4	16	108	5	25	302	20
7-----	14	112	4	13	128	4	24	258	17
8-----	12	92	3	9.6	106	3	16	160	7
9-----	12	82	3	6.4	125	2	15	131	5
10-----	14	67	3	4.6	75	--	13	130	5
11-----	12	64	2	5.2	75	1	7.4	108	2
12-----	12	88	3	7.6	152	3	6.7	132	2
13-----	19	109	6	12	187	6	8.4	259	4
14-----	16	92	4	8.9	149	4	74	--	1/2, 500
15-----	12	71	2	6.7	83	2	318	3,790	3/12, 000
16-----	9.2	75	2	8.9	86	2	2,710	9,340	3/90, 000
17-----	7.4	88	2	8.9	100	2	190	1,260	650
18-----	6.7	76	1	6.4	92	2	113	520	159
19-----	4.9	--	--	3.7	32	--	122	--	1/1, 400
20-----	3.1	--	--	4.0	43	--	1,250	--	1/30, 000
21-----	3.4	58	--	2.4	70	--	1,080	5,920	3/25, 000
22-----	8.1			3.7	87	--	346	1,880	1,760
23-----	6.7			364	9,270	3/15, 000	166	800	359
24-----	5.8			31	350	29	179	802	388
25-----	5.2			13	453	16	242	--	1/950
26-----	4.6	340	2	10	268	7	197	--	1/1, 300
27-----	4.3			9.6	214	6	921	--	1/20, 000
28-----	3.1			42	--	1/800	262	--	1/2, 800
29-----	2.9			297	--	1/9, 000	50	700	95
30-----	2.4			78	1,400	295	38	428	44
31-----	--	--	--	42	486	55	--	--	--
Total-	290.8	--	2/99	1,213.6	--	2/25, 500	8,485.5	--	190, 000
	July			August			September		
	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day
1-----	23	--	1/24	1.0	158	--	1.2	107	--
2-----	15	129	5	1.2	147	--	.8		
3-----	11	138	4	1.6	181	--	.4		
4-----	12	160	5	2.0	315	2	.8		
5-----	9.6	140	4	1.2	260	--	.8		
6-----	7.1	124	2	1.0	249	--	.4	107	--
7-----	5.5	134	2	.8	247	--	1.0		
8-----	5.5	180	3	1.6	876	4	.6		
9-----	28	--	1/160	11	--	1/120	.6		
10-----	14	220	8	13	--	1/100	.3		
11-----	8.1	150	3	3.4	110	1	.2	107	--
12-----	5.8	150	2	2.0	38	--	1.4		
13-----	6.7	204	4	2.2	--	--	.4		
14-----	9.0	--	1/16	2.2	--	1/8	.2		
15-----	18	--	1/70	36	--	1/440	.1		
16-----	6.4	470	8	18	--	1/50	.1	107	--
17-----	7.8	410	9	7.1	170	3	1.6		
18-----	7.1	210	4	4.9	168	2	1.6		
19-----	18	--	1/180	4.3	155	2	1.6		
20-----	7.8	740	16	3.1	208	2	1.8		
21-----	10	--	1/11	3.1	228	2	1.8	107	1/--
22-----	11	309	9	3.4	184	2	1.6		
23-----	8.9	211	5	3.1	135	1	1.8		
24-----	6.7	225	4	4.0	58	--	1.8		
25-----	5.2	105	1	3.7	118	1	2.0		
26-----	4.6	154	2	4.9	98	1	3.1	107	2
27-----	2.9	146	1	5.5	268	4	4.3		
28-----	2.0	171	--	5.5	370	5	7.4		
29-----	1.4	160	--	2.7	330	2	8.1		
30-----	1.4	142	--	2.0	200	1	7.8		
31-----	.8	132	--	1.0	229	--	--		
Total	280.3	--	2/564	156.5	--	2/759	55.6	--	2/14

Total discharge for year (second-foot-days) ----- 12,410.1  
Total load for year (tons) ----- 220,400

1/Estimated.

2/Includes days of sediment discharge less than 1.0 ton.

3/Sediment discharge computed by subdividing day.

KANSAS RIVER BASIN--Continued  
 ARIKAREE RIVER AT HAIGLER, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment												Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
June 15, 1948	8:25 a. m.	95	2,820	2,310	3	12	38	67	73	84	89	93				BN
June 15	9:12 a. m.	84	2,760	1,890	6	12	46	72	78	86	92	95				BN
June 21	5:10 p. m.	2,120	10,800	3,230	4	14	30	39	48	62	73					BN



## KANSAS RIVER BASIN--Continued

## REPUBLICAN RIVER AT TRENTON, NEBR.

LOCATION--At bridge on State Highway 25, half a mile upstream from Elm Creek and three-quarters of a mile south of Trenton, Hitchcock County.  
DRAINAGE AREA--8,120 square miles.

RECORDS AVAILABLE--Chemical analyses: November 1946 to September 1948.

Water temperatures: November 1946 to May 1947, January 1948 to September 1948.

Sediment records: November 1946 to September 1948.

EXTREMES 1947-48--Dissolved solids: Maximum, 477 parts per million Jan. 10, 19, Feb. 2; minimum, 320 parts per million Jan. 7.

Total hardness: Maximum, 282 parts per million Jan. 10, 19, Feb. 2; minimum, 165 parts per million Aug. 16.

Sediment loads: Maximum, 492,000 tons per day June 16; minimum, 0 tons per day many days.

EXTREMES 1946-48--Dissolved solids: Maximum, 504 parts per million Jan. 2-10, 1947; minimum, 308 parts per million June 24, 1947.

Total hardness: Maximum, 308 parts per million Jan. 2-10, 1947; minimum, 165 parts per million Aug. 16, 1948.

Sediment loads: Maximum, 492,000 tons per day June 16, 1948; minimum, 0 tons per day on many days.

REMARKS--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO <sub>3</sub> )	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium
																	Parts per million	Tons per acre-foot	Total	Non-carbonate	
Oct. 3-31, 1947 ----	14	8.3	607	62	0.02	54	20.49	6.8	8	238	97	14	1.4	1.4	3.0	0.11	418	0.57	218	10	32
Nov. 1-3, 17-20, 24	85	8.3	571	68	.02	62	19.38	5.6	9	245	86	8.0	1.5	1.5	3.0	--	401	.55	233	17	26
Nov. 25-Dec. 8 ----	102	8.2	581	70	.02	52	19.38	3.6	0	224	78	7.5	1.6	1.6	4.0	--	408	.55	208	24	28
Dec. 22, 29-30 ----	170	8.3	559	66	.02	63	18.39	4.8	10	233	85	8.0	1.2	2.8	2.8	--	392	.53	180	231	26
Jan. 7, 1948 ----	280	8.6	521	74	.02	75	23.45	4.4	12	304	96	10	1.6	3.0	3.0	--	320	.44	242	--	--
Jan. 10, 19, Feb. 2	97	8.4	656	74	.02	60	17	38	8	242	72	8.0	1.2	3.0	3.0	--	374	.51	223	220	8
Feb. 14-19 ----	221	8.4	541	64	.02	60	17	38	8	242	72	8.0	1.2	3.0	3.0	--	374	.51	223	220	8
Mar. 1 ----	222	8.4	464	66	.04	62	16	46	12	248	78	8.0	1.0	3.8	3.8	--	406	.55	243	220	0
Mar. 1, sta. 70 1/2	222	7.8	501	54	.04	60	17	37	0	266	62	9.0	--	5.2	5.2	--	424	.58	254	220	2
Mar. 1, sta. 110 1/2	222	7.9	523	54	.10	60	16	41	0	270	63	9.0	--	5.6	5.6	--	404	.55	242	216	0
Mar. 1, sta. 150 1/2	222	8.3	536	60	.12	60	17	41	8	262	63	8.0	--	4.0	4.0	--	424	.58	254	220	0
Mar. 15-31 ----	282	8.6	527	54	.06	55	17	35	5.2	18	222	60	9.5	5.8	5.8	--	414	.56	315	207	0
Apr. 1-30 ----	136	8.4	526	58	.03	47	20.36	6.8	12	226	62	11	1.1	1.1	2.4	.29	388	.53	142	200	0
May 1-31 ----	195	8.5	517	53	.03	48	18.35	9.2	14	216	67	11	1.0	1.0	3.1	.19	394	.52	194	0	27
May 23, sta. 100 1/2	723	7.7	541	42	.04	62	13	--	--	282	61	7.0	--	--	--	--	420	.57	820	--	--
May 23, sta. 46 1/2	723	7.7	508	42	.04	62	13	37	0	284	61	7.0	--	--	.8	--	408	.55	796	208	0

1/Not included in weighted average. Cross-section sampling stations measured, in feet, from end of bridge on right bank.

KANSAS RIVER BASIN--Continued  
 REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbo-nate (CO <sub>3</sub> )	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
June 1-19, 23-30, 1948	1,020	8.4	442	46	0.25	56	15	28	12	222	44	44	6.0	1.0	16	--	324	0.44	892	201	0	22
June 7, sta. 165 1/2	222	7.7	540	50	.24	60	19	36	36	0	246	82	10	1.8	.5	--	378	.51	227	228	26	26
June 7, sta. 135 1/2	222	7.9	550	64	.16	60	22	31	31	0	252	86	5.0	1.2	.5	--	410	.56	246	240	33	22
June 7, sta. 65 1/2	222	7.6	536	59	.20	58	19	38	38	0	244	82	10	1.6	1.6	--	386	.52	231	223	23	27
June 7, daily sta. 1/	222	7.6	536	58	.14	54	18	42	42	0	246	76	10	1.4	1.8	--	382	.52	229	209	7	30
July 1-31	153	8.4	538	59	.03	60	16	38	10	17	214	84	8.0	1.0	1.2	.19	408	.55	169	216	13	26
Aug. 1-30	42	7.7	502	50	.07	50	16	35	6.8	0	238	62	7.0	1.2	1.8	.14	380	.52	43	191	0	28
Aug. 18, 8:15 a.m. 1/	52	8.0	564	53	.04	48	11	49	49	0	232	62	8.0	1.2	1.6	--	368	.50	52	185	0	39
Aug. 18, sta. 36 1/2	52	8.5	568	79	.06	58	14	46	46	14	224	78	7.0	1.2	1.3	--	420	.57	56	202	0	33
Aug. 16, sta. 75 1/2	52	8.1	571	60	.06	49	14	46	46	0	236	74	7.4	1.2	1.6	--	368	.50	52	180	0	37
Aug. 16, sta. 115 1/2	52	8.0	568	54	.08	52	16	42	42	0	240	74	7.0	1.2	1.1	--	372	.51	52	196	0	32
Aug. 16, daily sta. 1/	52	8.4	580	72	.08	54	14	48	48	12	228	74	7.0	1.2	1.2	--	392	.53	55	182	0	35
Sept. 12, 11:-----	1.8	8.1	567	49	.03	46	16	46	46	0	226	74	10	1.2	1.5	--	372	.51	1.8	181	0	35
Weighted average 2/	230	--	486	52	0.15	55	16	32	9.7	248	57	57	7.7	1.0	9.7	--	359	0.49	223	203	0	24

1/Not included in weighted average. Cross-section sampling stations measured, in feet, from end of bridge on right bank.

2/Weighted average for period sampled only.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1					--	32	49	55	65	69	69	--
2					--		36	52	68	67	65	--
3					--		47	54	67	77		--
4					--		48		68	75	64	--
5					--		46	53	72	79	62	--
6					--			48	70	72	62	--
7				41	--		48	55	74	74	76	--
8					--		42	72	72	71	78	--
9					--		45	53	71	68	72	--
10					--		50	45	68	79	72	--
11					--		53	46	71	77	73	--
12					--		49	50	66	73	69	79
13					--		45	53	66	70	75	--
14					--		48	61	67	72	79	--
15					--	34	54	61	54	67	77	--
16					--			62	65	69	71	--
17					--	34	54	62	67	73	71	77
18					--		58	65	68	77	67	--
19					--		58	66	80	71	70	--
20					--		48	66	59	72	72	--
21					--			66	62	72	71	--
22					--		50	66	72	69	70	--
23					--	44	58	66	68	64	70	--
24					--	41	62	62	68	78	70	--
25					32	51	56	--	70	78	--	--
26												--
27					34	34	48	61	76	73	61	--
28					--	32	53	--	--	71	68	--
29					--		55	62	66	73	--	--
30					--	47	56	80	67	76	--	--
31					--		56	61	71	67	--	--
					--		--	63	--	79	--	--
Average					--		51	59	67	73	70	--

## MISSOURI RIVER BASIN

## KANSAS RIVER BASIN--Continued

## REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Suspended sediment, water year October 1946 to September 1947

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				--	--	--	234	1,520	960
2-----				--	--	--	217	1,930	1,130
3-----				--	--	--	202	2,540	1,390
4-----				--	--	--	191	2,320	1,200
5-----				--	--	--	186	1,720	864
6-----				--	--	--	181	1,700	831
7-----				--	--	--	202	1,700	927
8-----				--	--	--	186	1,700	854
9-----				--	--	--	191	1,690	871
10-----				--	--	--	196	1,570	831
11-----				--	--	--	196	1,340	709
12-----				--	--	--	186	1,400	703
13-----				--	--	--	202	1,470	802
14-----				--	--	--	212	1,660	950
15-----				--	--	--	222	2,480	1,490
16-----				--	--	--	222	2,330	1,400
17-----				--	--	--	186	1,570	788
18-----				--	--	--	162	2,430	1,060
19-----				--	--	--	132	2,380	848
20-----				--	--	--	176	2,170	1,030
21-----				--	--	--	288	3,600	2,800
22-----				--	--	--	275	4,680	3,470
23-----				--	--	--	228	2,000	1,230
24-----				--	--	--	217	1,850	1,080
25-----				212	2,150	1,230	207	2,050	1,150
26-----				252	1,970	1,340	181	2,290	1,120
27-----				246	1,800	1,190	162	2,400	1,050
28-----				246	1,600	1,060	100	--	1/526
29-----				252	1,430	974	50	--	1/100
30-----				252	1,410	959	30	--	1/14
31-----				--	--	--	30	--	1/14
Total -				1,460	--	6,750	5,650	--	32,190
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	30	--	1/14	75	--	1/90	220	--	1/750
2-----	30	160	13	90	--	1/80	210	--	--
3-----	35	--	1/15	95	250	64	250	1,300	878
4-----	40	--	1/15	100	--	--	210	850	482
5-----	50	120	16	110	--	--	220	350	208
6-----	40	--	1/14	110	--	--	200	380	205
7-----	50	160	22	110	--	--	220	390	232
8-----	55	190	28	120	--	--	300	600	486
9-----	85	--	1/46	120	--	--	360	520	505
10-----	130	--	1/70	120	--	--	550	1,110	1,650
11-----	170	205	94	90	--	1/800	560	2,600	3,930
12-----	220	330	196	160	--	--	422	--	1/4,270
13-----	200	120	65	360	--	--	343	4,180	3,870
14-----	180	200	97	780	--	--	252	2,950	2,010
15-----	180	500	243	1,040	--	--	275	2,766	2,050
16-----	150	--	--	915	--	--	269	3,360	2,440
17-----	160	--	--	928	--	--	257	--	1/2,120
18-----	150	--	--	448	--	--	263	2,610	1,850
19-----	170	--	1/250	230	3,000	1,860	830	18,500	2/46,100
20-----	190	--	--	190	4,800	2,460	1,120	19,700	59,600
21-----	150	--	--	180	2,500	1,220	1,010	10,700	29,200
22-----	150	575	233	160	--	1/886	653	7,000	12,300
23-----	170	1,590	730	160	--	1/864	398	5,500	5,910
24-----	200	--	1/853	200	1,900	1,030	302	4,600	3,750
25-----	270	--	1/1,140	180	--	--	281	--	1/2,280
26-----	380	1,540	1,580	130	--	1/700	228	2,100	1,290
27-----	370	1,270	1,270	100	--	--	222	--	1/1,140
28-----	210	--	--	130	--	--	212	2,100	1,200
29-----	140	--	1/265	--	--	--	191	2,400	1,240
30-----	120	--	--	--	--	--	191	2,100	1,080
31-----	95	--	--	--	--	--	191	3,200	1,650
Total -	4,570	--	9,310	7,431	--	23,400	11,210	--	195,400

1/Estimated.

2/Sediment discharge computed by subdividing day.

## KANSAS RIVER BASIN--Continued

## REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Suspended sediment, water year October 1946 to September 1947--Continued

Day	April			May			June					
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment				
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day			
1-----	181	2,000	977	439	5,800	6,870	269	6,200	4,500			
2-----	176	1,500	713	302	2,450	2,000	269	3,500	2,540			
3-----	176	1,500	713	252	2,100	1,430	288	2,800	2,180			
4-----	228	2,500	1,540	217	1,450	850	329	2,600	2,310			
5-----	207	--	1/1,340	228	1,560	960	302	1,900	1,550			
6-----	162	1,250	547	207	1,500	838	3,430	23,700	2/288,000			
7-----	101	--	1/825	181	1,280	626	901	9,480	2/25,100			
8-----	228	2,180	1,340	176	1,220	580	366	4,800	4,740			
9-----	275	--	1/1,740	176	1,120	532	329	2,500	2,220			
10-----	275	--	1/1,740	196	1,060	561	316	2,500	2,130			
11-----	269	2,350	1,710	217	1,480	867	343	--	1/2,590			
12-----	234	2,280	1,440	234	1,520	960	1,040	--	1/31,900			
13-----	196	--	1/1,000	252	1,400	953	421	5,600	6,370			
14-----	181	1,500	733	217	1,190	697	234	3,100	1,960			
15-----	181	1,360	665	212	980	561	257	2,000	1,390			
16-----	176	1,340	637	263	1,400	994	257	1,600	1,110			
17-----	181	1,300	635	398	3,400	3,650	207	1,500	838			
18-----	207	1,220	682	430	3,930	4,560	212	1,400	801			
19-----	186	1,140	573	316	1,800	1,540	162	1,200	525			
20-----	196	1,080	572	281	1,060	804	154	1,200	499			
21-----	196	1,050	556	263	990	703	196	1,000	529			
22-----	176	1,040	494	252	920	626	358	2,400	2,320			
23-----	171	1,020	471	222	890	533	653	5,700	10,000			
24-----	181	1,030	503	196	920	487	1,060	10,900	1/39,500			
25-----	202	1,800	982	181	980	479	515	--	1/8,480			
26-----	196	2,190	1,160	191	980	505	316	3,000	2,560			
27-----	186	2,040	1,020	186	920	462	212	1,200	687			
28-----	1,500	8,570	2/121,000	176	--	1/428	181	1,000	489			
29-----	1,820	15,000	2/81,800	2,040	30,900	2/170,000	150	950	385			
30-----	540	8,500	12,400	814	18,500	40,700	128	860	297			
31-----	--	--	--	414	10,500	11,700	--	--	--			
Total -	9,274	--	240,500	10,129	--	257,500	13,855	--	448,500			
	July			August			September					
1-----	96	640	166	25	}	1/3	}	}	}			
2-----	90	--	1/122	15								
3-----	85	390	90	10								
4-----	75	--	1/61	7								
5-----	70	210	40	5.5	79	1	}	}	}			
6-----	65	--	1/32	5.5	}	76						
7-----	58	--	1/28	3.2								
8-----	1,030	9,120	2/40,800	2								
9-----	240	2,900	1,880	1		}	}	}				
10-----	103	640	178	1								
11-----	61	360	59	0	--				0			
12-----	35	330	31	0	--				0			
13-----	28	310	23	0	--				0			
14-----	22	300	18	0	--				0			
15-----	37	--	1/30	0	--				0			
16-----	45	320	39	0	--	0	}	}	}			
17-----	198	5,100	2/3,320	0	--	0						
18-----	154	--	--	0	--	0						
19-----	121	--	--	0	--	0						
20-----	114	--	1/150	0	--	0	}	}	}			
21-----	114	--	--	0	--	0						
22-----	1,160	6,400	2/65,000	0	--	0						
23-----	370	8,320	2/8,900	0	--	0						
24-----	234	4,200	2,650	0	--	0	}	}	}			
25-----	181	2,200	1,080	0	--	0						
26-----	128	1,600	553	0	--	0						
27-----	86	--	--	0	--	0						
28-----	66	--	--	0	--	0	}	}	}			
29-----	66	--	1/90	0	--	0						
30-----	50	--	--	0	--	0						
31-----	35	--	--	0	--	0						
Total -	5,217	--	126,200	75.2	--	3/15	0	--	0			

1/Estimated.

2/Sediment discharge computed by subdividing day.

3/Includes sediment discharge for days of less than 1.0 ton.

## KANSAS RIVER BASIN--Continued

## REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0	--	0	42	228	26	121	1,150	376
2-----	1.4	50	--	47	230	29	132	600	214
3-----	7.6	130	3	52	240	34	128	--	1/110
4-----	7.6	--	1/2	56	280	42	70	}	1/22
5-----	7.6	--	1/1	69	295	55	55		
6-----	8.9	}	20	66	345	61	50		
7-----	8.9			66	--	1/80	60		
8-----	10			75	620	126	50		
9-----	10			92	622	154	50		
10-----	7			80	620	134	55		
11-----	4	}	20	83	--	1/280	50	}	1/80
12-----	2			99	685	183	60		
13-----	1.2			117	640	202	65		
14-----	2.0			114	600	185	65		
15-----	2.8			110	--	1/180	75		
16-----	6.2	}	40	106	630	180	100	--	1/65
17-----	7.6			106	--	1/240	110	--	1/80
18-----	8.9			117	960	303	110	--	1/80
19-----	8.9			124	1,360	455	120	--	1/95
20-----	8.9			158	1,500	640	110	--	1/80
21-----	9.6	27	--	75	--	1/260	120	--	1/95
22-----	9.6	--	1/1	45	--	1/100	130	245	86
23-----	8.9	59	1	25	--	1/30	140	--	1/130
24-----	11	52	2	30	263	21	150	--	1/150
25-----	16	--	1/4	145	1,300	508	170	--	1/200
26-----	23	--	1/9	124	1,960	656	200	--	1/270
27-----	33	168	15	120	--	1/300	200	--	1/270
28-----	38	158	16	130	--	1/200	230	--	1/360
29-----	42	183	21	120	--	1/160	240	660	428
30-----	42	255	29	117	1,480	468	160	1,410	609
31-----	42	225	26	--	--	--	110	--	1/80
Total-	396.6	--	2/138	2,710	--	6,290	3,486	--	4,040
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	130	--	1/110	65	--	1/28	222	1,380	827
2-----	140	--	1/140	60	109	18	230	2,750	1,710
3-----	140	--	1/140	80	}	1/55	180	--	1/220
4-----	150	--	1/150	90			140	--	1/130
5-----	150	214	87	90			120	--	1/95
6-----	150	--	1/150	80			90	--	1/50
7-----	280	--	1/550	80			90	--	1/50
8-----	320	--	1/750	100	}	1/55	120	--	1/95
9-----	170	--	1/200	110			120	--	1/95
10-----	176	2,200	1,040	95			120	--	1/95
11-----	171	--	1/940	90			100	--	1/65
12-----	171	--	1/940	90			110	--	1/80
13-----	117	--	1/420	85	}	1/55	210	--	1/300
14-----	96	--	1/280	100			340	--	1/850
15-----	63	--	1/120	95			390	--	1/14,000
16-----	45	--	1/12	80	180	39	1,090	11,100	32,700
17-----	30	--	1/7	130	420	147	448	--	1/7,300
18-----	35	--	1/8	400	--	1/1,200	263	--	1/2,400
19-----	55	320	48	520	980	1,380	207	--	1/1,400
20-----	80	--	1/40	490	--	1/1,800	217	--	1/1,600
21-----	110	--	1/80	370	--	1/1,000	212	--	1/1,500
22-----	180	--	1/220	310	--	1/700	196	1,150	609
23-----	220	--	1/340	470	--	1/1,600	162	1,000	437
24-----	207	--	1/1,400	440	--	1/1,400	154	700	291
25-----	106	--	1/340	240	4,000	2,590	158	630	269
26-----	89	--	1/240	246	--	1/2,000	150	--	1/260
27-----	40	--	1/10	196	--	1/1,300	158	--	1/480
28-----	30	--	1/7	154	--	1/750	263	--	1/850
29-----	25	--	1/6	158	--	1/800	275	2,000	1,480
30-----	40	--	1/10	--	--	--	240	2,400	1,560
31-----	40	--	1/10	--	--	--	207	--	1/1,100
Total-	3,756	--	8,800	5,514	--	17,440	6,982	--	72,900

1/Estimated.

