

Quality of Surface Waters of the United States 1951

Parts 5-6

Prepared under the direction of S. K. LOVE, Chief, Quality of Water Branch

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of Iowa, and with other agencies*



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PREFACE

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QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1951

PARTS 5-6

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 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 prior to 1948 were published in a single volume for the entire country. Beginning in 1948, the records were published in two volumes, and beginning in 1950, in four volumes, covering the drainage basins shown in figure 1. The samples for which data are given were collected from October 1, 1950, to September 30, 1951. 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.

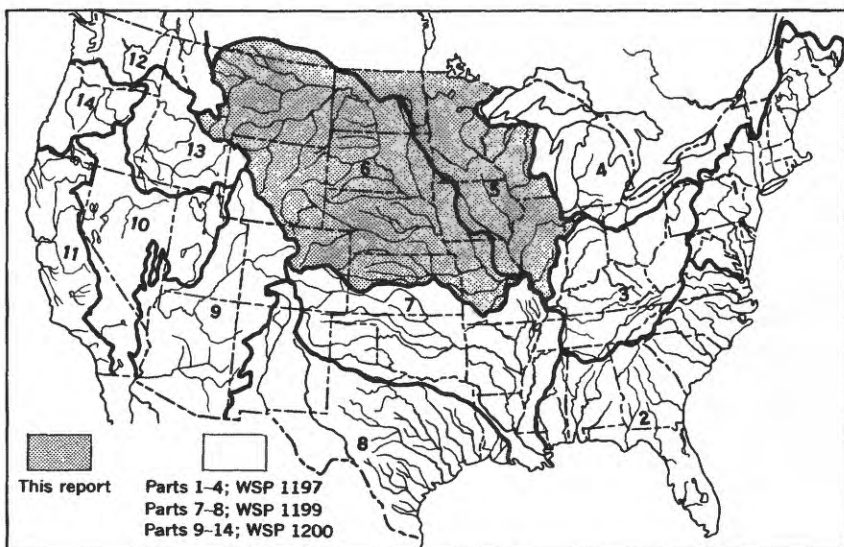


Figure 1. Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1951. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

Beginning with the series of reports for the water year ending September 30, 1951, the order of listing station records has been changed. In this report, stations on tributary streams are listed between stations on the main stream in the order in which those tributaries enter the main stem. Stations on tributaries to tributaries are inserted in a similar manner.

During the year ended September 30, 1951, 98 regular sampling stations on 97 streams 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 70 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 17.

Quantities of suspended sediment are reported for 87 stations during the year ended September 30, 1951. The sediment samples were collected one or more times daily at most stations, depending on the rate of flow and changes in stage of the

stream. Sediment samples were collected less frequently during the year at many other points. In connection with measurements of sediment discharge, sizes of sediment particles were determined at 110 of the stations. As noted under "Remarks" in the table headings, suspended-sediment concentrations also were determined from the samples collected for chemical analysis in some parts of the country. 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. Records of these infrequent determinations are available for reference in the district offices listed.

Material which is transported essentially in continuous contact with the stream bed is termed bed load. 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.

Some characteristics of the bed material at 11 locations are shown in the tables of particle-size distribution.

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 volumes of daily samples collected from the 1st to the 10th, from the 11th to the 20th, and during the remainder of the month. For some streams that are subject to sudden and large changes in chemical composition or concentration, 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. Public 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.

SEDIMENT

In general, samples were collected daily with the US D-43 depth-integrating sampler (U. S. Inter-agency, 1948, p. 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. Suspended-sediment samples, consisting of depth-integrated samples at three or more verticals in the cross section were made periodically 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 taken regularly 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 are 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 sedi-

ment loads for missing days in an otherwise continuous period of sampling 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, p. 82-90) was used in most of the analyses. Generally, sieves were used in the determination of particle sizes for sediments which were predominantly coarser than 0.062 mm. Size distribution for some sediments was determined by a combination of sieves and pipette methods in which the size fraction 0.062 mm and larger was analyzed by sieves and that smaller than 0.062 mm was analyzed by the pipette method (Kilmer and Alexander, 1949). 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 may 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 5,000 parts per million, where necessary, by means of a sample splitter, in order to stay within limits recommended for the bottom-withdrawal tube or pipette method. The concentration of suspended sediment used in the bottom-withdrawal tube was often different from the concentration in the original suspension. The concentration at which analyses were made is indicated in the appropriate tables.