2/Includes sediment discharge for days of less than 1.0 ton.

KANSAS RIVER BASIN--Continued  
 REPUBLICAN RIVER AT TRENTON, NEBR.--Continued  
 Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	191	950	490	150	600	243	240	2,690	1,740
2-----	176	625	297	257	2,400	1,660	167	1,740	785
3-----	171	880	406	406	4,080	4,470	137	960	355
4-----	158	900	384	414	3,160	3,530	106	1,000	286
5-----	141	900	343	329	1,900	1,690	117	620	196
6-----	141	840	320	240	1,120	726	86	540	125
7-----	128	900	311	181	900	440	222	--	1/2,200
8-----	145	340	133	154	840	349	171	4,200	1,940
9-----	145	280	110	121	880	288	96	2,490	645
10-----	132	300	107	106	1,080	309	56	1,200	181
11-----	117	300	95	99	1,080	289	37	770	77
12-----	132	330	118	103	1,170	325	38	680	70
13-----	137	510	189	141	1,530	582	37	460	46
14-----	154	--	1/240	158	1,300	555	37	493	49
15-----	150	600	243	132	940	335	5,650	24,200	3/480,000
16-----	145	550	215	99	710	190	6,740	21,600	3/492,000
17-----	137	610	226	80	570	123	1,990	14,700	2/83,400
18-----	132	720	257	58	420	66	814	9,300	20,500
19-----	114	820	252	45	320	39	742	4,400	8,810
20-----	106	370	106	28	270	20	3,050	--	1/173,000
21-----	103	210	58	22	200	12	1,290	10,600	3/37,500
22-----	124	300	100	17	150	7	2,320	--	1/114,000
23-----	128	350	121	723	8,260	3/37,700	550	12,000	17,800
24-----	128	600	207	478	8,060	3/11,000	430	3,700	4,300
25-----	124	--	1/160	295	5,100	4,060	336	2,900	2,630
26-----	121	320	105	196	1,700	900	590	--	1/5,200
27-----	137	--	1/100	121	1,120	368	4,490	--	1/346,000
28-----	132	--	1/95	86	1,020	237	2,410	--	1/132,000
29-----	121	290	95	191	1,450	748	742	12,500	3/25,200
30-----	110	360	107	322	4,200	3,650	422	6,000	6,840
31-----	--	--	--	302	4,130	3,370	--	--	--
Total -	4,080	--	5,990	6,054	--	78,280	34,113	--	1,958,000
	July			August			September		
1-----	309	3,300	2,750	9.6	176	5	0	--	0
2-----	246	2,300	1,530	7.6	86	2	0	--	0
3-----	196	1,390	736	19	--	1/60	0	--	0
4-----	171	1,020	471	30	350	28	0	--	0
5-----	154	950	395	33	1,130	101	0	--	0
6-----	154	900	374	19	600	31	0	--	0
7-----	145	730	286	16	330	14	0	--	0
8-----	167	1,150	519	25	--	1/30	0	--	0
9-----	453	--	1/6,000	28	820	62	16	--	1/38
10-----	390	4,320	4,550	106	--	1/1,800	19	--	1/40
11-----	263	2,100	1,490	167	7,800	3,520	8.2	580	13
12-----	162	1,210	529	106	5,500	1,570	3.6	320	3
13-----	117	1,050	332	72	1,300	253	.4	--	--
14-----	121	1,170	382	54	975	142	0	--	0
15-----	167	1,950	879	32	690	60	0	--	0
16-----	202	1,930	1,050	52	--	1/420	0	--	0
17-----	167	1,580	712	202	8,000	4,360	0	--	0
18-----	154	2,180	906	124	4,800	1,610	0	--	0
19-----	191	1,730	892	78	--	1/550	0	--	0
20-----	154	1,360	565	40	1,440	156	0	--	0
21-----	150	1,410	571	23	--	1/38	0	--	0
22-----	114	1,280	394	12	--	1/19	0	--	0
23-----	80	750	162	5.5	--	1/11	0	--	0
24-----	75	600	122	3.2	--	1/7	0	--	0
25-----	61	630	104	.7	--	--	0	--	0
26-----	52	1,100	154	3.2	610	5	0	--	0
27-----	45	340	41	2.8	260	2	0	--	0
28-----	37	180	18	1.4	--	--	0	--	0
29-----	28	174	13	1.2	--	--	0	--	0
30-----	18	154	8	.3	--	--	0	--	0
31-----	13	142	5	0	--	0	--	--	--
Total -	4,756	--	26,940	1,273.5	--	2/14,860	47.2	--	2/84

Total discharge for year (second-foot-days) ----- 73,168.3  
 Total load for year (tons) ----- 2,194,000  
 1/Estimated. 3/Sediment discharge computed by subdividing day.  
 2/Includes sediment discharge for days of less than 1.0 ton.

KANSAS RIVER BASIN--Continued  
 REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1946 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment												Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
May 29, 1947 -----	1:05 p. m.	4,480	40,000	4,340	--	10	15	55	62	73	82	92	96	98		BN
May 29 -----	1:15 p. m.	4,480	40,000	5,560	22	32	42	47	55	70	86	93	96	98		BN
June 15, 1948 -----	9:15 a. m.	12,600	36,700	2,810	9	16	26	33	41	56	70	81	99	100		BN
June 16 -----	3:10 p. m.	13,600	31,900	1,890	10	19	29	36	46	62	84	91	99	100		BN
June 22 -----	4:10 p. m.	1,700	11,800	1,410	15	22	30	36	42	58	76	88	99	100		BN



## KANSAS RIVER BASIN--Continued

## REPUBLICAN RIVER NEAR ORLEANS, NEBR.

LOCATION.--At gaging station at bridge on State Highway 89, 2 miles west of Orleans, Harlan County, and  $2\frac{1}{4}$  miles upstream from Sappa Creek.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 881,000 tons per day June 22; minimum, not determined.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 16, 1948	2,790	7.4	396	39	0.13	43	11	31	202	44	4.0	0.8	0.8	0.8	0.15	296	0.40	153	153	0	30
June 22	13,100	7.3	336	34	.04	42	8.6	18	200	10	1.1	1.1	.7	1.2	.08	239	.33	140	140	0	22
Aug. 6	231	7.8	323	30	.05	40	8.0	20	179	18	4.5	4.5	.3	3.8	.07	237	.32	133	133	0	24
Sept. 1	137	7.7	381	33	.02	48	9.5	19	198	26	6.0	6.0	.5	2.2	.15	256	.35	159	159	0	21

2/Sediment discharge computed by subdividing day.

## KANSAS RIVER BASIN--Continued

## REPUBLICAN RIVER NEAR ORLEANS, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	524	1,290	1,830	256	125	86	894	18,300	2/44,400
2-----	524	1,320	1,870	250	88	59	520	9,300	13,100
3-----	498	1,000	1,340	288	148	115	417	4,180	4,710
4-----	462	1,070	1,330	294	218	173	347	2,430	2,280
5-----	438	830	982	434	2,120	2,480	297	1,770	1,420
6-----	430	750	871	466	1,800	2,260	266	1,540	1,111
7-----	402	960	1,040	420	1,390	1,580	245	1,340	886
8-----	418	810	914	384	682	707	220	1,090	647
9-----	406	625	686	350	380	359	195	845	445
10-----	420	697	790	322	285	248	187	962	486
11-----	414	690	771	288	218	170	223	1,390	837
12-----	446	678	816	256	160	111	218	1,510	889
13-----	430	677	786	248	551	369	666	20,800	2/43,500
14-----	436	755	889	248	705	472	546	16,800	2/25,200
15-----	398	862	926	240	859	557	294	9,920	2/8,200
16-----	372	725	728	240	967	627	2,150	17,500	2/126,000
17-----	372	628	631	244	835	550	3,170	16,600	2/107,000
18-----	380	680	698	230	689	428	2,170	19,200	2/115,000
19-----	370	658	657	210	716	406	1,300	12,200	2/43,400
20-----	344	555	515	186	450	226	1,030	7,400	20,600
21-----	350	472	446	170	525	241	2,220	14,100	2/104,000
22-----	330	460	410	160	402	174	18,400	18,900	2/881,000
23-----	322	397	345	150	323	131	8,550	12,400	2/308,000
24-----	322	425	369	140	321	121	2,520	7,570	2/53,000
25-----	320	364	314	130	390	137	1,780	9,880	2/50,000
26-----	308	322	268	400	6,280	6,780	3,250	9,580	2/122,000
27-----	294	332	264	340	4,600	4,220	11,100	19,700	2/593,000
28-----	288	253	197	270	3,020	2,200	11,500	24,400	2/758,000
29-----	274	146	108	260	2,130	1,500	5,290	20,100	2/340,000
30-----	266	190	136	280	2,340	1,770	1,990	11,100	2/61,900
31-----	--	--	--	900	27,400	2/68,100	--	--	--
Total--	11,558	--	21,930	9,054	--	97,360	81,955	--	3,894,000
	July			August			September		
1-----	1,380	6,290	23,400	442	4,750	5,670	137	980	363
2-----	1,070	3,960	11,400	307	2,510	2,080	114	820	252
3-----	906	2,670	6,530	218	1,680	989	507	12,600	2/18,100
4-----	799	1,960	4,230	230	1,510	2/938	243	4,190	2/2,970
5-----	716	1,430	2,760	358	5,160	4,990	147	1,400	556
6-----	650	1,330	2,330	229	3,650	2,260	127	960	329
7-----	591	1,160	1,850	202	1,360	742	153	1,020	421
8-----	534	1,490	2,150	187	666	336	215	1,930	1,120
9-----	610	3,880	6,390	183	668	330	226	2,520	1,540
10-----	1,760	12,100	2/62,400	169	741	338	147	1,340	532
11-----	1,080	6,900	20,100	178	781	375	110	675	200
12-----	894	3,750	9,050	160	750	324	92	458	114
13-----	738	2,410	4,800	127	713	244	82	406	90
14-----	650	1,770	3,110	876	14,100	2/44,700	75	474	84
15-----	610	1,330	2,190	630	8,000	2/14,300	68	318	58
16-----	690	1,720	3,200	394	4,400	4,680	61	271	45
17-----	846	5,460	12,500	294	1,490	1,180	53	248	35
18-----	876	5,740	13,600	231	1,000	624	50	230	31
19-----	655	3,220	5,690	197	925	492	46	216	27
20-----	615	2,500	4,150	207	1,010	564	45	216	26
21-----	506	2,000	2,730	185	1,140	569	46	233	29
22-----	413	--	1/2,030	158	901	384	44	217	26
23-----	369	--	1/1,640	129	300	104	41	209	23
24-----	330	--	1/1,320	110	345	102	44	209	25
25-----	287	--	1/1,010	95	385	99	41	218	24
26-----	272	--	1/830	86	320	74	41	182	20
27-----	251	--	1/698	477	6,190	2/19,300	41	188	21
28-----	433	--	1/4,990	755	--	1/19,400	40	168	18
29-----	1,720	14,100	2/33,000	471	--	1/5,720	40	177	19
30-----	2,290	25,500	2/35,000	278	--	1/2,330	40	181	20
31-----	810	14,500	2/31,700	183	--	1/865	--	--	--
Total--	24,351	--	546,800	8,746	--	135,100	3,116	--	27,120
Total discharge for year (second-foot-days)-----213,751									
Total load for year (tons)-----5,344,000									
1/Estimated. 2/Sediment discharge computed by subdividing day.									

KANSAS RIVER BASIN--Continued  
REPUBLICAN RIVER NEAR ORLEANS, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 194<sup>1</sup> to September 1948  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500
June 14, 1948	3:48 p. m.	466	12,200	3,220	5	21	63	78	85	92	96	98	100	BN
June 16	4:38 p. m.	2,790	23,200	1,840	13	27	43	54	65	81	88	92	98	BN
June 17	5:23 p. m.	5,230	24,300	1,860	10	25	41	50	58	74	82	87	96	BN
June 22	5:40 a. m.	11,300	28,100	7,350	4	7	19	52	60	78	86	96	100	BN
June 22	9:25 a. m.	13,300	22,000	6,770	4	8	23	58	64	78	89	97	100	BN
June 22	11:05 a. m.	13,100	19,600	1,820	18	31	48	60	69	78	86	98	100	BN
June 22	2:30 p. m.	15,200	17,000	3,540	10	22	52	59	68	79	84	94	99	BN
June 22 1/2	11:59 p. m.	24,300	13,400	2,060	20	36	60	66	74	80	84	94	100	BN
June 23	9:50 a. m.	9,430	15,000	2,610	15	26	32	40	50	70	86	96	100	BN
June 23	10:15 a. m.	9,090	13,900	2,240	14	24	38	48	58	78	90	97	100	BN
June 23	10:15 a. m.	9,090	13,900	2,150	19	25	34	42	54	72	90	98	100	BW
June 23	1:30 p. m.	5,380	12,000	2,480	18	32	36	46	58	76	86	92	99	BN
June 23	4:00 p. m.	4,360	11,200	1,960	20	31	39	48	61	81	92	96	100	BN
July 5	7:30 a. m.	615	1,530	1,000	29	45	55	67	77	90	95	96	100	BN
Aug. 2	12:10 p. m.	307	2,440	1,120	44	66	83	92	97	98	99	100	100	BN
Aug. 14	6:10 p. m.	1,190	21,400	7,980	4	10	24	51	64	82	88	91	94	BN

1/ Sample is composite of overflow and main channels.

1/ Sample is composite of overflow and main channels.

## KANSAS RIVER BASIN--Continued

## MEDICINE CREEK AT CAMBRIDGE, NEBR.

LOCATION.--At bridge in City Park at east edge of Cambridge, Furnas County, about 500 feet upstream from bridge on U. S. Highways 6 and 34, 0.5 mile upstream from mouth, and 1.8 miles downstream from gaging station.

DRAINAGE AREA.--1,070 square miles of which only about 680 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Sediment records: November 1945 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 711,000 tons per day June 21; minimum, 11 tons per day Jan. 1.

EXTREMES, 1945-48.--Sediment loads: Maximum, 3,700,000 (estimated) tons per day June 22, 1947; minimum, 4 tons per day Jan. 31, 1947.

REMARKS.--Surface water gage moved  $1\frac{1}{2}$  miles upstream on Apr. 26. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	46	1,170	145	53	650	93	65	480	84
2-----	43	1,500	174	57	540	83	64	520	90
3-----	48	1,870	242	57	670	103	62	470	79
4-----	50	2,060	278	64	780	135	36	570	55
5-----	50	1,910	258	62	760	127	33	450	40
6-----	50	2,030	274	66	780	139	51	1,000	138
7-----	48	2,130	276	61	600	99	63	540	92
8-----	46	1,980	246	62	590	99	63	420	71
9-----	49	2,230	295	65	560	98	54	470	68
10-----	48	1,950	253	65	530	93	56	480	73
11-----	46	1,130	140	62	720	121	50	540	73
12-----	47	930	118	66	520	93	45	700	85
13-----	48	1,250	162	65	530	93	50	680	92
14-----	48	1,320	171	67	470	85	55	590	88
15-----	51	1,450	200	69	570	106	65	560	98
16-----	53	1,390	199	68	480	88	65	480	84
17-----	51	1,320	182	65	450	79	65	470	82
18-----	53	1,320	189	65	530	93	60	570	92
19-----	53	1,090	156	65	550	96	70	530	100
20-----	53	870	124	71	570	109	70	610	115
21-----	53	760	109	64	480	83	75	970	196
22-----	50	720	97	39	650	68	85	980	225
23-----	51	740	102	69	1,500	279	85	750	172
24-----	51	680	94	84	660	150	70	370	70
25-----	53	710	102	84	1,220	277	65	500	88
26-----	56	860	130	78	980	206	60	570	92
27-----	57	1,020	157	66	620	110	60	620	100
28-----	57	1,640	252	65	490	86	70	460	87
29-----	85	3,100	711	66	480	86	65	520	91
30-----	57	1,360	209	64	480	83	35	420	40
31-----	54	1,020	149	--	--	--	20	220	12
Total -	1,605	--	6,190	1,954	--	3,460	1,832	--	2,870

## MISSOURI RIVER BASIN

## KANSAS RIVER BASIN--Continued

## MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	20	200	11	55	145	22	58	840	132
2-----	20	220	12	55	145	22	42	1,290	146
3-----	45	480	58	60	170	28	83	790	134
4-----	120	1,490	483	55	175	26	40	670	72
5-----	80	740	160	50	205	28	35	880	83
6-----	80	780	168	55	175	26	80	1,390	300
7-----	75	920	186	60	160	26	75	1,300	263
8-----	70	970	183	45	205	25	100	480	130
9-----	75	1,110	225	35	200	19	100	620	167
10-----	70	1,050	198	35	175	16	45	440	53
11-----	65	1,600	281	35	190	18	25	260	18
12-----	40	900	97	30	155	13	45	300	36
13-----	20	317	17	30	165	13	65	500	88
14-----	25	200	14	35	225	21	80	2,100	454
15-----	25	335	23	45	370	45	1,000	29,700	80,200
16-----	30	241	20	70	670	127	1,520	63,300	1/285,000
17-----	20	300	16	90	350	85	465	24,000	30,100
18-----	25	302	20	100	380	103	199	8,200	4,410
19-----	40	218	24	85	590	135	126	3,530	1,200
20-----	40	240	26	70	470	89	102	2,360	650
21-----	65	745	131	75	510	103	91	1,840	452
22-----	70	540	102	75	870	176	84	1,700	386
23-----	70	250	47	110	1,150	342	80	1,430	309
24-----	35	180	17	120	670	217	73	1,480	292
25-----	45	140	17	80	1,930	417	71	1,480	284
26-----	65	165	29	160	2,500	1,080	73	1,440	284
27-----	55	170	25	164	4,620	2,050	85	2,890	663
28-----	35	145	14	93	2,520	633	115	1,440	447
29-----	45	160	19	74	1,080	216	75	1,120	227
30-----	40	185	20	--	--	--	64	1,230	213
31-----	50	145	20	--	--	--	67	1,070	194
Total -	1,560	--	2,660	2,046	--	6,120	5,143	--	407,400
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	63	780	133	55	496	74	64	1,680	290
2-----	62	780	131	56	510	77	82	2,180	365
3-----	58	1,100	172	66	1,040	185	58	1,110	174
4-----	60	870	157	56	504	76	54	760	111
5-----	60	860	139	54	535	78	51	720	99
6-----	59	710	113	54	530	77	50	820	111
7-----	57	680	105	53	535	77	45	770	94
8-----	59	790	126	53	590	84	42	570	65
9-----	59	700	112	52	558	78	42	605	69
10-----	57	940	145	51	495	68	46	700	87
11-----	57	780	120	52	545	77	50	2,330	315
12-----	59	700	112	52	480	67	366	28,800	1/49,400
13-----	59	680	108	52	441	62	152	18,500	1/8,610
14-----	56	630	95	52	525	74	102	6,200	1,710
15-----	54	650	95	51	522	72	129	14,800	1/7,360
16-----	55	680	101	49	462	61	70	3,200	605
17-----	54	500	73	48	485	63	65	1,450	254
18-----	54	610	89	46	485	60	62	1,350	226
19-----	53	600	86	46	445	55	58	980	153
20-----	53	690	99	46	530	66	70	1,450	274
21-----	54	560	82	45	630	77	6,800	25,400	1/711,000
22-----	55	470	70	45	580	70	3,220	23,300	1/240,000
23-----	54	470	69	44	455	54	150	9,500	3,850
24-----	57	550	85	43	398	46	545	31,800	1/73,700
25-----	60	790	128	42	365	41	85	4,300	987
26-----	58	650	102	42	375	43	118	5,830	1/5,090
27-----	57	660	102	42	398	45	1,070	42,400	1/140,000
28-----	56	480	73	42	402	46	1,910	64,700	1/463,000
29-----	56	500	76	43	500	58	151	9,890	1/4,420
30-----	55	500	74	111	8,670	1/4,950	93	4,240	1,060
31-----	--	--	--	106	8,980	1/3,360	--	--	--
Total -	1,710	--	3,170	1,649	--	10,320	15,780	--	1,714,000

1/Sediment discharge computed by subdividing day.

## KANSAS RIVER BASIN--Continued

## MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	83	1,400	314	94	4,600	1,170	57	3,010	463
2-----	80	1,330	287	89	1,400	336	77	10,900	2,270
3-----	70	860	163	200	18,200	$\frac{1}{16},500$	45	2,570	312
4-----	64	920	159	152	16,400	$\frac{1}{8},040$	43	1,170	136
5-----	60	750	122	80	4,300	929	42	1,010	115
6-----	56	650	98	70	1,500	284	46	1,450	180
7-----	52	600	84	63	1,220	208	50	2,700	364
8-----	52	540	76	60	1,030	167	50	1,940	262
9-----	61	1,790	295	58	1,030	161	50	1,610	217
10-----	64	1,190	206	60	1,450	235	50	1,600	216
11-----	61	920	152	58	1,660	260	47	1,570	199
12-----	57	890	137	53	1,450	207	46	1,540	191
13-----	59	1,400	223	62	5,870	983	44	1,510	179
14-----	62	1,580	264	86	12,500	2,900	41	1,480	164
15-----	85	6,220	1,430	80	5,390	1,160	39	1,450	153
16-----	92	4,510	1,120	58	3,370	528	36	1,400	136
17-----	102	9,210	$\frac{1}{2},730$	52	2,060	289	37	1,320	132
18-----	98	6,200	1,640	47	1,270	161	38	1,340	137
19-----	77	2,750	572	44	1,990	236	39	1,390	146
20-----	67	1,520	275	41	1,820	201	40	1,440	156
21-----	60	1,350	219	40	1,570	170	40	1,470	159
22-----	58	1,200	188	39	1,300	137	41	1,240	137
23-----	53	1,050	150	36	1,030	100	41	1,030	114
24-----	54	920	134	35	1,450	137	43	1,110	129
25-----	53	900	129	33	1,260	112	42	1,030	117
26-----	90	5,440	1,320	46	4,850	602	42	890	101
27-----	76	7,050	1,450	123	22,200	7,370	42	870	99
28-----	62	1,920	321	109	18,200	5,360	42	860	98
29-----	1,170	40,100	$\frac{1}{225},000$	56	7,680	1,160	43	850	99
30-----	226	19,900	$\frac{1}{13},400$	48	2,590	336	43	840	98
31-----	124	9,000	3,010	45	1,770	215	--	--	--
Total -	3,428	--	255,700	2,117	--	50,650	1,336	--	7,280

Total discharge for year (second-foot-days)----- 40,160

Total load for year (tons)----- 2,470,000

 $\frac{1}{2}$  Sediment discharge computed by subdividing day.

## KANSAS RIVER BASIN--Continued

## MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment												Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
June 16, 1948	9:32 a. m.	70	3,060	1,050	9	18	31	52	66	78	85	91	100		BN
June 21	8:45 p. m.	38,400	33,400	2,860	11	20	24	34	53	75	83	86	94		BW
June 21	9:56 p. m.	34,800	30,900	2,750	12	18	24	36	52	81	91	93	96		BW
June 21	11:00 p. m.	23,600	28,200	2,490	14	20	26	38	54	74	84	88	95		BN
June 21	11:00 p. m.	23,600	28,200	2,030	18	24	34	46	63	82	89	92	96		BW
June 22	4:32 a. m.	6,810	33,000	2,190	13	19	30	39	55	76	86	91	95		BN
June 22	5:00 a. m.	6,050	32,200	4,660	14	20	30	41	56	76	85	90	94		BN
June 25	8:20 a. m.	88	5,210	3,640	16	22	68	90	97	100	--	--	--		BN
June 25	8:20 a. m.	88	5,210	1,950	50	60	77	90	96	99	100	--	--		BW
June 28	10:30 a. m.	1,880	87,100	3,380	7	10	13	19	36	76	91	95	97		BN
July 7	1:35 p. m.	50	1,360	2,090	2	4	10	18	36	60	82	91	96		BN



## KANSAS RIVER BASIN--Continued

## SAPPA CREEK NEAR BEAVER CITY, NEBR.

LOCATION.--At downstream side of bridge on U. S. Highway 283, 200 feet upstream from gaging station and 7 miles southwest of Beaver City, Furnas County.

RECORDS AVAILABLE.--Sediment records: April 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 25,100 tons per day June 27; minimum, 0.2 ton per day on many days.

EXTREMES, April 1947-September 1948.--Sediment loads: Maximum, 42,700 tons per day June 22, 1947; minimum, 0.2 ton per day on some days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Chemical analyses, in parts per million, water year October 1947 to October 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium	
															Parts per million	Tons per acre- foot	Tons per day	Total	Non- carbon- ate		
June 20, 1948 -----	405	7.6	237	22	0.00	38	5.0	14	166	4.8	1.6	0.2	0.08	2.0	0.08	188	0.26	115	0	21	
Aug. 6 -----	201	7.6	482	26	.00	65	9.5	22	250	29	9.6	.3	.0	.0	.10	338	.46	201	201	0	19
Sept. 1 -----	7.8	7.7	447	26	.00	62	11	19	246	26	6.0	.5	2.9	.00	.00	302	.41	200	200	0	17

KANSAS RIVER BASIN--Continued  
 SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1.6	90	0.4	2.2	79	0.5	4.2	--	1/0.8
2-----	1.4	94	.4	3.8	119	1.2	3.9	67	.7
3-----	1.5	127	.5	4.6	166	2.1	4.5	--	1/.8
4-----	1.5	130	.5	1.4	109	.4	6.1	61	1.0
5-----	1.7	130	.6	1.6	118	.5	5.6	--	1/1.0
6-----	1.3	136	.5	2.1	143	.8	5.6	78	1.2
7-----	1.3	161	.6	2.0	142	.8	5.6	--	--
8-----	1.2	--	.5	1.6	137	.6	5.9	--	--
9-----	1.1	--	.5	1.6	153	.7	5.7	--	--
10-----	1.2	148	.5	2.8	150	1.1	5.6	--	--
11-----	.9	127	.3	2.8	145	1.1	5.7	--	--
12-----	.7	109	.2	2.2	140	.8	5.2	--	--
13-----	.5	122	.2	2.3	135	.8	5	--	--
14-----	.6	138	.2	3.4	130	1.2	5	--	--
15-----	1.8	128	.6	3.0	135	1.1	5	--	--
16-----	1.6	127	.5	2.5	135	.9	5	--	--
17-----	1.2	134	.4	3.9	135	1.4	5	--	--
18-----	1.4	131	.5	3.9	133	1.4	4	--	--
19-----	2.2	130	.8	4.1	132	1.5	4	--	--
20-----	1.5	138	.6	4.8	--	1/1.6	4	--	--
21-----	1.6	129	.6	5.6	--	1/1.8	4	--	--
22-----	1.7	118	.5	5.4	--	1/1.7	4	--	--
23-----	1.4	107	.4	3.9	--	1/1.2	4	--	--
24-----	1.7	103	.5	3.9	105	1.1	4	--	--
25-----	1.4	110	.4	3.9	100	1.0	4	--	--
26-----	2.2	87	.5	4.4	93	1.1	4	--	--
27-----	2.0	92	.5	4.8	--	1/1.1	4	--	--
28-----	3.9	101	1.1	4.5	80	1.0	4	--	--
29-----	2.8	109	.8	4.4	--	1/.9	4	--	--
30-----	4.9	117	1.5	5.1	73	1.0	4	--	--
31-----	4.2	118	1.3	--	--	--	4	--	--
Total -	54.0	--	17.4	102.5	--	32.4	144.6	--	2/25
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5	--	--	3	--	--	8	--	1/13
2-----	6	--	--	3	--	--	7	314	5.9
3-----	6	--	--	3	--	--	6	--	--
4-----	7	--	--	3	--	--	6	--	--
5-----	8	--	--	3	--	--	5	--	--
6-----	9	--	--	3	--	--	4	--	--
7-----	10	--	--	3	--	--	4	--	--
8-----	9	--	--	3	--	--	4	--	--
9-----	8	--	--	3	--	--	4	--	--
10-----	7	--	--	3	--	--	4	--	--
11-----	6	--	--	3	--	--	4	--	--
12-----	6	--	--	3	--	--	4	166	1.8
13-----	5	--	--	3	--	--	5	--	1/2.2
14-----	5	--	--	4	--	--	5	--	1/2.5
15-----	5	--	--	5	--	--	11	591	18
16-----	5	--	--	9	--	--	187	1,820	3/1,160
17-----	4	--	--	16	694	30	223	2,600	3/1,610
18-----	4	--	--	30	687	54	201	4,300	3/2,320
19-----	4	--	--	30	570	46	132	4,310	1,540
20-----	4	--	--	28	--	1/34	64	4,100	708
21-----	4	--	--	25	--	1/28	37	1,870	187
22-----	4	--	--	22	288	17	21	1,070	61
23-----	4	--	--	20	232	12	16	814	35
24-----	4	--	--	18	--	1/10	11	809	24
25-----	3	--	--	15	--	1/5.9	10	621	17
26-----	3	118	1.0	13	118	4.1	9.2	403	10
27-----	3	--	--	10	795	3/22	8.6	382	8.9
28-----	3	--	--	9	3,280	3/80	8.6	308	7.2
29-----	3	--	--	9	--	1/33	8.6	228	5.3
30-----	3	--	--	--	--	--	8.4	182	4.1
31-----	3	--	--	--	--	--	8.0	141	2/3.0
Total -	160	--	2/46	302	--	2/408	1,034.4	--	2/7,770

1/Estimated.

2/Includes estimated load for missing days.

3/Sediment discharge computed by subdividing day.

KANSAS RIVER BASIN--Continued  
SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	7.6	102	2.1	4.5	91	1.1	174	5,640	2,650
2-----	7.2	68	1.3	4.6	112	1.4	185	5,770	3/2,940
3-----	6.5	53	.9	6.1	124	2.0	303	3,950	3,230
4-----	6.3	45	.8	5.9	117	1.9	96	2,110	547
5-----	6.1	41	.7	6.3	124	2.1	45	1,600	194
6-----	6.1	46	.8	6.5	105	1.8	33	1,270	113
7-----	5.9	63	1.0	6.3	96	1.6	23	1,010	63
8-----	5.9	50	.8	5.7	94	1.4	18	780	38
9-----	6.1	38	.6	5.6	93	1.4	43	1,550	3/223
10-----	6.3	42	.7	5.1	91	1.2	36	1,310	127
11-----	5.9	57	.9	4.6	66	.8	16	1,030	44
12-----	6.8	51	.9	4.4	63	.7	12	830	27
13-----	6.5	46	.8	4.4	63	.7	16	1,130	49
14-----	6.6	43	.8	4.2	61	.7	17	1,100	50
15-----	6.8	44	.8	4.1	65	.7	18	1,120	54
16-----	6.6	49	.9	4.1	72	.8	12	550	18
17-----	6.5	55	1.0	4.1	82	.9	10	420	11
18-----	7.2	55	1.1	3.9	93	1.0	41	1,470	3/197
19-----	6.3	56	1.0	3.5	110	1.0	143	3,950	3/2,240
20-----	5.7	61	.9	3.4	98	.9	428	4,220	4,880
21-----	5.4	46	.7	3.1	97	.8	560	4,650	3/7,480
22-----	5.4	35	.5	3.1	117	1.0	536	6,670	3/9,630
23-----	5.4	28	.4	2.8	95	.7	757	7,150	3/14,400
24-----	5.6	22	.3	2.7	88	.6	383	4,910	3/4,980
25-----	5.2	16	.2	3.0	126	1.0	215	5,660	3/3,360
26-----	5.1	14	.2	8.8	229	5.4	295	7,710	3/11,000
27-----	4.9	16	.2	9.8	186	4.9	646	14,300	3/25,100
28-----	4.9	40	.5	6.3	131	2.2	808	9,240	3/19,500
29-----	4.9	58	.8	3.9	95	1.0	652	4,880	3/8,880
30-----	4.8	72	.9	7.4	4,870	3/131	138	4,120	1,540
31-----	--	--	--	73	2,550	3/1,050	--	--	--
Total -	180.5	--	23.5	221.2	--	1,220	6,659	--	123,500
Day	July			August			September		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	208	4,380	2,460	18	422	20	4.8	148	1.9
2-----	168	2,560	1,160	16	315	14	4.2	122	1.4
3-----	91	1,750	430	15	320	13	3.7	120	1.2
4-----	70	1,850	350	26	570	40	3.1	95	.8
5-----	50	1,400	189	34	606	56	3.0	98	.8
6-----	42	930	105	116	4,020	3/1,780	3.7	135	1.3
7-----	38	630	65	98	3,140	3/889	3.2	118	1.0
8-----	34	530	49	43	1,620	188	5.6	584	8.8
9-----	60	2,230	3/419	30	1,410	114	32	2,180	3/228
10-----	132	5,330	3/2,400	25	1,110	75	34	3,980	3/424
11-----	231	8,300	3/5,310	21	750	42	14	1,780	67
12-----	93	5,820	3/1,540	16	550	24	9.0	1,280	31
13-----	45	3,350	407	79	3,550	3/996	10	1,190	32
14-----	102	9,340	3/4,090	114	3,160	3/1,000	10	1,080	29
15-----	60	7,040	3/1,140	91	2,800	688	9.2	640	16
16-----	62	2,270	380	69	4,000	3/908	8.2	379	8.4
17-----	255	9,920	3/9,960	206	5,450	3/3,240	6.3	372	6.3
18-----	101	4,620	1,260	58	2,850	446	4.8	143	1.8
19-----	46	2,700	335	34	2,020	185	3.7	144	1.4
20-----	40	1,620	175	24	1,630	106	3.0	--	1/1.0
21-----	40	1,360	147	20	1,410	76	3.7	117	1.2
22-----	66	1,960	349	21	1,350	76	3.2	109	.9
23-----	108	3,490	3/998	18	1,010	49	2.5	--	1/.7
24-----	116	2,320	3/736	12	621	20	2.4	--	1/.6
25-----	58	1,750	274	9.4	424	11	1.8	--	1/.4
26-----	42	1,790	203	9.2	362	9.0	1.7	--	1/.3
27-----	68	9,600	3/1,890	9.6	418	11	1.6	--	1/.3
28-----	32	2,280	197	7.0	309	5.8	1.6	48	.2
29-----	31	1,150	96	8.0	308	6.6	1.8	--	1/.2
30-----	27	570	42	10	262	7.1	2.4	--	1/.3
31-----	21	452	26	6.1	173	2.8	--	--	--
Total -	2,537	--	37,180	1,263.3	--	11,100	198.2	--	868

Total discharge for year (second-foot-days) ----- 12,856.7  
Total load for year (tons) ----- 182,200

1/Estimated.

3/Sediment discharge computed by subdividing day.

KANSAS RIVER BASIN--Continued  
SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 31, 1948	2:30 p.m.	74	2,190	1,260	10	15	22	35	63	98	100	--	--	--	--	BN
May 31	4:12 p.m.	132	3,370	2,160	15	21	34	55	81	93	96	98	99	100	100	BN
May 31	6:45 p.m.	180	8,000	3,470	8	16	42	84	90	96	98	100	--	--	--	BN
May 31	6:55 p.m.	180	8,280	2,700	37	46	75	88	93	96	98	100	--	--	--	BNC
May 31	7:30 p.m.	187	10,500	2,940	18	28	75	89	94	98	100	--	--	--	--	BNC
June 19	9:25 p.m.	319	5,970	1,600	15	34	60	76	87	94	97	99	100	--	--	BN
June 20	12:50 p.m.	416	4,000	2,160	20	48	68	74	87	97	98	100	--	--	--	BN
June 20	3:30 p.m.	428	3,980	3,170	14	40	64	70	78	94	100	--	--	--	--	BN
June 21	9:50 p.m.	747	5,220	2,320	16	34	50	60	78	92	98	99	100	--	--	BN
June 24	1:45 p.m.	279	4,770	2,730	22	53	74	81	91	96	99	100	--	--	--	BN
June 27	1:45 p.m.	690	13,700	3,310	12	27	44	63	72	79	86	92	97	99	99	BN
July 11	12:55 p.m.	303	7,300	3,000	7	18	42	58	72	80	82	95	99	100	100	BN
July 17	9:52 a.m.	363	12,600	2,570	15	30	54	71	83	94	97	100	--	--	--	BN
Aug. 2	8:52 a.m.	17	314	693	40	64	78	84	87	91	94	96	99	100	100	BN
Aug. 7	12:52 p.m.	91	2,750	1,380	28	50	68	81	90	96	98	100	--	--	--	BN
Aug. 17	9:55 a.m.	247	4,950	1,280	22	30	40	54	76	94	98	100	--	--	--	BN
Sept. 10	9:00 a.m.	36	5,390	3,450	44	68	84	92	98	99	100	--	--	--	--	BW

## KANSAS RIVER BASIN--Continued

## SAPPA CREEK NEAR STAMFORD, NEBR.

LOCATION.--At county bridge, 500 feet upstream from gaging station, 2 miles east of Stamford, Harlan County, and  $5\frac{1}{2}$  miles upstream from mouth.  
DRAINAGE AREA, 3,840 square miles, of which only 3,560 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Sediment records: March 1947 to September 1948;

EXTREMES, March-September 1947.--Sediment loads: Maximum, 180,000 tons per day (estimated) June 22; minimum, 4.1 tons per day Sept. 30.

EXTREMES, 1947-48.--Sediment loads: Maximum, 22,000 tons per day June 27; minimum, 0.1 ton per day Sept. 30.

REMARKS.--Records of discharge for water year October 1946 to September 1947 given in Water-Supply Paper 1086. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium carbonate
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
June 16, 1948 -----	76	7.5	275	25	0.10	40	5.0	11	11	154	14	1.6	0.4	3.8	0.10	202	0.27	120	0	15
June 25 -----	984	7.3	218	22	.45	29	3.0		14	130	8.6	.2	.1	.5	.09	164	.22	85	0	27
Aug. 6 -----	50	8.2	452	28	.0	60	10	32	9.3	258	35	5.4	.4	5.3	.11	334	.45	191	0	27
Sept. 1 -----	36	7.6	281	25	.02	39	7.3			156	13	2.0	.5	2.6	.02	198	.27	127	0	14

## KANSAS RIVER BASIN--Continued

## SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	8.6	155	3.6	8.2	30	0.7	12	46	1.5
2-----	8.6	148	3.4	7.8	32	.7	12	27	.9
3-----	8.4	145	3.3	9.9	37	1.0	12	46	1.5
4-----	8.2	145	3.2	8.2	40	.9	9.9	59	1.6
5-----	8.6	145	3.4	7.6	40	.8	13	55	1.9
6-----	7.6	145	3.0	11	24	.7	12	55	1.8
7-----	7.6	145	3.0	8.6	23	.5	14	70	2.6
8-----	7.4	145	2.9	7.2	29	.6	13	108	3.8
9-----	7.2	145	2.8	6.2	203	3.4	13	100	3.5
10-----	6.8	145	2.7	5.4	130	1.9	12	95	3.1
11-----	6.8	144	2.6	6.2	47	.8	13	103	3.6
12-----	6.6	126	2.2	6.6	66	1.2	11	73	2.2
13-----	5.8	94	1.5	6.2	59	1.0	11	63	1.9
14-----	6.0	78	1.3	6.6	51	.9	10	57	1.5
15-----	6.6	66	1.2	8.2	88	1.9	11	51	1.5
16-----	6.2	61	1.0	8.8	100	2.4	11	55	1.6
17-----	6.0	85	1.4	7.4	98	2.0	11	93	2.8
18-----	6.0	68	1.1	8.2	97	2.1	11	98	2.9
19-----	6.0	82	1.3	9.3	95	2.4	11	85	2.5
20-----	6.6	123	2.2	12	92	3.0	12	72	2.3
21-----	5.6	133	2.0	12	88	2.8	12	43	1.4
22-----	5.2	138	1.9	9.9	103	2.8	14	41	1.5
23-----	5.6	144	2.2	9.6	97	2.5	14	48	1.8
24-----	6.4	152	2.6	10	90	2.4	14	57	2.2
25-----	5.0	167	2.2	12	82	2.6	14	77	2.9
26-----	6.2	118	2.0	13	74	2.6	14	102	3.8
27-----	7.6	36	.7	13	70	2.4	16	118	5.1
28-----	8.6	30	.7	12	62	2.0	17	77	3.5
29-----	8.0	26	.6	12	41	1.3	16	55	2.4
30-----	7.2	22	.4	12	45	1.4	16	43	1.8
31-----	11	52	1.5	--	--	--	14	56	2.1
Total -	218.0	--	63.9	275.1	--	51.7	395.9	--	73.5
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	13	58	2.0	9	79	1.9	33	63	5.6
2-----	14	60	2.3	9	47	1.1	31	54	4.5
3-----	13	61	2.1	10	25	.7	30	51	4.1
4-----	17	62	2.8	10	46	1.2	25	64	4.3
5-----	23	53	3.3	10	68	1.8	25	73	4.9
6-----	28	54	4.1	10	125	3.4	19	77	4.0
7-----	35	56	5.3	10	147	4.0	17	76	3.5
8-----	33	58	5.2	10	122	3.3	20	80	4.3
9-----	31	63	5.3	10	77	2.1	16	93	4.0
10-----	28	70	5.3	10	101	2.7	16	80	3.4
11-----	26	47	3.3	12	1/134	4.3	14	68	2.6
12-----	25	55	3.7	11	164	4.9	14	66	2.5
13-----	21	63	3.6	11	163	4.8	18	65	3.2
14-----	19	60	3.1	11	158	4.7	19	63	3.2
15-----	17	56	2.6	13	153	5.4	43	915	2/316
16-----	20	53	2.9	23	156	9.7	270	3,630	2/2,790
17-----	16	53	2.3	33	156	14	428	3,280	3,790
18-----	15	81	3.3	54	161	23	414	3,450	3,860
19-----	16	80	3.4	63	171	29	329	3,600	2/3,320
20-----	15	82	3.3	71	161	31	219	468	277
21-----	15	87	3.5	67	168	30	119	315	101
22-----	16	92	4.0	57	170	26	78	315	66
23-----	19	96	4.9	53	172	25	58	314	49
24-----	12	98	3.2	50	174	23	48	313	40
25-----	12	77	2.5	48	176	23	40	312	34
26-----	11	66	2.0	42	178	20	36	311	30
27-----	11	82	2.4	42	173	20	34	300	28
28-----	10	87	2.3	66	96	17	33	228	20
29-----	11	87	2.6	48	101	13	31	218	18
30-----	10	81	2.2	--	--	--	30	218	18
31-----	9	69	1.7	--	--	--	29	217	17
Total -	561	--	100	873	--	350	2,536	--	14,830

1/Estimated.

2/Sediment discharge computed by subdividing day.

## KANSAS RIVER BASIN--Continued

## SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	28	210	16	14	213	8.0	28	1,870	141
2-----	27	204	15	13	210	7.4	137	3,920	2/1,660
3-----	24	207	13	16	206	8.9	225	3,880	2,360
4-----	23	196	12	16	204	8.8	354	5,600	2/5,430
5-----	23	220	14	14	201	7.6	222	3,170	1,900
6-----	23	177	11	15	197	8.0	101	1,670	455
7-----	24	126	8.2	14	194	7.3	73	1,690	333
8-----	22	116	6.9	14	192	7.2	55	1,600	238
9-----	20	127	6.8	13	189	6.6	42	1,300	147
10-----	21	141	8.0	11	182	5.4	42	1,180	134
11-----	19	155	8.0	12	168	5.4	61	1,340	221
12-----	21	163	9.2	12	154	5.0	46	1,060	132
13-----	21	150	8.5	14	166	6.3	29	1,060	83
14-----	20	148	8.0	19	146	7.5	21	1,070	61
15-----	20	115	6.2	16	155	6.7	20	730	39
16-----	20	122	6.6	14	155	5.8	58	3,300	2/565
17-----	19	128	6.6	9.5	153	3.9	25	2,380	161
18-----	19	134	6.9	10	152	4.1	14	1,610	61
19-----	18	139	6.8	8.1	173	3.8	11	1,280	38
20-----	17	143	6.6	8.1	176	3.8	38	1,800	2/193
21-----	17	56	2.6	7.8	138	2.9	322	5,600	2/4,740
22-----	18	43	2.1	7.3	144	2.8	610	4,490	2/7,460
23-----	17	38	1.7	7.0	190	3.6	833	5,750	2/13,000
24-----	17	28	1.3	6.5	200	3.5	911	4,710	11,600
25-----	16	110	4.8	5.1	196	2.7	938	3,380	8,560
26-----	16	238	10	3.8	162	1.7	784	4,530	2/10,400
27-----	16	250	11	4.4	166	2.0	1,150	7,090	2/22,000
28-----	15	195	7.9	4.4	152	1.8	1,240	5,320	17,800
29-----	15	216	8.7	9.5	1/430	11	1,140	5,100	15,700
30-----	14	216	8.2	28	1/2,000	151	1,300	3,300	11,600
31-----	--	--	--	25	1/2,000	135	--	--	--
Total -	590	--	243	371.5	--	446	10,830	--	137,200

Day	July			August			September		
	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day	Mean discharge (second-foot)	Mean concentration (ppm)	Tons per day
1-----	711	3,620	6,950	71	1/1,590	305	40	2,980	322
2-----	489	3,950	5,220	62	1,120	187	27	2,050	149
3-----	420	3,940	4,470	57	940	145	23	1,560	97
4-----	356	3,910	3,760	57	820	126	24	1,280	83
5-----	334	3,400	3,070	62	875	146	21	820	46
6-----	228	1/2,550	1,570	57	775	119	18	780	38
7-----	174	1,860	874	80	1,300	2/370	19	820	42
8-----	171	1,810	836	157	4,100	2/1,770	31	1,540	2/132
9-----	172	2,430	2/1,140	84	2,290	519	27	1,870	136
10-----	314	6,050	2/5,240	72	1,600	311	19	1,180	60
11-----	254	5,210	2/3,650	71	1,660	318	49	1,540	2/209
12-----	338	7,860	2/7,200	57	1,390	214	34	1,100	101
13-----	262	6,840	2/4,660	57	1,320	203	23	1,380	86
14-----	179	4,020	1,940	70	2,280	2/496	17	1,560	72
15-----	231	5,650	2/3,950	162	3,740	2/1,620	15	730	30
16-----	210	1/5,680	2/3,330	183	3,850	1,900	16	559	24
17-----	133	4,480	1,610	118	3,610	1,150	12	608	20
18-----	269	7,710	2/5,600	246	6,620	2/4,430	12	489	16
19-----	258	7,140	4,970	171	4,400	2,030	11	481	14
20-----	150	5,300	2,150	106	4,020	1,150	7.6	388	8.0
21-----	100	4,300	1,160	77	3,550	738	6.0	359	5.8
22-----	85	2,760	633	63	2,700	459	4.5	435	5.3
23-----	94	2,550	647	63	2,130	362	3.7	330	3.3
24-----	125	2,580	2/933	60	1,920	311	3.5	198	1.9
25-----	223	4,540	2,730	51	1,330	183	3.9	165	1.7
26-----	150	3,200	1,300	44	1,020	121	3.1	141	1.2
27-----	103	2,410	670	40	830	90	2.2	120	.7
28-----	213	7,010	2/4,470	38	670	69	1.6	103	.4
29-----	111	5,000	1,500	40	670	72	1.6	97	.4
30-----	94	2,780	706	79	1/2,570	2/701	1.3	35	.1
31-----	86	1/2,180	506	73	1/3,550	2/715	--	--	--
Total -	7,037	--	87,640	2,628	--	21,330	477.0	--	1,710

Total discharge for year (second-foot-days)

26,792.5

Total load for year (tons)

264,000

1/Estimated.

2/Sediment discharge computed by subdividing day.

## MISSOURI RIVER BASIN

## KANSAS RIVER BASIN--Continued

## SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1946 to September 1947

Date	Water discharge (second-foot-days)	Suspended sediment, water year October 1, 1946 to September 1, 1947					
		Suspended sediment		Suspended sediment			Load (tons)
		Concentration, ppm		Daily load, tons			
		Weighted mean 1/	Maximum observed (daily)	Mean	Maximum	Minimum	
Mar. 29-31, 1946--	232	442	450	92	96	86	277
April-----	1,924	381	766	66	157	33	1,980
May-----	1,924	1,840	10,700	308	6,580	27	9,540
June-----	26,344	6,590	--	15,600	--	185	2/469,000
July-----	6,866	2,050	3,950	1,230	10,100	122	2/38,000
August-----	1,598	603	1,550	84	293	33	2,600
September-----	495.2	395	1,100	18	107	4.1	529
Total for period --	39,383.2	4,910	--	2,810	--	4.1	521,900

1/Weighted with water discharge.

2/Includes loads estimated for missing days.



KANSAS RIVER BASIN--Continued  
SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis			
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000
June 16, 1948-----	5:22 a. m.	56	994	609	41	56	82	92	98	99	100	--				BN
June 16 -----	5:15 a. m.	56	996	286	90	92	93	96	100	--	--	--				BW
June 16 -----	5:15 a. m.	56	996	322	77	82	93	96	98	99	100	--				BWC
June 16 -----	3:55 p. m.	76	6,450	2,270	14	35	97	98	100	--	--	--				BN
June 22 -----	7:55 a. m.	499	3,920	2,560	18	48	75	84	94	98	99	100				BN
June 23 -----	5:55 p. m.	789	4,580	1,530	31	54	72	84	93	97	99	100				BN
June 25 -----	1:00 p. m.	970	3,200	1,400	44	75	86	90	95	98	100	--				BN
June 25 -----	3,130	968	7,520	1,540	36	75	86	91	95	98	100	--				BN
June 27 -----	12:40 p. m.	1,060	3,520	2,240	20	48	76	87	94	99	100	--				BN
June 28 -----	6:30 a. m.	1,380	4,910	2,110	25	62	84	89	94	98	100	--				BN
July 12 -----	5:37 p. m.	366	9,090	1,800	16	34	64	82	94	98	100	--				BN
Aug. 2 -----	10:30 a. m.	63	1,090	880	34	60	85	93	98	99	100	--				BN

KANSAS RIVER BASIN--Continued  
PRAIRIE DOG CREEK AT NORTON, KANS.

LOCATION.--At gaging station at bridge on U. S. Highway 283, half a mile south of Norton, Norton County.

RECORDS AVAILABLE.--Sediment records: March 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 23,800 tons per day June 27; minimum, 0.1 ton per day Jan. 31, Sept. 5, 28, 29. Maximum 95,800 tons per day June 22, 1947; minimum, 0.1 ton per day Jan. 31, Sept. 5, 28, 29, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
May 30, 1948 ----	472	7.1	224	26	0.20	31	5.0	8.3	136	1.0	1.0	1.0	0.5	0.8	0.07	180	0.24		98	0	16
June 27 -----	1,250	7.2	225	28	.40	32	5.0	14	140	9.6	3.0	3.0	.2	.3	.07	168	.23		100	0	23
Aug. 9 -----	73	7.8	421	37	.02	65	10	11	296	3.2	9.0	9.0	.9	.3	.00	296	.40		203	0	11
Aug. 13 -----	250	7.4	249	27	.50	32	7.0	6.5	130	46	.5	.5	.1	1.2	.09	188	.26		108	0	8
Sept. 8 -----	16	8.1	339	26	.02	39	6.7	23	186	12	3.0	3.0	.4	5.8	.05	218	.30		125	0	29

## KANSAS RIVER BASIN--Continued

## PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Suspended sediment, water year October 1942 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4.0	29	0.3	2.7	75	0.5	5	1/23	0.3
2-----	3.8	27	.3	2.7	75	.5	5	15	.2
3-----	3.6	25	.2	2.8	73	.6	5	1/29	.4
4-----	3.4	24	.2	3.6	92	.9	4	1/34	.4
5-----	3.4	24	.2	2.9	70	.5	4	1/36	.4
6-----	3.0	25	.2	2.9	60	.5	4	1/38	.4
7-----	2.8	27	.2	3.4	59	.5	4	1/40	.4
8-----	2.8	29	.2	3.2	65	.6	4	42	.5
9-----	2.8	30	.2	3.4	56	.5	5	1/55	.7
10-----	2.8	40	.3	3.6	40	.4	5	1/80	1.1
11-----	2.5	56	.4	5.4	85	1.2	5	103	1.4
12-----	2.5	1/71	.5	4.0	56	.6	5	1/113	1.5
13-----	2.5	86	.6	4.2	43	.5	5	119	1.6
14-----	2.6	102	.7	4.2	50	.6	5	1/101	1.4
15-----	2.5	114	.8	4.6	50	.6	5	85	1.1
16-----	2.7	94	.7	5.6	76	1.1	5	1/71	1.0
17-----	2.1	85	.5	5.6	1/85	1.3	5	58	.8
18-----	2.4	80	.5	5.0	1/66	.9	6	1/44	.7
19-----	2.7	75	.5	5.0	58	.8	6	35	.6
20-----	3.2	72	.6	5.2	54	.8	7	40	.8
21-----	2.8	83	.6	5.2	1/51	.7	7	1/47	.9
22-----	2.7	85	.6	6.4	1/47	.8	8	54	1.2
23-----	2.7	72	.5	7.0	1/44	.8	8	1/61	1.3
24-----	2.8	72	.5	7.0	40	.8	9	71	1.7
25-----	2.8	73	.6	6.4	1/36	.6	9	1/81	2.0
26-----	3.8	75	.8	6.0	31	.5	10	85	2.3
27-----	3.4	1/61	.6	5.8	1/22	.3	10	85	2.3
28-----	3.4	64	.6	5.6	16	.2	10	1/85	2.3
29-----	3.4	67	.6	5.4	1/24	.3	10	85	2.3
30-----	2.8	70	.5	5.2	30	.4	7	1/85	1.6
31-----	2.7	73	.5	--	--	--	7	87	1.6
Total -	91.4	--	14.5	140.0	--	19.3	194	--	35.2
	January			February			March		
1-----	8	1/119	2.6	5	1/33	0.4	3	408	3.3
2-----	8	161	3.5	5	1/58	.8	3	271	2.2
3-----	9	159	3.9	5	1/60	.8	3	282	2.3
4-----	10	1/136	3.7	5	59	.8	3	1/291	2.4
5-----	10	117	3.2	5	1/48	.6	3	270	2.2
6-----	9	1/97	2.4	5	40	.5	2	240	1.3
7-----	10	78	2.1	5	1/60	.8	2	185	1.0
8-----	10	1/104	2.8	5	1/84	1.1	2	166	.9
9-----	8	111	2.4	5	85	1.1	3	1/166	1.3
10-----	7.4	80	1.6	5	1/84	1.1	5	1/231	3.1
11-----	7.2	1/70	1.4	6	1/83	1.3	7	1/180	3.4
12-----	6.6	70	1.2	10	1/81	2.2	5	148	2.0
13-----	6	1/70	1.1	25	79	5.3	5	208	2.8
14-----	6	70	1.1	30	1/75	6.1	3	265	2.1
15-----	6	1/70	1.1	50	135	18	49	1,560	2/655
16-----	6	70	1.1	100	1,220	329	203	4,660	2/2,660
17-----	5	1/78	1.1	150	3,280	1,330	133	4,960	2/1,990
18-----	5	1/98	1.3	51	1,810	249	82	4,340	961
19-----	5	100	1.4	32	1,250	108	53	3,180	455
20-----	5	1/84	1.1	22	772	46	27	2,080	152
21-----	5	32	.4	21	390	22	18	1,000	48
22-----	5	21	.3	18	385	19	14	488	18
23-----	4	1/20	.2	12	260	8.4	12	310	10
24-----	4	1/20	.2	8	268	5.8	11	233	6.9
25-----	4	1/20	.2	8	389	9.0	11	200	5.9
26-----	4	1/20	.2	4	430	4.6	10	175	4.7
27-----	4	1/20	.2	4	484	5.2	10	155	4.2
28-----	4	1/20	.2	4	928	10.0	10	1/138	3.7
29-----	5	20	.3	4	507	5.5	9.6	127	3.3
30-----	5	1/13	.2	--	--	--	9.3	120	3.0
31-----	5	9	.1	--	--	--	9.0	120	2.9
Total -	196.2	--	42.6	609	--	2,190	719.9	--	7,010

1/Estimated.

2/Sediment discharge computed by subdividing day.

## MISSOURI RIVER BASIN

## KANSAS RIVER BASIN--Continued

## PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	9.3	156	3.9	8.0	30	0.6	88	4,480	2/1,150
2-----	9.3	153	3.8	8.0	30	.6	34	2,350	216
3-----	9.6	143	3.7	10	70	1.9	19	1,210	62
4-----	8.8	136	3.2	8.8	53	1.3	12	634	21
5-----	8.6	131	3.0	8.4	58	1.3	7.8	416	8.8
6-----	8.8	133	3.2	7.4	103	2.1	6.0	328	5.3
7-----	8.6	161	3.7	7.6	102	2.1	6.2	299	5.0
8-----	8.4	99	2.2	7.2	112	2.2	7.0	277	5.2
9-----	8.4	91	2.1	7.4	120	2.4	5.0	270	3.6
10-----	8.8	83	2.0	7.2	89	1.7	6.0	413	6.7
11-----	8.6	64	1.5	7.2	107	2.1	4.0	221	2.4
12-----	9.3	58	1.5	7.0	132	2.5	4.2	197	2.2
13-----	9.3	61	1.5	7.0	145	2.7	4.2	199	2.3
14-----	9.3	60	1.5	7.0	149	2.8	4.0	164	1.8
15-----	9.3	51	1.3	7.0	147	2.8	27	3,760	2/304
16-----	9.0	50	1.2	6.8	130	2.4	40	6,730	2/849
17-----	9.0	48	1.2	6.4	168	2.9	67	5,720	2/1,260
18-----	9.0	44	1.1	6.2	165	2.8	29	3,100	2/258
19-----	9.3	38	1.0	6.2	141	2.4	19	1,820	93
20-----	8.8	32	.8	5.0	88	1.2	58	6,030	2/1,490
21-----	9.0	30	.7	4.8	87	1.1	146	9,580	2/6,070
22-----	9.0	30	.7	5.8	90	1.4	195	6,750	2/4,710
23-----	8.8	30	.7	7.8	87	1.8	40	4,440	2/479
24-----	8.8	30	.7	9.3	133	3.3	33	4,320	2/459
25-----	8.6	30	.7	10	100	2.7	15	1,320	53
26-----	8.4	30	.7	7.6	67	1.4	29	3,770	2/543
27-----	8.2	30	.7	5.0	47	.6	1,020	9,360	2/23,800
28-----	7.8	30	.6	4.4	53	.6	160	4,890	2/2,130
29-----	8.0	30	.6	6.6	67	1.2	85	4,150	2/1,410
30-----	7.8	30	.6	230	12,000	8,880	159	7,220	2/3,380
31-----	--	--	--	235	8,210	2/5,430	--	--	--
Total--	263.9	--	50.1	672.1	--	14,360	2,329.4	--	48,780
	July			August			September		
1-----	35	2,750	2/288	5.0	118	1.6	3.2	28	0.2
2-----	21	1,020	58	5.4	126	1.8	2.7	27	.2
3-----	17	436	20	5.0	138	1.9	2.5	35	.2
4-----	14	297	11	15	800	32	2.5	30	.2
5-----	11	1/251	7.5	42	4,460	2/531	2.3	24	.1
6-----	8.8	229	5.4	15	3,000	2/134	2.7	32	.2
7-----	8.0	202	4.4	8.6	1,290	30	7.2	1,080	2/27
8-----	7.2	176	3.4	7.0	656	12	11	1,410	42
9-----	328	8,390	2/9,530	6.0	409	6.6	6.2	700	12
10-----	73	5,580	2/1,180	5.4	322	4.7	18	1,970	2/114
11-----	26	2,680	188	5.0	260	3.5	27	3,150	2/234
12-----	16	1,000	43	5.0	230	3.1	13	1,550	54
13-----	12	490	16	99	6,930	2/4,930	10	1,270	34
14-----	11	300	8.9	75	7,620	2/2,010	6.8	950	17
15-----	200	8,360	2/6,100	16	2,440	105	5.6	600	9.1
16-----	106	6,360	2/2,130	30	3,510	284	4.0	392	4.2
17-----	21	1,040	59	14	1,400	53	3.2	216	1.9
18-----	12	450	15	8.8	630	15	2.9	164	1.3
19-----	294	8,280	2/8,150	7.4	355	7.1	2.7	118	.9
20-----	184	6,450	2/3,280	6.4	236	4.1	2.5	1/94	.6
21-----	90	3,720	2/939	5.8	177	2.8	2.5	73	.5
22-----	42	2,630	298	5.4	142	2.1	2.6	59	.4
23-----	23	1,350	84	4.8	118	1.5	2.5	49	.3
24-----	15	647	26	4.4	104	1.2	2.5	52	.4
25-----	11	418	12	3.8	73	.7	2.5	32	.2
26-----	9.0	322	7.8	4.0	59	.6	2.5	1/27	.2
27-----	8.0	295	6.4	4.0	45	.5	2.4	25	.2
28-----	7.4	238	4.8	3.6	42	.4	2.3	21	.1
29-----	6.6	211	3.8	2.7	34	.2	2.3	16	.1
30-----	5.8	145	2.3	3.0	35	.3	2.3	28	.2
31-----	5.2	130	1.8	2.6	39	.3	--	--	--
Total--	1,628.0	--	32,480	425.1	--	8,180	160.4	--	556
Total discharge for year (second-foot-days)									7,429.4
Total load for year (tons)									113,700

1/Estimated.

2/Sediment load computed by subdividing day.

KANSAS RIVER BASIN--Continued  
PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Feb. 16, 1948	7:25 p. m.	126	2,720	1,820	21	31	44	62	78	91	96	99	--	--	BW
Feb. 17	1:35 p. m.	128	3,680	2,580	36	50	66	76	90	96	99	100	--	--	BW
Feb. 18	2:40 p. m.	47	2,180	1,320	31	42	59	74	89	95	99	100	--	--	BN
Feb. 18	2:40 p. m.	47	2,180	1,430	36	46	58	75	86	94	96	97	--	--	BW
Feb. 19	12:35 p. m.	34	1,340	725	34	41	56	74	88	90	94	97	--	--	BN
Mar. 15	6:44 p. m.	22	2,880	1,550	16	22	30	40	57	79	87	90	95	95	BW
Mar. 15	9:25 p. m.	136	5,180	4,040	14	23	32	46	62	86	92	93	95	95	BW
Mar. 16	1:10 a. m.	430	5,590	3,900	23	34	45	58	71	90	95	96	98	98	BW
Mar. 16	1:45 a. m.	430	4,850	3,220	26	36	50	65	78	94	96	98	99	99	BW
Mar. 30	6:48 a. m.	444	16,400	2,740	17	28	40	56	70	88	94	95	98	98	BW
May 30	7:30 a. m.	472	13,600	3,630	16	27	40	54	69	90	95	96	98	98	BW
May 30	8:04 a. m.	472	14,100	3,520	16	22	38	56	80	90	94	96	99	99	BN
May 30	8:07 a. m.	472	14,100	1,760	24	32	48	64	83	96	99	100	--	--	BW
May 30	8:07 a. m.	472	14,100	1,760	22	34	49	64	84	96	98	100	--	--	BWC
May 30	4:00 p. m.	205	12,600	2,320	26	46	60	74	90	97	98	98	100	100	BW
May 31	12:58 p. m.	300	8,340	1,580	28	47	60	74	80	96	97	98	100	100	BW
May 31	1:15 p. m.	300	7,920	3,010	28	48	60	72	84	94	96	96	97	97	BW
June 1	12:55 p. m.	82	4,300	1,500	42	63	79	89	98	100	--	--	--	--	BW
June 15	8:48 a. m.	25	3,020	1,020	28	46	72	86	94	98	99	100	--	--	BN
June 17	12:43 p. m.	140	8,680	2,300	15	26	55	84	94	98	99	100	--	--	BN
June 17	12:45 p. m.	140	8,680	1,340	26	42	70	86	96	99	100	--	--	--	BNC
June 17	12:45 p. m.	140	8,680	1,450	35	53	71	86	96	99	100	--	--	--	BW
June 17	12:45 p. m.	140	8,680	1,450	38	54	74	86	96	98	100	--	--	--	BWC
June 27	5:40 a. m.	1,070	12,600	2,830	17	31	57	70	88	95	98	100	--	--	BN
June 27	5:48 a. m.	1,070	12,400	2,560	22	34	57	74	90	97	99	100	--	--	BNC

KANSAS RIVER BASIN--Continued  
PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
June 27, 1948-----	5:45 a. m.	1,070	12,400	2,500	30	40	60	75	90	98	100	--	--	--	--	BW
June 27-----	5:45 a. m.	1,070	12,400	2,510	28	40	56	74	88	94	98	99	100	--	--	BWC
June 27-----	8:30 a. m.	1,150	9,650	3,110	20	30	52	71	84	92	98	100	--	--	--	BNC
June 27-----	8:48 a. m.	1,150	9,480	2,320	25	39	61	75	88	94	97	98	100	--	--	BN
June 27-----	8:45 a. m.	1,150	9,480	1,660	31	42	64	79	90	98	100	--	--	--	--	BNC
June 27-----	8:45 a. m.	1,150	9,480	1,810	38	49	67	81	91	98	100	--	--	--	--	BW
June 27-----	8:45 a. m.	1,150	9,480	1,720	38	48	63	77	88	96	100	--	--	--	--	BWC
July 9-----	12:25 p. m.	950	9,070	1,050	26	36	52	74	90	96	98	100	--	--	--	BNC
July 9-----	12:25 p. m.	930	9,070	1,010	26	38	57	74	88	96	98	100	--	--	--	BW
July 9-----	12:30 p. m.	930	9,070	1,820	22	33	51	70	87	95	97	99	100	--	--	BN
Aug. 5-----	9:50 a. m.	73	4,770	2,210	6	18	46	72	89	96	98	100	--	--	--	BN
Aug. 13-----	8:15 p. m.	296	14,000	1,700	11	20	34	55	78	94	99	100	--	--	--	BN
Sept. 10-----	7:00 p. m.	26	2,550	1,850	20	41	82	89	93	95	96	97	100	--	--	BN
Sept. 10-----	9:10 p. m.	28	2,970	2,250	15	34	82	93	96	98	99	99	100	--	--	BN
Sept. 11-----	10:00 a. m.	31	3,570	1,070	46	68	86	92	96	98	99	100	--	--	--	BN

KANSAS RIVER BASIN--Continued  
SMOKY HILL RIVER NEAR ELLIS, KANS.

LOCATION.--At gaging station at county bridge 11½ miles south of Ellis, Ellis County.

DRAINAGE AREA.--5,630 square miles.

RECORDS AVAILABLE.--Sediment records: March 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 19,800 tons per day Aug. 3; minimum, not determined.

EXTREMES, March 1947-September 1948.--Sediment loads: Maximum, 19,800 tons per day Aug. 3, 1948; minimum, less than 0.1 ton per day on several days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 18, 1948 ----	191	7.3	1,340	22	0.02	258	39	27		127	708	10	0.9	3.2	1,130	1.54		804	700	7
June 28 -----	532	7.4	495	17	.00	82	11	5.1		120	152	1.8	.3	.6	368	.50		250	132	4
July 31 -----	154	7.8	966	28	.14	144	24	54		172	394	14	.7	3.6	812	1.10		458	317	20
Aug. 28 -----	42	7.6	935	26	.02	131	47	3.0		162	354	16	.7	1.2	706	.96		520	387	1
Sept. 17 -----	14	7.9	2,110	23	.02	130	28	288		206	256	442	.6	2.8	1,280	1.74		440	271	59

## MISSOURI RIVER BASIN

## KANSAS RIVER BASIN--Continued

## SMOKY HILL RIVER NEAR ELLIS, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1			3			4		
2-----	.7			3			4		
3-----	.5			3			7		
4-----	.7			3			8		
5-----	.6			3	7	0.1	11	31	0.6
6-----	.3			3			13		
7-----	.4			3			11		
8-----	.7			4			10		
9-----	.7			3			15		
10-----	.8			6			13		
11-----	.9			3			10		
12-----	1			4			10		
13-----	1			3	54	.8	10		
14-----	1			6			11		
15-----	7			10			12		
16-----	3	--	1/0.1	8			10		
17-----	3			7			10		
18-----	2			6			11	56	1.6
19-----	2			7			12		
20-----	2			8			12		
21-----	2			9			12		
22-----	.9			16	160	4.1	12		
23-----	1			15			11		
24-----	1			10			10		
25-----	2			8			11		
26-----	5			6			11		
27-----	4			5			10		
28-----	4			5	--	1/1	9		
29-----	3			4			8		
30-----	3			4			9		
31-----	3			--	--	--	11		
Total -	58.2	--	3.1	178	--	48.2	318	--	43.6
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4			2			38		
2-----	4			2			52		
3-----	5			2			52		
4-----	6			1			50	--	1/24
5-----	7			1			45		
6-----	8			1			40		
7-----	9			1			35		
8-----	10			1			30		
9-----	8			1	--	1/0.4	25		
10-----	8			1			15	--	1/8
11-----	7			1			10		
12-----	7			1			5		
13-----	5			1			6	--	1/1
14-----	5			1			7		
15-----	5			2			8		
16-----	5	52	0.8	2			10	50	1
17-----	5			3			15	2,600	105
18-----	5			3			20	3,900	211
19-----	5			5			30	3,720	301
20-----	5			6	--	1/4	40	--	1/260
21-----	6			8			50	820	111
22-----	6			10			54	580	84
23-----	6			15			47	610	77
24-----	6			26			41		
25-----	6			28			31		
26-----	6			28	--	1/17	35	--	1/42
27-----	5			43			32		
28-----	5			36			29		
29-----	4			30			27	270	20
30-----	3			--	--	--	26	--	1/18
31-----	2			--	--	--	24	262	17
Total -	178	--	24.8	262	--	136	92.9	--	1,620

1/Estimated.





KANSAS RIVER BASIN--Continued  
SMOKY HILL RIVER NEAR ELLIS, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment													Methods of analysis
			Concentration of sample (ppm)		Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
			0.002	0.004		0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
June 18, 1948	8:25 a. m.	122	11,400	4,540	5	7	16	54	--	98	99	100	--	--	--	BN
June 18	8:30 a. m.	124	11,300	2,860	--	0	14	--	--	99	99	100	--	--	--	BN
June 18	1:15 p. m.	214	6,410	2,530	32	52	80	95	98	100	--	--	--	--	--	BN
June 29	12:32 p. m.	748	7,140	1,260	13	37	85	88	88	89	89	90	97	100	100	BN
Aug. 10	6:05 a. m.	870	5,640	1,650	14	31	70	92	95	96	98	99	100	--	--	BN

## KANSAS RIVER BASIN--Continued

## SALINE RIVER NEAR RUSSELL, KANS.

LOCATION:--At gaging station at bridge on U. S. Highway 281, 2 miles downstream from Salt Creek, and 5 miles north of Russell, Russell County.  
DRAINAGE AREA.--1,502 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

Water temperatures: April 1946 to September 1948.

Sediment records: May 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 4,430 parts per million Oct. 1-31, 1947; minimum, 208 parts per million June 30.

Total hardness: Maximum, 943 parts per million Nov. 1-30; minimum, 135 parts per million June 30.

Water temperatures: Maximum, 78° F. July 21; minimum, freezing point on several days in November, December, January, and February.

Sediment loads: Maximum, 37,200 tons per day June 30; minimum, 0.1 ton per day May 28.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 4,430 parts per million Oct. 1-31, 1947; minimum, 208 parts per million June 30, 1948.

Total hardness: Maximum, 978 parts per million Sept. 18-30, 1947; minimum, 135 parts per million June 30, 1948.

Water temperatures (1946-48): Maximum, 80° F. July 8, 1947; minimum, freezing point on many days in winter months.

Sediment loads (1946-48): Maximum, 112,000 tons per day Oct. 9, 1946; minimum, 0.1 ton per day May 28, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent non-carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-31, 1947----	8.6	8.1	6,660	16	0.10	227	90	1,290	14	295	722	1,920	0.6	1.5	0.68	4,430	6.02	103	936	692	75
Nov. 1-30-----	12	7.9	5,640	16	.10	238	85	998	8.8	302	542	1,860	.5	1.9	.71	3,620	4.92	117	943	695	69
Dec. 1-31-----	18	7.9	4,220	22	.10	199	65	706	11	276	502	1,120	.5	2.5	.45	2,770	3.77	135	764	538	66
Jan 1-Feb. 1, 1948	12	7.9	3,960	17	.10	179	63	662	9.2	272	492	1,060	.5	1.7	.39	2,620	3.56	85	705	482	67
Feb. 2-29-----	16	8.2	2,900	17	.10	162	47	448	11	238	362	720	.5	1.4	.29	1,880	2.57	82	597	402	61
Mar. 1-31-----	51	8.1	2,160	18	.10	152	42	271	9.2	218	322	480	.6	1.7	.25	1,400	1.90	193	552	373	51
Apr. 1-30-----	29	8.1	3,260	11	.10	164	54	517	12	228	422	820	.6	1.7	.36	2,120	2.88	166	631	446	63
May 1-31-----	31	8.1	3,720	38	.00	196	57	575	25	233	460	925	.5	1.5	.19	2,390	3.25	200	723	532	62

KANSAS RIVER BASIN--Continued  
 SALINE RIVER NEAR RUSSELL, KANS.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent non-carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-28, 1948---	114	7.9	1,560	49	0.00	127	21	175		189	174	315	0.5	2.1	0.15	966	1.31	297	403	248	49
June 6 1/2-----	264	7.3	1,340	16	.03	138	24	125		124	250	248	.6	1.2	.21	972	1.32	693	443	341	38
June 28 1/2-----	1,150	7.4	603	20	.00	79	14	32		154	130	44	.3	.7	.16	438	.60	1,360	255	129	22
June 28 1/2-----																					
12.45 p.m.-----	1,150	7.3	685	23	.02	80	12	47		178	88	80	.4	.2	.11	488	.66	1,520	249	103	29
June 29-July 1-----	1,850	8.4	435	52	.00	62	6.9	17	6.0	2/176	38	25	.5	1.3	--	286	.39	1,430	183	39	16
June 30 1/2-----	2,470	7.5	316	18	.03	45	5.5		8.8	158	8.0	10	.4	1.4	.03	208	.28	1,390	135	5	12
July 1 1/2-----	1,650	7.7	305	24	.05	47	5.0			146	21	13	.3	.8	.04	218	.30	971	138	18	14
July 2-31-----	717	8.1	726	51	.00	78	11	57	10	172	116	74	.4	2.1	.12	470	.64	402	240	99	33
July 2 1/2-----	317	7.6	376	19	.05	49	5.6	23		147	32	28	.2	1.1	.09	248	.34	480	145	25	25
July 18 1/2-----	1,500	7.6	330	19	.02	49	5.6	15		152	30	15	.2	.6	.06	230	.31	932	145	20	18
Aug. 1-31-----	145	8.2	972	52	.00	84	14	102	18	184	102	168	.4	1.7	.00	696	.95	272	267	116	43
Sept. 1-30-----	27	8.1	3,270	50	.00	173	46	504	33	254	368	788	.5	.8	--	2,090	2.84	152	821	413	62
Weighted average	78.6	--	1,380	45	0.02	103	21	174	12	182	171	277	0.5	1.7	0.15	904	1.23	193	344	187	51

1/Not included in weighted average.

2/Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	50	38	--	--	33	36	59	65	74	72	70
2	--	51	42	32	32	32	40	70	66	73	73	72
3	58	50	37	--	--	--	44	53	64	73	69	69
4	--	55	45	--	--	34	45	--	65	74	65	68
5	61	39	33	--	--	--	46	55	68	76	67	68
6	--	43	31	--	--	--	50	46	68	76	67	69
7	63	32	35	34	--	--	51	51	68	76	66	67
8	--	34	33	33	--	--	44	55	71	74	71	60
9	61	36	--	36	--	32	--	59	68	69	--	58
10	61	34	32	38	--	--	52	63	69	74	74	61
11	--	32	32	34	--	--	49	48	73	74	75	64
12	58	33	33	35	--	--	48	48	70	74	73	64
13	55	35	33	33	--	--	44	55	66	75	75	63
14	60	42	33	--	--	--	47	58	67	76	76	64
15	63	35	33	32	--	--	54	58	66	73	74	64
16	60	36	33	--	34	33	53	58	70	72	74	63
17	59	31	33	--	--	--	52	58	71	74	74	64
18	57	39	33	--	--	36	55	52	71	76	74	65
19	54	42	33	--	34	43	52	60	65	76	73	68
20	55	44	34	--	31	--	52	62	64	72	69	68
21	56	35	34	33	32	45	66	64	65	78	71	66
22	58	33	33	34	33	43	59	65	68	73	74	65
23	54	33	35	--	34	44	58	65	68	72	69	64
24	52	32	33	--	34	46	62	64	67	71	68	64
25	46	35	33	--	33	54	54	50	68	76	69	60
26	--	35	34	32	40	42	52	50	74	74	--	56
27	48	42	34	--	48	34	54	57	70	76	70	64
28	46	34	34	--	35	36	54	50	66	74	70	53
29	46	46	34	--	35	42	54	64	63	76	71	52
30	50	34	--	--	--	47	56	62	71	75	74	50
31	50	--	34	--	--	41	--	65	--	72	72	--
Average	56	38	34	--	--	--	51	57	68	74	71	63

## KANSAS RIVER BASIN--Continued

## SALINE RIVER NEAR RUSSELL, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	9	29	0.7	9	35	0.8	16	50	2.2
2-----	8	45	1.0	9	53	1.3	16	50	2.2
3-----	8	45	1.0	9	50	1.2	16	51	2.2
4-----	8	45	1.0	9	19	.5	26	154	11
5-----	8	45	1.0	9	20	.5	24	119	7.7
6-----	8	45	1.0	9	20	.5	22	46	2.7
7-----	8	44	1.0	9	20	.5	20	58	3.1
8-----	8	43	.9	9	20	.5	19	60	3.1
9-----	9	42	1.0	9	20	.5	16	60	2.6
10-----	8	34	.7	9	51	1.2	16	60	2.6
11-----	8	26	.6	9	92	2.2	15	60	2.4
12-----	8	36	.8	9	43	1.0	13	60	2.1
13-----	8	44	1.0	9	22	.5	16	59	2.5
14-----	8	41	.9	11	25	.7	19	56	2.9
15-----	8	38	.8	15	48	1.9	19	52	2.7
16-----	3	34	.7	13	39	1.4	13	48	1.7
17-----	9	32	.8	13	34	1.2	16	45	1.9
18-----	9	38	.9	13	49	1.7	18	43	2.1
19-----	9	28	.7	13	50	1.8	16	55	2.4
20-----	9	16	.4	14	50	1.9	14	35	1.3
21-----	9	14	.3	15	50	2.0	15	47	1.9
22-----	8	16	.3	12	82	2.6	18	41	2.0
23-----	8	19	.4	15	83	3.4	19	46	2.4
24-----	9	22	.5	19	60	3.1	19	82	4.2
25-----	9	24	.6	20	72	3.9	16	77	3.3
26-----	9	30	.7	18	51	2.5	19	53	2.7
27-----	9	37	.9	16	50	2.2	20	50	2.7
28-----	10	30	.8	15	50	2.0	19	50	2.6
29-----	10	30	.8	16	50	2.2	20	56	3.0
30-----	10	30	.8	16	50	2.2	20	53	2.9
31-----	10	30	.8	--	--	--	13	--	1/1.8
Total -	267	--	23.8	371	--	47.9	548	--	90.9
January February March									
1-----	10	--	1/1.2	10	--	1/2.6	26	47	3.8
2-----	6			10			31		
3-----	7			10			33		
4-----	8			9			20		
5-----	8			9			18		
6-----	8	74	1.9	9	--	1/2.3	16	132	6.0
7-----	9			9			16		
8-----	9			9			16		
9-----	10			9			16		
10-----	11			9			16		
11-----	12	69	2.4	9	--	1/2.2	17	--	1/10
12-----	13			9			18		
13-----	13			9			20		
14-----	13			9			23		
15-----	13			9			27		
16-----	13	--	1/2.4	10	87	3.3	31	234	20
17-----	13			12			40	249	27
18-----	13			14			79	1,200	256
19-----	13			16			126	1,570	534
20-----	13			18			121	1,120	366
21-----	13	76	2.7	20	134	7.2	90	482	117
22-----	13			25	140	9.4	88	256	61
23-----	13			30	91	7.4	81	167	36
24-----	13			28	83	6.3	75	140	28
25-----	13			28	76	5.7	69	132	24
26-----	13	88	2.9	25	69	4.6	61	120	20
27-----	13			29	146	11	56	94	14
28-----	13			33	108	9.6	53	86	12
29-----	12			34	76	7.0	51	83	11
30-----	11			--	--	--	48	81	10
31-----	10			--	--	--	45	88	11
Total -	352	--	70.4	460	--	120	1,427	--	1,650

1/Estimated.

KANSAS RIVER BASIN--Continued  
 SALINE RIVER NEAR RUSSELL, KANS.--Continued  
 Suspended sediment, water year October 1947 to September 1948--Continued

Suspended sediment, water year October 1947 to September 1948--Continued									
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	42	22	2.5	28	44	3.3	104	2,850	2/872
2-----	39	23	2.4	29	27	2.1	59	520	83
3-----	37	25	2.5	54	217	32	40	127	14
4-----	36	26	2.5	56	37	5.6	34	40	3.7
5-----	33	28	2.5	52	17	2.4	29	16	1.3
6-----	31	30	2.5	41	2	.2	23	24	1.5
7-----	29	31	2.4	37	2	.2	25	47	3.2
8-----	28	27	2.0	32	3	.3	19	73	3.7
9-----	28	22	1.7	28	5	.4	18	137	6.7
10-----	28	18	1.4	25	6	.4	18	170	8.3
11-----	27	12	.9	23	7	.4	17	130	6.0
12-----	26	8	.6	23	10	.6	17	128	5.9
13-----	25	5	.3	22	23	1.4	16	140	6.0
14-----	24	5	.3	20	23	1.2	15	119	4.8
15-----	24	5	.3	20	22	1.2	436	10,200	2/17,600
16-----	23	6	.4	20	21	1.1	264	9,650	2/7,490
17-----	24	6	.4	18	32	1.6	115	4,030	2/1,360
18-----	23	5	.3	17	57	2.6	73	1,350	266
19-----	24	5	.3	16	17	.7	61	640	105
20-----	24	5	.3	15	26	1.1	62	500	84
21-----	24	22	1.4	13	15	.5	54	380	55
22-----	25	60	4.0	13	13	.5	46	230	29
23-----	26	58	4.1	15	102	4.1	37	130	13
24-----	30	71	5.8	14	66	2.5	36	110	11
25-----	36	64	6.2	13	27	.9	118	4,640	2/1,640
26-----	32	81	7.0	13	55	1.9	115	2,500	2/798
27-----	31	90	7.5	12	28	.9	178	1,840	2/990
28-----	28	5	.4	12	3	.1	1,150	8,690	2/28,200
29-----	28	2	.2	22	894	53	1,420	7,360	2/28,800
30-----	28	21	1.6	117	4,000	2/1,970	2,470	5,670	2/37,200
31-----	--	--	--	128	5,150	2/1,900	--	--	--
Total -	863	--	64.7	948	--	3,990	7,069	--	125,700

## KANSAS RIVER BASIN--Continued

## SALINE RIVER NEAR RUSSELL, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment										Methods of analysis			
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000
June 15, 1948-----	6:20 p. m.	1,240	19,300	1,870	11	22	58	86	89	90	91	98	100	--	--	BN
June 15 -----	8:15 p. m.	1,240	17,600	1,520	9	20	59	84	88	90	92	96	99	100	--	BN
June 23 -----	4:10 p. m.	1,780	10,100	1,410	7	26	66	76	80	81	84	91	98	99	--	BN
June 28 -----	1,780	1,780	10,100	1,560	34	56	72	86	91	96	98	100	--	--	--	BW
June 30 -----	4:12 p. m.	2,650	4,820	2,520	42	66	76	82	86	88	92	97	100	--	--	BW
July 31 -----	4:10 p. m.	138	1,050	2,830	9	16	38	92	92	93	94	98	99	100	--	BN



KANSAS RIVER BASIN--Continued  
SALINE RIVER NEAR WILSON, KANS.

LOCATION.--At highway bridge, 100 feet downstream from gaging station, and about 3 miles west and 7 miles north of Wilson, Ellsworth County.  
DRAINAGE AREA.--1,900 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1945, September to October 1946, February to September 1948.

Water temperatures: March to September 1948.

EXTREMES, February-September 1948.--Dissolved solids: Maximum, 3,830 parts per million Sept. 2-30; minimum, 374 parts per million June 29.

Total hardness: Maximum, 703 parts per million Sept. 2-30; minimum, 196 parts per million Aug. 15, 17.

Water temperatures: Maximum, 89° F. May 27, July 27; minimum, 45° F. Mar. 26, Apr. 1.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical Analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean dis-charge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Car-bonate (CO <sub>3</sub> )	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-cent so-lu-sion	
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total		Non-carbon-ate
Feb. 19, 1948	40	7.9	4,260	48	0.10	152	57	719		0	268	414	1,080	0.2	3.3	--	2,610	3.55	282	614	394	72
Mar. 14-31	102	8.4	2,600	19	.04	152	35	352	10	10	186	304	580	.5	4.5	0.20	1,560	2.12	430	523	354	59
Apr. 1-30	37	8.1	5,200	12	.04	156	70	961	12	0	206	556	1,450	.5	3.2	.14	3,330	4.53	333	682	513	75
May 2-31	32	8.5	5,203	23	.06	166	65	937	14	16	202	536	1,430	.6	1.7	.35	3,291	4.47	284	866	494	74
June 1-30	298	8.4	1,460	26	.04	100	15	181	10	10	170	164	280	.5	2.6	.12	880	1.20	708	307	151	55
June 29 1/2	1,960	7.4	554	18	.00	72	11	32		0	158	102	40	.4	.5	.13	374	.51	1,980	225	95	23
July 6-31	393	8.4	1,050	16	.04	92	12	111	14	10	158	120	180	.5	2.6	.08	650	.88	690	279	133	45
Aug. 1-2, 5-10, 18-22	156	8.2	1,640	26	.03	94	21	212	5.6	0	203	168	335	.4	2.8	.03	966	1.31	407	321	155	58
Aug. 4	236	7.5	2,170	28	.20	131	26	298		0	246	246	440	.2	3.6	--	1,300	1.77	828	434	232	60
Aug. 15, 17	373	8.3	571	24	.10	64	8.7	44		8	172	48	60	.4	2.0	.05	384	.52	387	196	42	33
Aug. 24-31	65	7.7	3,360	25	.03	130	42	590	17	0	254	346	856	.4	1.9	--	2,130	2.90	374	497	289	71
Sept. 2-30	33	8.0	5,670	19	.03	150	80	1,100	14	0	283	566	1,620	.5	1.4	--	3,830	5.21	341	703	471	77
Weighted Average 2/	235	--	2,130	20	0.04	123	27	297	11	199		240	472	0.5	3.4	0.15	1,300	1.77	825	418	253	56

KANSAS RIVER BASIN--Continued  
SALINE RIVER NEAR WILSON, KANS.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1						--	45	--	74	--	79	--
2						--	57	55	--	--	82	82
3						--	55	62	76	--	--	80
4						--	63	66	--	--	73	79
5						--	61	68	80	--	72	74
6						--	--	69	80	79	69	--
7						--	63	68	--	--	66	--
8						--	63	72	84	75	77	62
9						--	62	75	87	74	83	75
10						--	--	56	88	72	84	77
11						--	63	58	84	82	--	80
12						--	58	69	87	--	--	66
13						--	62	77	75	--	--	79
14						--	66	76	86	--	--	81
15						--	69	79	70	78	79	72
16						--	66	79	72	79	--	72
17						--	71	77	74	79	85	78
18						49	72	83	75	84	80	83
19						51	--	80	65	76	81	71
20						51	71	--	71	75	80	--
21						49	67	83	68	83	76	85
22						--	71	83	83	--	80	70
23						54	71	86	82	79	--	67
24						62	64	77	--	87	83	65
25						57	--	73	--	84	82	64
26						45	71	74	--	--	76	64
27						46	--	89	79	89	81	71
28						48	69	65	73	--	87	71
29						48	65	71	85	85	81	64
30						50	71	76	72	--	87	62
31						--	--	70	--	81	86	--
Average						--	65	73	--	--	--	73

## KANSAS RIVER BASIN--Continued

## PARADISE CREEK NEAR PARADISE, KANS.

LOCATION.--At gaging station at bridge on U. S. Highway 281, 3½ miles east and 3 miles south of Paradise, Russell County, and about 12 miles north of Russell. DRAINAGE AREA.--212 square miles.

RECORDS AVAILABLE.--Chemical analyses: March to August 1947, October 1947, February to September 1948.

Water temperatures: June to September 1948.

Sediment records: March 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,050 parts per million Feb. 19; minimum, 182 parts per million June 28.

Total hardness: Maximum, 745 parts per million Feb. 19; minimum, 124 parts per million June 28.

Water temperatures: No continuous record.

Sediment loads: Maximum, 19,700 tons per day June 28; minimum, 0 tons per day on many days.

EXTREMES, March-August 1947, February-September 1948.--Dissolved solids: Maximum, 1,050 parts per million Feb. 19, 1948; minimum, 182 parts per million June 28, 1948.

Total hardness: Maximum, 745 parts per million Feb. 19, 1948; minimum, 124 parts per million June 28, 1948.

Water temperatures: No continuous record.

Sediment loads (March 1947-September 1948): Maximum, 22,200 tons per day April 1947; minimum, 0 tons per day on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent non-carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-9, 1947 1/-----	2/0	8.0	975	15	0.00	131	17	53	6.4	224	254	72	0.4	0.6	--	756	1.03	0	396	212	24
Feb. 19, 1948 -----	2	7.4	1,240	24	.00	254	27	41		300	524	28	.4	3.5	--	1,050	1.56	.6	745	499	12
Mar. 17-31-----	8.4	8.5	600	20	.00	95	10	16		3/164	160	6.0		4.4	--	462	.63	10	278	144	13
Apr. 1-28-----	1	7.9	1,060	17	.00	164	19	55	2.8	254	338	59	.3	.9	--	884	1.20	.2	487	279	20
May 4-31-----	4.8	8.2	490	23	.05	78	6.0	24		170	106	10	.4	7.2	--	378	.51	4.9	219	80	19
June 1-29-----	95	8.2	298	24	.05	46	2.6	7.4	.4	142	31	0	.2	1.8	--	226	.31	60	125	9	11
June 28 1/-----	1,000	7.3	266	19	.10	40	6.0	8.3	9.6	136	23	3.6	.2	1.9	0.19	182	.25	491	124	12	14
June 30-July 23-----	50	7.9	349	23	.06	55	6.2	13		173	42	6.4	.3	1.9	--	260	.35	35	163	21	14
Aug. 3-Sept. 24-----	.6	7.9	939	21	.03	127	16	54	10	262	216	68	.3	.8	--	702	.95	1.1	383	168	23
Weighted average 4/	---	---	333	24	0.05	52	4.1	10	3.2	153	42	2.9	0.2	2.1	---	251	0.34	16	147	22	12

1/ Not included in weighted average.

2/ Practically no flow.

3/ Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

4/ Weighted average for period sampled only.

## MISSOURI RIVER BASIN

## KANSAS RIVER BASIN--Continued

## PARADISE CREEK NEAR PARADISE, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day
1-----				0		0	0	--	0
2-----				0		0	0	--	0
3-----				0		0	.1		
4-----				0		0	.3		
5-----				0		0	.1		
6-----				0		0	.1		
7-----				.1		--	.1		
8-----				0		0	.1		
9-----				0		0	.1		
10-----				0		0	.1		
11-----				0		0	.1		
12-----				0		0	.1		
13-----				0		0	.1		
14-----				.1		--	.1		
15-----				0		0	.1		
16-----	0.01	--	--	0		0	.1		--
17-----				0		0	.1		--
18-----				0		0	.1		--
19-----				0		0	.1		--
20-----				0		0	.1		--
21-----				.1		--	.1		
22-----				.1		--	.1		
23-----				0		0	.1		
24-----				0		0	.1		
25-----				0		0	.1		
26-----				0		0	.1		
27-----				0		0	.1		
28-----				0		0	.1		
29-----				0		0	.1		
30-----				0		0	.1		
31-----				--		--	0	--	0
Total -	0.3		1/0.1	.4		1/0.2	3.0	--	1/1
Day	January			February			March		
	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day
1-----				0		0	2		
2-----				0		0	2		
3-----				0		0	2		
4-----				0		0	1		
5-----				0		0	1		
6-----				0		0	.5		
7-----				0		0	.5		
8-----				0		0	.5		
9-----				0		0	0		0
10-----				0		0	0		0
11-----				0		0	0		0
12-----				0		0	0		0
13-----				0		0	0		0
14-----				0		0	0		0
15-----				0		0	0		0
16-----				0		0	.5		1/.1
17-----				.1			1.1	115	.3
18-----				.2			24	--	1/34
19-----				.2			58	--	1/130
20-----				.2	78		26	498	35
21-----				.1			9.2	273	6.8
22-----				.1		--	3.5	141	1.3
23-----				.1			1.7	88	.4
24-----				.1			.8	61	.1
25-----				.1			.4	47	.1
26-----				.1			.3		
27-----				.5			.2		
28-----				.6		1/.1	.3		
29-----				1			.2	22	--
30-----				--		--	.1		
31-----				--		--	.1		
Total -	0		0	3.4		2/0.6	135.9	--	2/211

1/Estimated.

2/Includes days of sediment discharge less than 0.1 ton.

KANSAS RIVER BASIN--Continued  
PARADISE CREEK NEAR PARADISE, KANS.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day
1-----	0.3	94	0.1	0.1	--	--	24	2,250	146
2-----	.2			.1	--	--	7.6	710	15
3-----	.1			17	--	1/110	3.7	315	3.1
4-----	.2			23	--	1/150	2.6	193	1.4
5-----	.2			3.9	380	4.0	1.0	106	.3
6-----	.2	83	--	2.4	125	.8	.9	90	.2
7-----	.2			.5	--	--	.3	92	.1
8-----	.1			.5	--	--	0	--	0
9-----	.1			.4	--	--	0	--	0
10-----	.1			.3	52	.1	0	--	0
11-----	.1	--	0	.4	--	--	0	--	0
12-----	.1			.4	--	--	0	--	0
13-----	0			.3	--	--	0	--	0
14-----	.1			.4	--	--	0	--	0
15-----	.1			.3	--	--	506	12,900	3/19,600
16-----	0	--	0	.3	88	.1	522	8,790	3/12,100
17-----	0	--	0	.3			117	3,840	3/1,280
18-----	0	--	0	.3			27	1,520	111
19-----	0	--	0	.2			10	642	17
20-----	.1	58	--	.1			6.0	289	4.7
21-----	0	--	0	0	--	0	3.4	--	1/2.0
22-----	.2	68	--	0	--	0	2.7	213	1.6
23-----	.3			.1	38	--	2.1	--	1/.7
24-----	.1			0	--	0	2.0	--	
25-----	.3			.1	40	--	2.0	--	
26-----	.5			0	--	0	3.8	--	1/48
27-----	.2	--	--	0	--	0	224	10,100	3/6,280
28-----	.1			.1	31	--	1,000	7,180	3/19,700
29-----	.1			.2	159	.1	297	4,900	3/4,190
30-----	.1			46	3,450	3/826	59	2,220	3/373
31-----	--	--	--	54	4,650	3/683	--	--	--
Total-	4.1	--	2/0.9	151.7	--	2/1,780	2,824.1	--	63,880
Day	July			August			September		
	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day
1-----	16	1,110	48	6.6	698	13	0	--	0
2-----	6.3	452	7.7	3.1	--	1/3	0	--	0
3-----	3.4	231	2.1	2.0	--	1/1	0	--	0
4-----	2.1	--	1/.6	1.7	--	1/1	0	--	0
5-----	1.7			1.4	--	--	.1	--	
6-----	1.4			1.3	--	1/.4	.1	45	--
7-----	1.2			1.4			.1		
8-----	1.1			1.3			.2		
9-----	190	9,360	3/6,700	1.2			.2		
10-----	38	--	1/800	1.1			.1		
11-----	9.5	--	1/160	.9	--	1/.1	0	--	0
12-----	5.2	4,420	62	4.5			.1		
13-----	2.6	--	1/20	6.6			.1		
14-----	1.6	--	1/8	1.9			.1		
15-----	48	--	1/1,000	1.0			.1		
16-----	76	--	1/1,400	.6	--	1/.1	.1	--	0
17-----	48	--	1/550	.4			0		
18-----	16	--	1/80	.3			.1		
19-----	253	9,420	3/7,140	.1			.1		
20-----	310	7,960	3/6,670	0			.2		
21-----	83	6,650	3/1,600	.1	--	--	.2	27	--
22-----	24	3,680	3/260	0	0	0	.2		
23-----	11	644	19	0	0	0	.2		
24-----	6.0	--	1/5	0	0	0	.2		
25-----	4.1	--	1/2	0	0	0	.2		
26-----	3.2	--	1/.5	0	0	0	.1	--	--
27-----	2.4			0	0	0	.1		
28-----	2.1			0	0	0	.1		
29-----	3.6			0	0	0	.1		
30-----	125	--	1/2,600	0	0	0	.1		
31-----	.22	--	1/140	0	0	0	--	--	--
Total-	1,317.5	--	28,290	37.5	--	2/38.3	3.2	--	2/0.3

Total discharge for year (second-foot-days)-----

Total load for year (tons)-----

4,481.1

95,200

1/Estimated.

2/Includes days of sediment discharge less than 0.1 ton.

3/Sediment discharge computed by subdividing day.

## KANSAS RIVER BASIN--Continued

## PARADISE CREEK NEAR PARADISE, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
June 15, 1948 -----	5:05 p. m.	460	11,600	1,660	21	44	63	75	85	92	96	97	98	100	BN
June 16 -----	3:55 p. m.	566	8,520	1,780	30	50	64	71	78	86	91	93	96	100	BN
June 16 -----	4:35 p. m.	568	4,920	2,470	24	48	64	72	80	88	92	94	97	100	BN

## KANSAS RIVER BASIN--Continued

## WOLF CREEK NEAR SYLVAN GROVE, KANS.

LOCATION.--At bridge at gaging station, 3 miles upstream from mouth and 4½ miles west of Sylvan Grove, Lincoln County.  
DRAINAGE AREA.--261 square miles.

RECORDS AVAILABLE.--Sediment records: April 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 17,500 tons per day June 28; minimum, less than 0.05 ton per day on several days.

EXTREMES, April 1947-September 1948.--Sediment loads: Maximum, 36,800 tons per day Apr. 10, 1947; minimum, less than 0.05 ton per day on several days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent sodium
																Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate	
June 28, 1948 -----	1,830	7.4	266	19	0.30	36	1.8		15	142	7.2	3.5	0.4	0.2		178	0.24		97	0	25
Aug. 1 -----	5.1	7.3	1,360	14	.03	79	18		189	192	212	214	.3	.7		876	1.19		271	114	60
Aug. 29 -----	.5	7.7	5,610	6.8	.00	117	64	1,060	1,060	328	538	1,440	.4	.0	0.38	3,390	4.61		555	286	81

## KANSAS RIVER BASIN--Continued

## WOLF CREEK NEAR SYLVAN GROVE, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948

Suspended sediment, water year October 1947 to September 1948													
Day	October			November			December						
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment					
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day				
1-----	0.6	47	0.1	1.3	--	1/0.3	1.7	33	1/0.4				
2-----	.7			1.3			1.7						
3-----	.7			1.3			1.9						
4-----	.6			1.4			2.8						
5-----	.6			1.3			3.3						
6-----	.6	44	.1	1.3	42	.2	2.4	51	.2				
7-----	.6			1.4			2.2						
8-----	.7			1.3			2.0						
9-----	.7			1.5			1.9						
10-----	.7			1.3			1.9						
11-----	.7	47	.1	.4	40	.2	1.8	66	.3				
12-----	.7			.3			1.8						
13-----	.8			.9			1.7						
14-----	.8			1.7			1.7						
15-----	.8			2.1			1.8						
16-----	.8	47	.1	2.2	--	--	1.7	66	.3				
17-----	.8			1.8			1.7						
18-----	.9			1.7			1.7						
19-----	.9			1.6			1.7						
20-----	.8			1.6			1.7						
21-----	.8	47	.1	1.3	40	.2	1.7	66	.3				
22-----	.8			1.6			1.9						
23-----	1.0			1.9			2.0						
24-----	1.2			1.8			2.0						
25-----	1.2			1.8			1.9						
26-----	1.3	47	.1	1.7	--	--	2.0	66	.3				
27-----	1.2			1.7			1.9						
28-----	1.2			1.6			1.9						
29-----	1.2			1.7			1.9						
30-----	1.2			1.7			1.9						
31-----	1.2			--			1.9						
Total-	26.8	--	3.1	44.5	--	6.7	60.1	--	7.4				
January				February			March						
1-----	2.2	46	0.3	2	--	1/0.5	11	--	1/15				
2-----	2.2						9.4	68	1.7				
3-----	2.1						10	52	1.4				
4-----	2.3						8.7	--	1/1.1				
5-----	2.4						8.0	--	1/1.0				
6-----	2.4	26	.1	46	.7	6	10	27	.8				
7-----	2.4												
8-----	2.4												
9-----	2.4												
10-----	2.4												
11-----	2.3	2	84	.5	60	.5	18	1,180	57				
12-----	2.2									9.4	464	12	
13-----	2.0						6.9	133	2.5				
14-----	1.8						5.4						
15-----	1.9						4.8						
16-----	1.8	2					4.5	66	.8				
17-----	1.8						4.4						
18-----	1.8						4.4						
19-----							4.1						
20-----							4.0						
21-----		2			409	2/47	4.2	66	.8				
22-----							4.4						
23-----							4.4						
24-----							2,180			2/1,750			
25-----							24			2/163			
26-----		2			--	--	4.0	66	.8				
27-----							--						
28-----							--						
29-----							--						
30-----							--						
31-----						--			4.2				
Total-	64.8	--	10.7	215.9	--	1,970	483.2	--	2,470				

1/ Estimated.

2/ Sediment discharge computed by subdividing day.



KANSAS RIVER BASIN--Continued  
WOLF CREEK NEAR SYLVAN GROVE, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June				
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment			
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		
1-----	4.0	49	0.5	2.8	57	0.4	23	2,570	2/212		
2-----	3.7			3.2	78		6.6	266	4.7		
3-----	3.4			12	--	1/55	4.2	143	1.6		
4-----	3.1			164	--	1/4,000	3.2	68	.6		
5-----	3.0			17	2,000	2/103	2.8				
6-----	3.0	68	.6	9.1	272	6.7	2.7				
7-----	3.0			6.9	--	1/3.0	3.3				
8-----	3.0			5.7	92	1.4	3.7			113	1.1
9-----	3.0			5.1	--	1/1.1	3.8	182	1.8		
10-----	3.0			4.7	--	1/1.0	2.9	--	1/1.6		
11-----	2.9	75	.5	4.3	84	1.0	2.3	180	1.1		
12-----	2.8			4.1	--	1/9	2.1	145	.8		
13-----	2.7			3.8	69	.7	1.9				
14-----	2.6			3.7			1.8				
15-----	2.5			3.3			531			7,550	2/11,400
16-----	2.5	74	.5	3.0			65			.4	414
17-----	2.4			2.7				14	2,150		2/93
18-----	2.4			2.4	7.6	380		7.8			
19-----	2.4			2.1	5.7	190		2.9			
20-----	2.4			1.7	11	1,130		2/46			
21-----	2.4	54	.4	1.7	86	.4	9.0	1,550	38		
22-----	2.6			1.7			6.6	230	4.1		
23-----	2.9			1.7			5.0	--	1/2.2		
24-----	3.0			1.6			4.2	140	1.6		
25-----	3.4			1.6			4.0	200	2.2		
26-----	3.5	38	.3	1.4	82	.3	4.0	--	1/3.1		
27-----	3.4			1.4			30	1,360	2/269		
28-----	2.8			1.4			1,190	6,340	2/17,500		
29-----	2.5			1.7			969	2,780	2/8,180		
30-----	2.4			56			--	1/220	1,180	2/156	
31-----	--	--	--	265	--	1/5,600	--	--	--		
Total -	86.7	--	14.0	586.8	--	10,000	3,315.4	--	45,430		
July				August				September			
1-----	116	242	76	5.2	120	1.7	0.4	60	0.1		
2-----	26	--	1/9.5	4.4	83	1.0	.3	50	--		
3-----	8.0	--	1/3.0	3.9	57	.6	.2				
4-----	7.0	--	1/2.6	3.7	37	.4	.2				
5-----	6.4	--	1/2.4	3.4	38	.3	.2				
6-----	6.0	--	1/2.2	3.1	45	.4	.2				
7-----	5.7	--	1/2.0	3.0	57	.5	.2	37	.1		
8-----	5.4	135	2.0	2.9	82	.5	.2				
9-----	32	2,780	2/299	2.7			.2				
10-----	26	1,860	2/131	2.6			.2				
11-----	14	880	33	2.4			66			.2	.2
12-----	9.3	279	7.0	2.3				.2			
13-----	8.7	--	1/3.4	2.0	.2						
14-----	7.7	--	1/2.6	1.8	.3						
15-----	7.8	123	2.6	1.6	.2						
16-----	8.0	127	2.7	1.4	63	.1	.3	37	.1		
17-----	8.3	133	3.0	1.3			.2				
18-----	7.8	--	1/3.0	1.1			.3				
19-----	88	2,650	2/1,110	1.0			.4				
20-----	187	3,560	2/1,820	.9			.3				
21-----	222	4,190	2/2,760	.9	63	.1	.6	37	.1		
22-----	16	1,440	62	.8			.6				
23-----	8.8	326	7.7	.8			.7				
24-----	7.2	--	1/4.0	.7			.7				
25-----	6.5	--	1/3.4	.7			.7				
26-----	6.4	172	3.0	.6	63	.1	.6	37	.1		
27-----	6.0	150	2.4	.6			.6				
28-----	5.9	--	1/2.2	.5			.6				
29-----	5.8	157	2.4	.5			.6				
30-----	11	--	1/6.5	.4			.6				
31-----	7.3	--	1/3.4	.4	--	--	--	--	--		
Total -	888.0	--	6.370	57.6	--	10.4	11.2	--	3/1.7		

Total discharge for year (second-foot-days)	5,851.0
---------------------------------------------	---------

Total discharge for year (second-foot-days) -----	5,851.0
Total load for year (tons)-----	66,300

1/Estimated.

3/Includes days of sediment discharge less than 0.05 ton.

2/Sediment discharge computed by subdividing day.

## KANSAS RIVER BASIN--Continued

## WOLF CREEK NEAR SYLVAN GROVE, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis		
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
May 31, 1948	10:06 a. m.	399	6,670	2,400	46	66	81	91	96	99	100	---				BW
June 15	11:22 p. m.	1,160	6,750	1,650	30	53	75	87	94	98	100	---				BN
June 28	5:50 p. m.	1,820	4,780	1,410	32	56	82	92	97	98	100	---				BN
June 28	8:26 p. m.	1,860	4,580	1,500	34	58	82	90	98	99	100	---				BN
July 20	7:56 p. m.	151	2,540	1,510	42	52	66	78	92	96	99	100				BN

## KANSAS RIVER BASIN--Continued

## SOUTH FORK SOLOMON RIVER AT ALTON, KANS.

LOCATION --At bridge at gaging station, 1.1 miles south of Missouri Pacific Railroad in Alton, Osborne County.  
DRAINAGE AREA --1,720 square miles.

RECORDS AVAILABLE --Sediment records: June 1946 to September 1948.

EXTREMES, 1947-48 --Sediment loads: Maximum, 62,000 tons per day June 23; minimum, not determined.

EXTREMES, 1946-48 --Sediment loads: Maximum, 168,000 tons per day Oct. 8, 1946; minimum, not determined.

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 16, 1948 -----	500	7.3	401	26	0.05	54	9.3	8.5	152	48	9.0	0.7	3.1	0.08	0.08	290	0.39		173	48	10
Aug. 2 -----	19	8.1	682	27	.02	96	10	44	239	114	42	.4	1.1	.14	.14	488	.66		281	85	25
Aug. 30 -----	16	7.9	600	32	.00	82	16	2.9	222	56	24	.3	2.4	.00	.00	390	.53		270	88	2

## MISSOURI RIVER BASIN

## KANSAS RIVER BASIN--Continued

## SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December										
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment									
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day								
1-----	2.2	88	0.4	1.0	99	0.3	2.8	79	0.6								
2-----	1.9			1.0			2.8										
3-----	1.6			1.0			2.8										
4-----	1.3			1.3			4.6										
5-----	1.3			1.3			3.4										
6-----	1.3	106	.3	1.3	76	.5	3.7			49	.4						
7-----	1.3			1.3			4.0										
8-----	1.3			1.3			3.1										
9-----	1.3			1.6			3.1										
10-----	1.3			1.3			2.8										
11-----	1.3	111	.4	1.3	78	.6	2.5	31	.7								
12-----	1.0			1.6			2.5										
13-----	1.0			1.6			2.5										
14-----	1.0			2.5			2.8										
15-----	1.0			3.1			3.1										
16-----	1.0	111	.4	3.1	78	.6	2.8			31	.7						
17-----	1.0			2.8			2.8										
18-----	.9			2.8			3.1										
19-----	.9			2.8			3.1										
20-----	1.0			2.8			3.1										
21-----	.9	111	.4	2.8	78	.6	3.1	31	.7								
22-----	.9			2.5			3.7										
23-----	.9			2.5			3.4										
24-----	1.0			2.2			2.5										
25-----	1.3			3.1			2.8										
26-----	1.6	111	.4	2.8	78	.6	3.4			31	.7						
27-----	1.6			2.8			3.1										
28-----	1.3			2.8			2.8										
29-----	1.3			2.8			2.8										
30-----	1.3			2.8			2.8										
31-----	1.3	111	.4	--	78	.6	1.3	31	.7								
Total-----	38.3			--			11.4					63.9	--	14.0	93.1	--	15.4
1-----	0.3			50			0.4					1	49	0.1	5	29	0.2
2-----	1.0											1			5		
3-----	1.9											1			4		
4-----	2.8	1	3														
5-----	3.1	1	3														
6-----	3.4	50	0.4	1	49	0.1	2			29	0.2						
7-----	3.7			1			2										
8-----	4.6			1			1										
9-----	4.6			1			1										
10-----	4.0			1			1										
11-----	4.0	50	0.4	1	49	0.1	1	29	0.2								
12-----	3.7			1			1										
13-----	2.5			1			1										
14-----	2.2			1			1										
15-----	3.1			1			1										
16-----	2.2	50	0.4	1	49	0.1	1			29	0.2						
17-----	2.5			2			8										
18-----	2.8			2			158										
19-----	2.2			3			109										
20-----	2.5			5			92										
21-----	2	70	.4	5	148	2.0	76	300	62								
22-----	2			10			47					1.3	65				
23-----	2			10			36					1.0	57				
24-----	2			10			65					1.8	51				
25-----	2			15			150					6.1	48				
26-----	2	70	.4	10	56	1.5	44			72	8.6						
27-----	2			5			55					.7	40				
28-----	2			5			64					.9	38				
29-----	1			5			--					1/.9	36				
30-----	1			--			--					--	34				
31-----	1	70	.4	--	150	6.1	31	130	12								
Total-----	76.1			--			12.4					103	--	21.9	920	--	1,590

1/Estimated.

KANSAS RIVER BASIN--Continued  
SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	26	49	3.4	7.6	--	1/0.6	336	7,940	2/7,770
2-----	26	74	5.2	8.2	24	.5	172	3,500	2/1,700
3-----	23	70	4.3	14	--	1/3.0	104	1,140	320
4-----	22	45	2.7	50	--	1/1,800	68	450	83
5-----	21	35	2.0	126	--	1/2,700	52	226	32
6-----	19	--	1/1.9	49	2,230	2/325	43	225	26
7-----	18	44	2.1	30	--	482	39	164	16
8-----	17	--	1/2.1	22	235	14	29	140	11
9-----	16	--	1/1.9	16	--	1/7.5	56	--	1/64
10-----	15	46	1.9	13	--	1/5.5	60	756	122
11-----	15	26	1.1	10	154	4.2	39	--	1/50
12-----	14	27	1.0	9.4	--	1/3.8	31	--	1/20
13-----	14	31	1.2	8.8	155	3.7	33	233	21
14-----	15	13	.5	8.2	--	1/3.6	32	--	1/18
15-----	16	17	.7	7.6	--	1/3.4	38	--	1/33
16-----	16	27	1.2	6.4	205	3.5	160	4,400	2/4,460
17-----	14	43	1.6	5.8	--	1/2.6	336	12,700	2/12,000
18-----	12	38	1.2	5.2	133	1.9	154	6,360	2/2,750
19-----	11	77	2.3	4.6	129	1.6	98	2,720	2/741
20-----	9.4	35	.9	4.0	--	1/1.4	72	1,200	233
21-----	8.2	49	1.1	3.7	--	1/1.2	62	690	116
22-----	8.8	77	1.8	3.4	122	1.1	1,130	6,840	2/39,100
23-----	9.4	74	1.9	3.7	--	1/1.2	2,820	7,800	2/62,000
24-----	11	45	1.3	3.4	120	1.1	459	4,140	2/31,300
25-----	12	75	2.4	24	--	1/23	328	1,600	1,420
26-----	14	69	2.6	13	194	6.8	254	920	631
27-----	10	--	1/2.0	7.6	--	1/2.6	297	1,930	2/1,970
28-----	8.2	80	1.8	5.2	115	1.6	1,510	7,760	2/32,400
29-----	7.6	--	1/1.3	4.6	153	1.9	1,400	8,050	2/31,300
30-----	7.0	40	.8	390	8,570	2/12,500	481	4,000	2/5,400
31-----	--	--	--	630	--	2/24,000	--	--	--
Total -	435.6	--	56.2	1,494.4	--	41,470	10,690	--	210,200
	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	290	1,880	2/1,490	29	141	11	15	81	3.3
2-----	207	1,030	576	24	113	7.3	13	79	2.8
3-----	164	498	221	322	--	1/16,000	12	--	1/2.4
4-----	138	366	136	512	--	1/22,000	11	60	1.8
5-----	121	258	84	214	7,300	2/4,460	10	--	1/1.3
6-----	107	--	1/55	121	3,600	2/1,200	10	35	.9
7-----	99	169	45	86	862	200	12	87	2.8
8-----	93	154	39	68	--	1/95	14	70	2.6
9-----	88	193	46	57	305	47	21	--	1/5.5
10-----	117	--	1/140	50	183	25	14	--	1/2.4
11-----	117	--	1/150	44	133	16	11	59	1.8
12-----	78	190	40	40	147	16	10	50	1.4
13-----	67	122	22	268	8,020	2/9,990	9.0	53	1.3
14-----	61	102	17	970	--	1/37,000	8.0	72	1.6
15-----	56	92	14	788	11,000	2/24,800	7.0	87	1.6
16-----	57	81	12	299	--	1/4,300	6.0	100	1.6
17-----	142	--	1/300	184	2,030	1,010	5.5	104	1.5
18-----	149	--	1/260	119	836	269	5.0	60	.8
19-----	404	4,900	2/6,570	87	396	93	5.0	62	.8
20-----	427	4,720	2/5,520	68	356	65	4.5	62	.8
21-----	258	--	1/3,300	54	180	26	5.0	94	1.3
22-----	151	1,940	2/819	45	117	14	4.0	104	1.1
23-----	98	--	1/150	37	97	9.7	4.0	--	1/1.1
24-----	71	256	49	30	88	7.1	3.8	101	1.0
25-----	59	158	25	25	90	6.1	3.8	84	.9
26-----	50	--	1/20	22	99	5.9	3.6	101	1.0
27-----	43	--	1/18	22	--	1/4.8	3.6	107	1.0
28-----	42	160	18	21	59	3.3	3.4	62	.6
29-----	42	188	21	17	50	2.3	3.4	37	.3
30-----	44	--	1/20	28	--	1/9.0	3.2	--	1/3
31-----	36	158	15	19	72	3.7	--	--	--
Total -	3,876	--	20,190	4,670	--	121,700	240.8	--	47.6
Total discharge for year (second-foot-days)-----									
Total load for year (tons)-----									
									22,701.2
									395,300
1/Estimated. 2/Sediment discharge computed by subdividing day.									

## KANSAS RIVER BASIN--Continued

## SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
June 1, 1948 -----	10:45 a. m.	332	8,120	2,350	16	35	71	93	98	99	100	--	--		BN
June 16 -----	11:30 a. m.	331	1,650	4,866	27	54	75	92	97	99	100	--	--		BN
June 16 -----	6:35 p. m.	332	12,300	4,760	8	18	37	76	84	94	98	100	--		BN
June 16 -----	10:10 p. m.	496	15,000	2,160	22	39	70	90	94	98	100	--	--		BN
June 23 -----	12:10 a. m.	4,020	10,600	1,620	29	56	79	92	93	96	99	100	--		BN
June 23 -----	4:10 a. m.	6,380	8,500	2,280	34	60	79	90	96	98	100	--	--		BN
June 29 -----	2:45 a. m.	2,840	8,250	1,380	26	48	74	86	90	96	99	100	--		BN
July 19 -----	8:25 p. m.	796	10,200	2,460	10	18	31	47	78	90	96	99	100		BN

KANSAS RIVER BASIN--Continued  
SOLONON RIVER AT BELOIT, KANS.

LOCATION--At bridge on State Highway 14 in Beloit, Mitchell County, 300 feet downstream from dam at city water plant, 450 feet downstream from recorder, and about 11 miles upstream from Lebanon Creek.

DRAINAGE AREA 5,430 square miles.

RECORDS AVAILABLE--Sediment records: May 1948 to September 1948.

EXTREMES, period May to September 1948.--Sediment loads: Maximum, 91,400 tons per day June 29; minimum, 6.2 tons per day Sept. 20.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1116.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 25, 1948	2,440	7.4	347	27	0.20	58	7.1	8.8	196	26	3.0	0.2	0.8	0.07	0.34	252	0.34	174	13	10	
June 29	4,210	7.4	338	20	.00	50	6.5	16	162	4.0	4.0	2	1.5	.22	.22	.31	228	.31	146	13	19
July 19	4,810	7.4	163	13	.08	26	2.6	3.4	95	3.2	.4	.2	.9	.06	.06	.17	128	.17	76	0	9
July 21	6,780	7.6	194	15	.05	31	2.4	6.6	104	14	.5	.2	.6	.07	.07	.19	142	.19	87	2	14
Aug. 2	167	7.7	533	18	.02	64	7.6	41	171	76	40	.4	4.2	.09	.09	.49	362	.49	191	51	32
Aug. 30	67	7.5	1,006	28	.00	102	16	91	309	98	114	.4	.7	.34	.34	.87	638	.87	320	67	38

## MISSOURI RIVER BASIN

KANSAS RIVER BASIN--Continued  
 SOLOMON RIVER AT BELOIT, KANS.--Continued  
 Suspended sediment, water year October 1947 to September 1948

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				--	--	--	1,250	10,700	1/36,800
2-----				--	--	--	829	829	1/19,400
3-----				--	--	--	874	12,300	1/29,600
4-----				--	--	--	517	7,800	1/11,200
5-----				--	--	--	315	3,800	3,230
6-----				--	--	--	223	1,250	753
7-----				--	--	--	211	696	397
8-----				--	--	--	141	415	158
9-----				--	--	--	100	158	43
10-----				--	--	--	92	128	32
11-----				--	--	--	80	111	24
12-----				--	--	--	98	116	31
13-----				--	--	--	92	117	29
14-----				--	--	--	75	115	23
15-----				--	--	--	478	3,190	1/4,870
16-----				--	--	--	114	574	1/184
17-----				--	--	--	580	8,400	1/14,800
18-----				--	--	--	219	2,430	1/1,670
19-----				--	--	--	458	7,480	9,250
20-----				--	--	--	280	7,120	5,380
21-----				--	--	--	433	5,870	1/7,120
22-----				50	200	27	184	1,000	1/546
23-----				634	9,800	1/17,800	150	530	215
24-----				144	4,480	1/1,950	1,260	8,270	1/42,900
25-----				67	433	78	1,820	9,060	1/47,300
26-----				54	110	16	930	7,080	17,800
27-----				49	77	10	794	6,300	13,500
28-----				50	88	12	2,870	6,600	51,100
29-----				59	110	18	3,870	8,760	1/91,400
30-----				73	97	19	3,460	6,380	1/60,000
31-----				128	1,050	1/716	--	--	--
Total -				--	--	20,650	22,797	--	469,800
Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,020	5,540	1/30,200	227	772	473	59	120	19
2-----	712	5,540	10,700	138	251	94	61	127	21
3-----	433	3,980	4,650	108	140	41	55	127	19
4-----	374	2,750	2,780	92	120	30	52	102	14
5-----	271	1,250	915	264	7,170	1/9,520	50	114	15
6-----	219	600	355	484	15,100	1/20,800	50	94	13
7-----	181	290	142	258	6,140	1/4,400	54	136	20
8-----	160	190	82	280	5,350	4,040	69	168	31
9-----	955	4,590	1/15,700	184	2,930	1,460	92	175	43
10-----	679	2,800	1/5,610	167	1,060	478	90	178	43
11-----	358	1,910	1,850	275	2,740	1/3,230	63	168	29
12-----	358	--	2/1,800	838	9,440	1/21,600	57	137	21
13-----	397	--	2/2,500	484	6,110	1/8,030	52	107	15
14-----	207	1,160	648	490	6,390	1/8,720	49	83	11
15-----	154	428	178	227	2,120	1/1,360	48	66	8.6
16-----	131	238	84	843	11,500	1/26,900	48	75	9.7
17-----	134	222	80	865	10,700	1/25,500	46	97	12
18-----	203	571	313	471	8,140	10,400	48	86	11
19-----	3,560	5,000	1/48,600	310	3,420	1/2,940	48	53	6.9
20-----	5,440	3,190	1/46,800	219	1,230	727	46	50	6.2
21-----	6,480	3,090	1/53,500	167	510	230	44	70	8.3
22-----	2,860	7,480	1/56,400	122	159	52	40	100	11
23-----	856	7,380	17,100	103	94	26	37	103	10
24-----	471	4,950	1/6,570	92	86	21	37	104	10
25-----	315	1,890	1,610	80	84	18	36	103	10
26-----	248	800	536	75	97	20	32	96	8.3
27-----	192	428	222	71	89	17	32	96	8.3
28-----	170	346	159	67	89	16	30	98	7.9
29-----	141	176	67	63	90	15	28	103	7.8
30-----	164	244	108	67	93	17	28	125	9.4
31-----	280	754	570	71	107	21	--	--	--
Total -	29,123	--	310,800	8,202	--	151,200	1,481	--	459

Total load for period May 22 to Sept. 30 (tons) ----- 952,900

1/Sediment discharge computed by subdividing day

2/Estimated.



## KANSAS RIVER BASIN--Continued

## SOLOMON RIVER AT BELOIT, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (second- feet)	Suspended sediment											Methods of analysis		
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1. 000	2. 000
June 1, 1948 -----																
June 1 -----	12:20 p. m.	1,590	9,890	3,290	20	34	78	92	96	97	98	99	100	--	BN	
June 1 -----	1:30 p. m.	1,510	9,520	5,180	12	20	47	92	96	97	98	100	--	BN		
June 3 -----	7:40 p. m.	760	11,000	2,180	19	31	77	97	99	99	100	--	--	BN		
June 3 -----	7:40 p. m.	760	11,000	2,260	60	70	85	90	93	94	95	99	99	100	BN	
June 3 -----	7:40 p. m.	760	11,000	2,360	50	63	82	90	94	96	97	100	--	BWC		
June 24 -----															BN	
June 24 -----	5:50 p. m.	2,220	16,600	2,630	8	20	54	92	92	96	98	100	--	BN		
June 25 -----	7:10 a. m.	2,500	9,820	1,730	12	42	92	94	98	100	--	--	--	BN		
June 29 -----	8:15 p. m.	4,150	8,570	2,480	13	26	72	93	96	99	100	--	--	BN		
July 19 -----	6:35 p. m.	4,750	3,810	2,100	34	48	65	82	85	90	96	98	99	100	BN	
July 21 -----	6:28 a. m.	6,850	2,870	2,320	40	62	80	90	92	93	94	98	99	100	BN	
Aug. 2 -----	8:02 a. m.	144	256	396	20	52	79	95	97	98	100	--	--	BN		

KANSAS RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN KANSAS RIVER BASIN

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Discharge (second feet)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per- cent so- di- um	
																Parts per mil- lion	Tons per acre- foot	Total	Non- carbon- ate		
REPUBLICAN RIVER AT CAMBRIDGE, NEBR.																					
June 15, 1948	5,340	7.5	447	48	0.00	45	12	30	30	264	4.0	2.0	0.6	0.8	0.20	266	0.36	162	0	28	
Sept. 1	46	7.8	471	55	.00	66	12	16	270	22	2.0	2.0	.6	1.7	.02	320	.44	214	0	14	
REPUBLICAN RIVER NEAR BLOOMINGTON, NEBR.																					
June 22, 1948	6,610	7.4	466	39	0.50	47	10	38	220	50	4.0	4.0	0.8	1.4	0.12	296	0.40	158	0	34	
July 22	915	7.6	358	29	.02	42	8.3	26	191	24	6.0	6.0	.4	5.1	.22	253	.34	139	0	29	
Aug. 26	171	7.9	494	47	.0	62	12	25	256	34	7.0	7.0	.7	.8	.14	342	.47	204	0	21	
Sept. 23	64	8.0	525	39	.02	62	16	33	291	36	9.0	9.0	.5	2.2	.05	350	.48	220	0	24	
NORTH FORK REPUBLICAN RIVER NEAR WRAY, COLO.																					
July 12, 1948	1/	8.2	340	56	0.02	38	13	22	210	12	3.0	3.0	1.4	4.2	0.19	256	0.35	148	0	24	
NORTH FORK REPUBLICAN RIVER AT COLO.-NEBR. STATE LINE																					
July 26, 1948	13	8.3	540	56	0.15	66	19	38	2/284	75	6.0	6.0	1.4	4.3	0.15	420	0.37	243	10	26	
Sept. 28	20	8.0	557	47	.02	57	20	49	288	80	5.0	5.0	1.2	2.6	.06	414	.56	224	0	32	
SOUTH FORK REPUBLICAN RIVER AT COLO.-KANS. STATE LINE																					
July 26, 1948	15.6	8.2	369	51	0.02	38	12	30	307	209	23	6.5	1.4	2.4	0.15	271	0.37	144	0	31	
Sept. 27	14.5	8.3	386	43	.02	29	13	37	2/219	12	6.0	6.0	1.4	1.4	.09	282	.38	126	0	39	
FRENCHMAN CREEK NEAR ENDERS, NEBR.																					
Aug. 9, 1948	74	8.0	379	65	0.0	46	14	13	212	18	2.0	2.0	0.9	2.6	0.04	282	0.38	172	0	14	
Aug. 30	63	8.0	373	63	.0	43	14	14	212	14	2.0	2.0	.9	2.8	.04	274	.37	165	0	16	
Sept. 28	85	8.2	358	52	.02	44	12	16	218	218	3.2	3.0	1.4	3.8	.08	268	.36	159	0	18	

1/Discharge not available.

2/Includes equivalent of 7 parts per million of carbonate (CO<sub>3</sub>).

3/Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

## FRENCHMAN CREEK AT CULBERTSON, NEBR.

Aug. 2, 1948-----	19	7.9	550	84	0.10	61	21	33	280	56	11	1.0	6.7	0.0	402	0.55	239	9	23
Aug. 30-----	23	7.9	628	67	.0	68	20	38	308	57	10	.9	6.9	.08	434	.59	232	0	24
Sept. 27-----	47	7.8	513	51	.02	46	16	54	287	44	7.0	.9	6.3	.11	366	.50	181	0	39

## SMOKY HILL RIVER AT ELLSWORTH, KANS.

June 16, 1948-----	100	7.4	978	16	0.04	78	8.4	120	138	34	202	0.6	2.7		620	0.84	229	116	53
July 16-----	2,720	7.3	346	17	.20	50	2.4	13	132	8.8	30	.5	2.1		234	.32	135	27	17

## ROSE CREEK NEAR WALLACE, KANS.

Mar. 25, 1948-----	4.3	7.9	447	27	0.10	48	14	31	246	37	8.0	1.2	4.2	0.21	330	0.45	177	0	27
Aug. 3-----	3.2	8.0	397	28	.16	47	10	29	216	30	6.0	1.2	.8	--	282	.38	158	0	28
Sept. 7-----	2.2	7.8	415	32	.04	44	12	21	228	2.0	7.5	1.1	2.6	.06	284	.39	159	0	22
Sept. 22-----	2.3	7.7	422	28	.02	44	11	34	228	28	5.0	1.2	2.9	.14	276	.38	165	0	32

## NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.

June 25, 1948-----	131	7.7	276	24	0.06	41	5.5	10	158	14	1.5	0.3	0.8	0.09	182	0.25	125	0	15
Aug. 20-----	8.0	7.8	376	28	.02	56	8.5	14	198	34	4.0	.3	1.7	.00	254	.35	175	13	15



# INDEX

A	Page
Abbotts Creek at Lexington, N. C. . . .	178-180
Abram Run near Bridgeport, Pa. . . .	93
Alderson, W. Va., Greenbrier River at. . .	225
Allegheny River at Kittanning, Pa. . . .	193-194
at Sharpsburg, Pa. . . .	195-196
tributaries of . . . .	201-205
Alton, Kans., South Fork Solomon River at . . . .	501-504
Aluminum . . . .	8
Ambridge, Pa., Ohio River at . . . .	197-200
Angelica Creek at Reading, Pa. . . .	90
Antelope Creek near Gordon, Nebr. . . .	398
Antietam Creek near Lorane, Pa. . . .	91
near Waynesboro, Pa. . . .	137
Arikaree River at Haigler, Nebr. . . .	447-450
Arvada, Wyo., Powder River at . . . .	299-302
Auburn, Pa., Schuylkill River at . . . .	40-45
Aughwick Creek near Three Springs, Pa. . .	132
Auglaize River at Wapakoneta, Ohio . . .	245

B	Page
Bad River near Fort Pierre, S. Dak. . . .	377
Bad River basin . . . .	377
Badwater Creek at Bonneville, Wyo. . . .	287-290
Bates Creek near Alcova, Wyo. . . .	446
Beaver City, Nebr., Sappa Creek near . .	467-470
Beaver Creek at Loretto, Nebr. . . .	441-444
Beaverdam Creek at State Farm, Va. . . .	161
Auburn, Pa., Schuylkill River at . . . .	217-219
Beaver River basin . . . .	214-219
Belle Fourche River below Moorcroft, Wyo. . . .	376
near Elm Springs, S. Dak. . . .	375
Beloit, Kans., Solomon River at . . . .	505-507
Bent Creek, Va., James River at . . . .	145-147
Berne, Pa., Schuylkill River at . . . .	46-52
Bighorn River at Kane, Wyo. . . .	279-282
at Manderson, Wyo. . . .	275-278
at Thermopolis, Wyo. . . .	270-274
near Custer, Mont. . . .	283-286
Big Laurel Creek near Stackhouse, N. C. .	243
Big Sandy River basin . . . .	227
Blanchard River at Findley, Ohio . . . .	247
Bonneville, Wyo., Badwater Creek at . .	287-290
Bonnie Doone, Glenville and Kornbu Lakes at Fayetteville, N. C. . . .	191
Boron . . . .	11
Botzum, Ohio, Cuyahoga River at . . . .	254-256
Boylston Creek near Horseshoe, N. C. . .	242
Brandywine Creek at Chadds Ford, Pa. . .	73
at Wilmington, Del. . . .	74-78
Briar Creek at Briar, Pa. . . .	129
Bridgeport, Md., Monocacy River at . . .	138
Broad River near Carlisle, S. C. . . .	185
Buchanan, Va., James River at . . . .	141-143
Buena Vista, Va., Maury River near . . .	154
Buffalo Bill Reservoir, Wyo., Shoshone River below . . . .	291-292
Buffalo Creek at Newport, Pa. . . .	133
Buffalo River near Norwood, Va. . . .	155
Byron, Wyo., Shoshone River at . . . .	293-294

C	Page
Cacapon River at Great Cacapon, W. Va. .	134
Calcium . . . .	9
Calpasture River at Goshen, Va. . . .	159
Cambridge, Nebr., Medicine Creek at . .	463-466
Cane Creek at Fletcher, N. C. . . .	242
Cannonball River at Breien, N. Dak. . . .	353
near New Leipzig, N. Dak. . . .	346-349
Cannonball River basin . . . .	346-353
Carbonate and bicarbonate . . . .	10
Carlisle, S. C., Broad River near . . . .	185
Cartersville, Va., James River at . . . .	149
Casper Creek at Casper, Wyo. . . .	446
Casper, Wyo., North Platte River below	401-404
Cassa, Wyo., North Platte River near . .	409-412

	Page
Catasauqua, Pa., Lehigh River at . . . .	28-30
Catawba Creek near Catawba, Va. . . .	159
Catawba River at Catawba, N. C. . . .	191
near Marion, N. C. . . .	191
Cedar Creek near Pretty Rock, N. Dak. . .	350-352
Cedar Rapids, Iowa, Cedar River at . . .	262-264
Cedar River at Cedar Rapids, Iowa . . . .	262-264
Chadds Ford, Pa., Brandywine Creek at	73
Charleroi, Pa., Monongahela River at . .	207-209
Chatuge Reservoir near Hayesville, N. C. .	244
Chemical quality . . . .	3
Cheoah River at Tapoco, N. C. . . .	244
Chester Creek at Chester (U. S. Highway 13), Pa. .	95
at Wawa (U. S. Highway 1), Pa. . . .	95
Cheyenne River near Hot Springs, S. Dak. .	370-374
near Wasta, S. Dak. . . .	375
Cheyenne River basin . . . .	370-376
Chickahominy River near Providence	
Forge, Va. . . .	157
Chloride . . . .	10
Clarion River near Piney, Pa. . . .	201-202
Clifton Forge, Va., Cowpasture River near	153
Clover Creek at Larke, Pa. . . .	132
Cobbs Creek near Lansdowne (U. S. High- way 1), Pa. . . .	95
Cocolumas Creek near Millers-Town, Pa. .	133
Cody, Nebr., Niobrara River near . . . .	387-389
Collection and examination of samples . .	3-5
Color . . . .	12
Composition of surface waters . . . .	7-15
Conestoga Creek at Lancaster, Pa. . . .	125-127
Conococheague Creek at Fairview, Md. . .	136
Contentnea Creek at Hookerton, N. C. . .	191
Cooks Creek near Riegelsville, Pa. . . .	79
near Springtown, Pa. . . .	79
Coolseemee, N. C., South Yadkin River at	175-177
Cooperation and division of work . . . .	16-19
Copeland, N. C., Fisher River near . . . .	174
Corrosiveness . . . .	14
Cottonwood Creek at Winchester, Wyo. . .	304
Cowpasture River near Clifton Forge, Va. .	153
Craig Creek at Parr, Va. . . .	156
Crum Creek near Media (U. S. Highway 1), Pa. .	95
Cullasaja Creek at Cullasaja, N. C. . . .	243
Custer, Mont., Bighorn River near . . . .	283-286
Cuyahoga River at Botzum, Ohio . . . .	254-256

D	Page
Dan River at Leaksville, N. C. . . .	191
Danville, Pa., Susquehanna River at . . .	99-104
Darby Creek at Darby, Pa. . . .	95
near Clifton Heights (U. S. Highway 1), Pa. . . .	95
Davidson River near Brevard, N. C. . . .	242
Dayton, Ohio, Mad River near . . . .	238-240
Dayton, Ohio, Miami River at . . . .	236
Dayton, Ohio, Stillwater River at . . . .	237
Deep Creek near Mannboro, Va. . . .	161
De Land, Fla., St. Johns River near . . .	188-190
Delaware, Ohio, Olentangy River at . . . .	228
Delaware, Ohio, Olentangy River near . . .	229
Delaware River at Easton Pa. . . .	22-24
at Trenton, N. J. . . .	25-27
Delaware River basin . . . .	22-95
Des Lacs River at Foxholm, N. Dak. . . .	256
Dissolved solids . . . .	11
Douglas, Wyo., North Platte River near	405-408
Dreherstown, Pa., Little Schuylkill River at	65-70
Dubois, Wyo., Wind River near . . . .	266-267
Dunlap Creek near Covington, Va. . . .	156
Dunning Creek at Beldon, Pa. . . .	132
Dunning, Nebr., Middle Loup River at . .	425-426

E	Page
East Fork Little Miami River near	
Milford, Ohio . . . .	234

	Page		Page
Easton, Pa., Delaware River at . . . . .	22-24	Huntingdon, Pa., Frankstown Branch	
Edisto River basin . . . . .	187	Juniata River at . . . . .	116-118
Eldorado, N. C., Uwharrie River near . . . . .	181	Huntingdon, Pa., Raystown Branch	
Elkhorn River at Ewing, Nebr. . . . .	445-446	Juniata River near . . . . .	122-124
at Norfolk, Nebr. . . . .	446	Hydrogen-ion concentration . . . . .	12
at Waterloo, Nebr. . . . .	446	I . . . . .	
Elkins, W. Va., Tygart River at . . . . .	206	Introduction . . . . .	1-3
Ellis, Kans., Smoky Hill River near . . . . .	481-484	Iowa City, Iowa, Iowa River at . . . . .	259-261
Elmore, Ohio, Portage River at . . . . .	249	Iowa River at Iowa City, Iowa . . . . .	259-261
Enoree River near Enoree, S. C. . . . .	186	Iowa River basin . . . . .	259-264
Enoree, S. C., Enoree River near . . . . .	186	Iron . . . . .	9
Expression of results . . . . .	6-7	Ivy River near Marshall, N. C. . . . .	243
F		J . . . . .	
Fairview, Md., Conococheague Creek at . . . . .	136	Jackson River at Falling Spring, Va. . . . .	139
Faith, S. Dak., Moreau River near . . . . .	363-368	James River at Bent Creek, Va. . . . .	145-147
Falling Creek near Drewrys Bluff, Va. . . . .	161	at Buchanan, Va. . . . .	141-143
Falling Spring, Va., Jackson River at . . . . .	139	at Cartersville, Va. . . . .	149
Falls, Pa., Susquehanna River at . . . . .	96-98	at Holcombs Rock, Va. . . . .	144
Fargo, N. Dak., Red River of the North at . . . . .	257	at Lick Run, Va. . . . .	140
Findley, Ohio, Blanchard River at . . . . .	247	at Richmond, Va. . . . .	150-152
Fine Creek at Fine Creek Mills, Va. . . . .	161	at Scottsville, Va. . . . .	148
Fisher River near Copeland, N. C. . . . .	174	James River basin . . . . .	139-162
Fluoride . . . . .	10-11	Johns Creek at Newcastle, Va. . . . .	158
Fontana Reservoir at Fontana Dam, N. C. . . . .	243	Julesburg, Colo., South Platte River at . . . . .	416-419
Frankstown Branch Juniata River at . . . . .		Juniata River at Lewistown, Pa. . . . .	130
Alexandria, Pa. . . . .	129	at Mifflintown, Pa. . . . .	130
at Huntingdon, Pa. . . . .	116-118	at Mill Creek, Pa. . . . .	130
at Huntington, Pa. . . . .	130	at Mount Union, Pa. . . . .	130
below Huntington, Pa. . . . .	130	at Newport, Pa. . . . .	119-121, 131
below Williamsburg, Pa. . . . .	129	near Lewistown, Pa. . . . .	130
near Williamsburg, Pa. . . . .	129	K	
Fremont, Ohio, Sandusky River at . . . . .	251-253	Kanawha River basin . . . . .	224-226
French Broad River at Ashville, N. C. . . . .	242	Kane, Wyo., Bighorn River at . . . . .	279-282
at Blantyre, N. C. . . . .	242	Kansas River basin . . . . .	447-509
at Rosman, N. C. . . . .	242	Kermit, W. Va., Tug Fork at . . . . .	227
Frenchman Creek at Culbertson, Nebr. . . . .	509	Kerrs Creek near Lexington, Va. . . . .	159
near Enders, Nebr. . . . .	508	Keyapaha River at Wewela, S. Dak. . . . .	399
G		near Hidden Timber, S. Dak. . . . .	399
Genoa, Ohio, Toussaint River near . . . . .	248	Kingsley Reservoir on North Platte	
Glenville Lake near Glenville, N. C. . . . .	243	River, Nebr. . . . .	445
Glenville, W. Va., Little Kanawha River at . . . . .	223	Kishacoquillas Creek at Reedsville, Pa. . . . .	133
Golden Valley, N. Dak., Knife River near . . . . .	325-328	Kiskiminetas River at Leechburg, Pa. . . . .	203-205
Gooseberry Creek at Pulliam, Wyo. . . . .	304	Kitanning, Pa., Allegheny River at . . . . .	193-194
Gordon Creek near Simeon, Nebr. . . . .	398	Knapp Creek at Marlinton, W. Va. . . . .	226
Gordon, Nebr., Niobrara River near . . . . .	383-386	Knife River at Hazen, N. Dak. . . . .	329-332
Grand River at Shadehill, S. Dak. . . . .	354-359	near Golden Valley, N. Dak. . . . .	325-328
near Wakpala, S. Dak. . . . .	360	Knife River basin . . . . .	325-332
Grand River basin . . . . .	354-362	L	
Graters Ford, Pa., Perkiomen Creek at . . . . .	71-72	Lackawanna River at Archbald, Pa. . . . .	128
Great Cacapon, W. Va., Cacapon River at . . . . .	134	at Carbondale, Pa. . . . .	128
Great Trough Creek at Marklesburg, Pa. . . . .	132	at Forrest City, Pa. . . . .	128
Greenbrier River at Alderson, W. Va. . . . .	225	Lakawaxen River at Kimbles, Pa. . . . .	79
Guernsey Reservoir, Wyo., North Platte		Lake Erie, Streams Tributary to . . . . .	245-256
River below . . . . .	413-415	Lancaster, Pa., Conestoga Creek at . . . . .	125-127
Gulph Creek near West Conshohocken, Pa. . . . .	94	Landingville, Pa., Schuylkill River at . . . . .	33-39
H		Leechburg, Pa., Kiskiminetas River at . . . . .	203-205
Haigler, Nebr., Arikaree River at . . . . .	447-450	Lehigh River at Catasauqua, Pa. . . . .	28-30
Hardness . . . . .	13	at Glendon, Pa. . . . .	79
Hardware River near Scottsville, Va. . . . .	160	at Walnutport, Pa. . . . .	31-32
Harrisburg, Pa., Susquehanna River at . . . . .	105-109	Lewisburg, Pa., West Branch	
Harvey Creek at West Nanticoke, Pa. . . . .	128	Susquehanna River at . . . . .	113-115
Hazel Creek at Proctor, N. C. . . . .	244	Lexington, N. C., Abbotts Creek at . . . . .	178-180
Hazen, N. Dak., Knife River at . . . . .	329-332	Lick Run, Va., James River at . . . . .	140
Heart River near Elgin, N. Dak. . . . .	343	Lima, Ohio, Ottawa River at . . . . .	246
near Richardson, N. Dak. . . . .	339-342	Linville River at Branch, N. C. . . . .	192
near South Heart, N. Dak. . . . .	333-338	Literature cited . . . . .	21
Heart River basin . . . . .	333-345	Little Juniata River above Spruce Creek, Pa. . . . .	131
Henry Fork near Henry River, N. C. . . . .	192	above Tyrone, Pa. . . . .	131
High Rock, N. C., Yadkin River at . . . . .	167-169	at Barree, Pa. . . . .	131
Hinton, W. Va., New River at . . . . .	224	at Pinecroft, Pa. . . . .	131
Hiwassee Reservoir at Hiwassee Dam, N. C. . . . .	244	below Tyrone, Pa. . . . .	131
Hiwassee River above Murphy, N. C. . . . .	244	Little Kanawha River at Glenville, W. Va. . . . .	223
Holcombs Rock, Va., James River at . . . . .	144	Little Kanawha River basin . . . . .	223
Hominy Creek at Chandler, N. C. . . . .	243	Little Miami River at Milford, Ohio . . . . .	230-232
Hot Springs, S. Dak., Cheyenne River		near Oldtown, Ohio . . . . .	233
near . . . . .	370-374	Little Miami River basin . . . . .	230-235
Hudson Bay and Upper Mississippi		Little Missouri River at Marmarth, N. Dak. . . . .	311-321
River basins . . . . .	257-264	at Medora, N. Dak. . . . .	305-310
Hunlock Creek at Hunlock, Pa. . . . .	129	near Watford City, N. Dak. . . . .	311-321
		Little Missouri River basin . . . . .	305-324

	Page		Page
Little Neshaminy Creek at Hartsville, Pa. . . . .	81	Northeast Branch Perkiomen Creek	
Little River near Penrose, N. C. . . . .	242	near Bergey, Pa. . . . .	93
Little Schuylkill River at Dreherstown, Pa. . . . .	65-70	near Schwenksville, Pa. . . . .	93
at Port Clinton, Pa. . . . .	89	North Fork Edisto River at Orangeburg, S. C. . . . .	187
at South Tamaqua, Pa. . . . .	88	North Fork Grand River near White Butte, S. Dak. . . . .	360
at Tamaqua, Pa. . . . .	88	North Fork Republican River at Colo. -Nebr. State line . . . . .	508
Little Tennessee River near Fontana, N. C. . . . .	243	near Wray, Colo. . . . .	508
near Prentiss, N. C. . . . .	243	North Fork Solomon River at Kirwin, Kans. . . . .	509
Lock Haven, Pa., West Branch Susquehanna River at . . . . .	110-112	North Fork Swannanoa River near Black Mountain, N. C. . . . .	243
Long Pine Creek near Riverview, Nebr. . . . .	395-397	North Loup River at Brewster, Nebr. . . . .	446
Loretto, Nebr., Beaver Creek at . . . . .	441-444	near St. Paul, Nebr. . . . .	436-440
Lumber River at Boardman, N. C. . . . .	191	North Platte River below Casper, Wyo. . . . .	401-404
M		below Guernsey Reservoir, Wyo. . . . .	413-415
Macoby Creek at Greenlane, Pa. . . . .	92	near Cassa, Wyo. . . . .	409-412
Mad River at West Liberty, Ohio . . . . .	241	near Douglas, Wyo. . . . .	405-408
near Dayton, Ohio . . . . .	238-240	Northwest Branch Perkiomen Creek	
Magnesium . . . . .	9	near Greenlane, Pa. . . . .	92
Mahoning Creek at Danville, Pa. . . . .	129	North Wilkesboro, N. C., Reddies River at . . . . .	173
Mahoning River at Warren, Ohio . . . . .	214-216	Norton, Kans., Prairie Dog Creek at . . . . .	476-480
Maiden Creek near Temple, Pa. . . . .	89	Norwood, N. C., Rocky River near . . . . .	182-184
Manatwny Creek at Pottstown, Pa. . . . .	91	Norwood, Va., Buffalo River near . . . . .	155
Manderson, Wyo., Bighorn River at . . . . .	275-278	Nottely River at Ranger, N. C. . . . .	244
Manganese . . . . .	8-9		
Marias River near Shelburne, Mont. . . . .	265	O	
Marias River basin . . . . .	265	Oconolufy River at Cherokee, N. C. . . . .	244
Marlinton, W. Va., Knapp Creek at . . . . .	228	Ogala, S. Dak., White River near . . . . .	378-381
Massie Creek at Oldtown, Ohio . . . . .	235	Ohio River at Ambridge, Pa. . . . .	197-200
Maury River at Rockbridge Baths, Va. . . . .	159	main stem . . . . .	193-200
near Buena Vista, Va. . . . .	154	Ohio River basin . . . . .	193-244
near Lexington, Va. . . . .	159	Oldtown, Ohio, Little Miami River near . . . . .	233
Meadow Creek at Newcastle, Va. . . . .	158	Oldtown, Ohio, Massie Creek at . . . . .	235
Mechum River near Ivy, Va. . . . .	161	Olentangy River at Delaware, Ohio . . . . .	228
Medicine Creek at Cambridge, Nebr. . . . .	463-466	near Delaware, Ohio . . . . .	229
Medora, N. Dak., Little Missouri River at . . . . .	305-310	Orangeburg, S. C., North Fork Edisto River at . . . . .	187
Miami River above Stillwater River at Dayton, Ohio . . . . .	236	Orleans, Nebr., Republican River near . . . . .	459-462
Miami River basin . . . . .	236-241	Ottawa River at Lima, Ohio . . . . .	246
Middle Creek near Selinsgrove, Pa. . . . .	129	Owl Creek near Lucerne, Wyo. . . . .	304
Middle Loup River at Arcadia, Nebr. . . . .	446	Oxygen consumed . . . . .	12
at Dunning, Nebr. . . . .	425-426	P	
at St. Paul, Nebr. . . . .	427-430	Palmyra, Va., Rivanna River at . . . . .	156
Miles City, Mont., Tongue River at . . . . .	295-298	Panther Creek at Tamaqua, Pa. . . . .	89
Milford, Ohio, East Fork Little Miami River near . . . . .	234	Paradise Creek near Paradise, Kans. . . . .	493-496
Milford, Ohio, Little Miami River at . . . . .	230-232	Paradise, Kans., Paradise Creek near . . . . .	493-496
Mill Creek at Bristol (U. S. Highway 13), Pa. . . . .	80	Parsons, W. Va., Shavers Fork at . . . . .	210
at Port Carbon, Pa. . . . .	87	Patterson, N. C., Yadkin River at . . . . .	163
near Gladwyne, Pa. . . . .	94	Pedlar River near Pedlar Mills, Va. . . . .	160
Mills River at Mills River, N. C. . . . .	242	Pee Dee River near Rockingham, N. C. . . . .	170-172
Mineral constituents in solution . . . . .	8-11	Pee Dee River basin . . . . .	163-184
Minnehaduzza Creek at Valentine, Nebr. . . . .	398	Pennypack Creek at Philadelphia, Pa. . . . .	81
Missouri River basin . . . . .	265-509	Percent sodium . . . . .	14
Monocacy River at Bridgeport, Md. . . . .	138	Perkiomen Creek at Graters Ford, Pa. . . . .	71-72
Monongahela River at Charleroi, Pa. . . . .	207-209	at Oaks, Pa. . . . .	92
Monongahela River basin . . . . .	206-213	at Rahns, Pa. . . . .	92
Moreau River at Promise, S. Dak. . . . .	369	Petersburg, W. Va., South Branch Potomac River near . . . . .	135
near Eagle Butte, S. Dak. . . . .	369	Philadelphia, Pa., Schuylkill River at Belmont Filters . . . . .	62-64
near Faith, S. Dak. . . . .	363-368	Philadelphia, Pa., Schuylkill River at Manayunk . . . . .	59-61
Moreau River basin . . . . .	363-369	Piney, Pa., Clarion River near . . . . .	201-202
Mud Creek at Naples, N. C. . . . .	242	Platte River near Cozad, Nebr. . . . .	445
Muskingum River basin . . . . .	220-222	near Odessa, Nebr. . . . .	445
N		Platte River basin . . . . .	401-446
Neshaminy Creek at Croydon, Pa. . . . .	81	Plum Creek near Meadville, Nebr. . . . .	398, 400
at Hulmeville, Pa. . . . .	81	Plymouth Creek at Conshohocken, Pa. . . . .	94
near Edison, Pa. . . . .	80	Poquessing Creek at Philadelphia, Pa. . . . .	81
near Langhorne, Pa. . . . .	81	Portage River at Elmore, Ohio . . . . .	249
New Brighton, Pa., Beaver River at . . . . .	217-219	Potomac River basin . . . . .	134-138
Newcomerstown, Ohio, Tuscarawas River at . . . . .	220-222	Potts Creek near Covington, Va. . . . .	158
New Leipzig, N. Dak., Cannonball River near . . . . .	346-349	Pottstown, Pa., Schuylkill River at . . . . .	53-58
Newport, Pa., Juniata River at . . . . .	119-121	Powder River at Arvada, Wyo. . . . .	299-302
New River at Hinton, W. Va. . . . .	224	Prairie Dog Creek at Norton, Kans. . . . .	476-480
Niobrara River near Cody, Nebr. . . . .	387-389	Pretty Rock, N. Dak., Cedar Creek near . . . . .	350-352
near Gordon, Nebr. . . . .	383-386	Properties and characteristics of water . . . . .	12-14
near Sparks, Nebr. . . . .	390-394	Providence Forge, Va., Chickahominy River near . . . . .	157
near Spencer, Nebr. . . . .	398	Publications . . . . .	15-16
Niobrara River basin . . . . .	383-400		
Nitrate . . . . .	11		
North Atlantic Slope basins . . . . .	22-138		

## R

	Page
Railroad Reservoir near Dickinson, N. Dak.	343
Raystown Branch Juniata River at Everett, Pa.	132
at Saxton, Pa.	132
near Huntingdon, Pa.	122-124
near Huntingdon, Pa.	132
Reddies River at North Wilkesboro, N. C.	173
Red River of the North at Fargo, N. Dak.	257
Red River of the North basin	257-258
Republican River at Cambridge, Nebr.	508
at Trenton, Nebr.	451-458
near Bloomington, Nebr.	508
near Orleans, Nebr.	459-462
Richardson, N. Dak., Heart River near	339-342
Richmond, Va., James River at	150-152
Ridley Creek near Media (U. S. Highway 1), Pa.	95
Rivanna River at Palmyra, Va.	156
Riverdale, Nebr., Wood River near	420-424
Riverton, Wyo., Wind River at	268-269
Riverview, Nebr., Long Pine Creek near	395-397
Rockfish River near Greenfield, Va.	160
Rockingham, N. C., Pee Dee River near	170-172
Rocky River near Norwood, N. C.	182-184
Rose Creek near Wallace, Kans.	509
Russell, Kans., Saline River near	485-490

## S

St. Johns River near De Land, Fla.	188-190
St. Johns River basin	188-190
St. Lawrence River basin	245-256
St. Michael, Nebr., South Loup River at	431-435
St. Paul, Nebr., Middle Loup River at	427-430
St. Paul, Nebr., North Loup River near	436-440
Saline River near Russell, Kans.	485-490
near Wilson, Kans.	491-492
Sandusky River at Fremont, Ohio	251-253
at Upper Sandusky, Ohio	250
Santee River basin	185-186
Santeehah Reservoir near Robbinsville, N. C.	244
Sappa Creek near Beaver City, Nebr.	467-470
near Stamford, Nebr.	471-475
Schuykill River at Auburn, Pa.	40-45
at Belmont Filters, Philadelphia, Pa.	62-64
at Berne, Pa.	46-52
at Conshohocken, Pa.	86
at Girard Avenue in Philadelphia, Pa.	87
at Hamburg, Pa.	83
at Landingville, Pa.	33-39
at Leesport, Pa.	83
at Manayunk, Philadelphia, Pa.	59-61
at Monocacy, Pa.	84
at Mount Carbon, Pa.	82
at Passayunk Avenue in Philadelphia, Pa.	87
at Phoenixville, Pa.	85
below French Creek at Phoenixville, Pa.	85
at Port Clinton, Pa.	83
at Port Kennedy, Pa.	86
at Pottstown, Pa.	53-58
at Pottsville, Pa.	82
at Reading near Muhlenberg Station, Pa.	84
at Stowe, Pa.	85
two miles below Angelica Creek near	
Reading, Pa.	84
Scioto River basin	228-229
Scotts Creek near Tulleytown, Pa.	80
Scottsville, Va., James River at	148
Sediment	14-15
Shadehill, S. Dak., Grand River at	354-359
Sharpsburg, Pa., Allegheny River at	195-196
Shavers Fork at Parsons, W. Va.	210
Shell Creek near Columbus, Nebr.	446
Shickshinny Creek at Shickshinny, Pa.	129
Shoshone River at Byron, Wyo.	293-294
below Buffalo Bill Reservoir, Wyo.	291-292
Silica	8
Skippack Creek at Mainland, Pa.	93
Slate River near Arvonja, Va.	160
Smith Creek near Clifton Forge, Va.	158
Smith River at Spray, N. C.	191
Smoky Hill River at Ellsworth, Kans.	509
near Ellis, Kans.	481-484
Snake Creek near Burge, Nebr.	398

Snowbird Creek near Robbinsville, N. C.	244
Sodium and potassium	9-10
Solomon River at Beloit, Kans.	505-507
Souris River near Verendrye, N. Dak.	258
South Atlantic Slope and Eastern Gulf of Mexico basins	139-192
South Bald Eagle Creek at Tyrone, Pa.	132
near Tyrone, Pa.	131
South Branch Potomac River near Petersburg, W. Va.	135
South Fork Catawba River at Lowell, N. C.	192
South Fork Grand River near Cash, S. Dak.	360
South Fork New River at Jefferson, N. C.	242
South Fork Republican River at Colo.-Kans. State line	508
South Fork Solomon River at Alton, Kans.	501-504
South Heart, N. Dak., Heart River near	333-338
South Loup River at St. Michael, Nebr.	431-435
near Cumro, Nebr.	446
South Platte River at Julesburg, Colo.	416-419
near Kersey, Colo.	445
South Yadkin River at Cooleemee, N. C.	175-177
Sparks, Nebr., Niobrara River near	390-394
Specific conductance	13
Stamford, Nebr., Sappa Creek near	471-475
Standing Stone Creek at Huntington, Pa.	132
Stillwater River at Dayton, Ohio	237
Stony Creek at Norristown, Pa.	93
Stream flow	20
Streams Tributary to Lake Erie	245-256
Sulfate	10
Suspended sediment	4-5
Susquehanna River at Danville, Pa.	99-104
at Falls, Pa.	96-98
at Harrisburg, Pa.	105-109
at Marietta, Pa.	128
at Shickshinny, Pa.	128
Susquehanna River basin	96-133
Sutersville, Pa., Youghiogheny River at	211-213
Swannanoa River at Biltmore, N. C.	243
Swatara Creek near Hummelstown, Pa.	133
Swift Creek near Chester, Va.	162
Sylvan Grove, Kans., Wolf Creek near	497-500

## T

Tar River at Greenville, N. C.	191
Temperature	5
Thermopolis, Wyo., Bighorn River at	270-274
Tinicum Creek at Tinicum, Pa.	80
Toby Creek at Luzerne, Pa.	128
Tohickon Creek at Point Pleasant, Pa.	80
at Tohickon, Pa.	80
near Pipersville, Pa.	80
near Quakertown, Pa.	80
Tongue River at Miles City, Mont.	295-298
Total acidity	13
Toussaint River near Genoa, Ohio	248
Trenton, Nebr., Republican River at	451-458
Trenton, N. J., Delaware River at	25-27
Trout Creek near Port Kennedy, Pa.	93
Tuckasegee River at Bryson City, N. C.	244
Tug Fork at Kermit, W. Va.	227
Tulpehocken Creek at West Bridgeport, Pa.	90
Tumbling Run near Pottsville, Pa.	87
Tuscarawas River at Newcomerstown, Ohio	220-222
Tuscarora Creek at Port Royal, Pa.	133
Tye River near Lovingson, Va.	160
Tygart River at Elkins, W. Va.	206

## U

Unami Creek near Summeytown, Pa.	92
Upper Sandusky, Ohio, Sandusky River at	250
Uwharrie River near Eldorado, N. C.	181

## V

Valley Creek at Valley Forge, Pa.	93
Valley River at Tomatia, N. C.	244
Verdigre Creek near Verdigre, Nebr.	399
Verdigre River at Verdigre, Nebr.	400



## W

	Page
Walnutport, Pa., Lehigh River at . . .	31-32
Wapakoneta, Ohio, Auglaize River at . .	245
Warren, Ohio, Mahoning River at . . .	214-216
Watford City, N. Dak., Little Missouri River near . . . . .	311-321
Waynesboro, Pa., Antietam Creek near .	137
West Branch Schuylkill River at Cressona, Pa.	88
West Branch Susquehanna River at . . .	
Lewisburg, Pa. . . . .	113-115
at Lock Haven, Pa. . . . .	110-112
West Liberty, Ohio, Mad River at . . .	241
West Mahantango Creek near McKees Half Falls, Pa. . . . .	129
West Swamp Creek at Layfield, Pa. . . .	92
near Delphi, Pa. . . . .	93
White River near Kadoka, S. Dak. . . .	382
near Oacoma, S. Dak. . . . .	382
near Oglala, S. Dak. . . . .	378-381
White River basin . . . . .	378-382
Wilkesboro, N. C., Yadkin River at . .	164-166
Willis River at Flanagan Mills, Va. . .	161

	Page
Wilmington, Del., Brandywine Creek at .	74-78
Wilson, Kans., Saline River near . . .	491-492
Wind River at Riverton, Wyo. . . . .	268-269
near Dubois, Wyo. . . . .	266-267
Wissahickon Creek at Philadelphia, Pa. .	94
at Whitmarsh, Pa. . . . .	94
near Fort Washington, Pa. . . . .	94
Wood River near Riverdale, Nebr. . . .	420-424
Wolf Creek near Sylvan Grove, Kans. . .	497-500
Wyomissing Creek at West Reading, Pa. .	90

## Y

Yadkin River at High Rock, N. C. . . .	167-169
at Patterson, N. C. . . . .	163
at Wilkesboro, N. C. . . . .	164-166
at Yadkin College, N. C. . . . .	191
Yellowstone River at Miles City, Mont. .	303
near Sidney, Mont. . . . .	303
Yellowstone River basin . . . . .	266-304
Youghiogheny River at Sutersville, Pa. .	211-213