Size determinations of bed material were made by sieve analysis.

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.

Records of thermograph observations consist of maximum and minimum temperatures for each day, and the monthly averages of

the maximum daily and minimum daily temperatures.

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 although 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 (Fe ⁺⁺)	0.0358	Carbonate (CO ₃ ⁻⁻)	0.0333
Iron (Fe ⁺⁺⁺)	.0537	Bicarbonate (HCO ₃ ⁻)	.0164
Calcium (Ca ⁺⁺)	.0499	Sulfate (SO ₄ ⁻⁻)	.0208
Magnesium (Mg ⁺⁺)	.0822	Chloride (Cl ⁻)	.0282
Sodium (Na ⁺)	.0435	Fluoride (F ⁻)	.0526
Potassium (K ⁺)	.0256	Nitrate (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 constituents.

The hardness, as calcium carbonate (CaCO₃), 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 moder-

ate 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. 17) and the temperature in degrees Fahrenheit. Color is expressed in units of the platinum-cobalt scale proposed by Hazen (1892, p. 427-428). Hydrogen-ion concentration (pH) is given as the negative logarithm of the number of moles of ionized hydrogen per liter of water.

An average of analyses (arithmetical or weighted) for the water year is given for most daily sampling stations. An arithmetical average 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 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 of the analyses 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. Water as represented by the weighted average is less concentrated 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. A part per million of sediment is computed as 1,000,000 times the ratio of the weight of sediment to the weight of water-sediment mixture. Daily sediment loads are expressed in tons per day, and except for subdivided days are usually obtained by multiplying daily mean sediment concentration in parts per million by the daily mean discharge, and the appropriate conversion factor, normally 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 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 regions--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, oxygen consumed, and other dissolved constituents and physical properties 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 (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 scale; 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 waters 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 on fabrics and 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 (CO_3 and 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 (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 or are affected by ground-water inflow carrying appreciable quantities of chloride. Large quantities of chloride may affect the industrial use of water by in-

creasing 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. 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. However, excess 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 (Dean, 1936, p. 1269-1272). This defect becomes increasingly noticeable as the quantity of fluoride in water increases above 1.5 to 2.0 parts per million.

Nitrate (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 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 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 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 NO_3) should be regarded as unsafe for infant feeding.

Boron (B)

Boron in small quantities 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 Survey 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 an approximation 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. Waters having pH values progressively lower than 7.0 denote increasing acidity, whereas values progressively higher than 7.0 denote increasing alkalinity.

(See p. 7). 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 pH 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. (See p. 7 .)

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. The use of hard water is also objectionable because it contributes to 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. Additionally, 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. (See p. 6 .) 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 (Magistád and Christiansen, 1944, p. 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 sedimentation diameters indirectly. Sediment particles in the sand-size (larger than 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 on 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 on 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, 1948, 1949, and 1950, for many of the stations listed in this report are given in Water-Supply Papers 942, 950, 970, 1022, 1030, 1050, 1102, 1132, 1162, and 1187.

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 1, 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 water of Georgia, 1944.
- *998. Suspended sediment in the Colorado River, 1925-41, 1947.
- 1048. Discharge and sediment loads in the Boise River drainage basin, Idaho, 1939-40, 1948.
- 1110-C. Quality of water of Conchas Reservoir, New Mexico, 1939-49, 1952.

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

Records in Iowa, Upper Mississippi River basin, were obtained in cooperation with the Iowa Geological Survey, H. G. Hershey, director and State geologist. Records on file for sediment sampling stations can be obtained by writing to the District Engineer, Surface Water, 508 Hydraulic Laboratory, University of Iowa, Iowa City, Iowa.

Financial assistance was furnished by the Bureau of Reclamation of the United States Department of the Interior in the operation of some stations in the Missouri River basin.

In addition to these cooperative programs, many of the stations were operated from funds appropriated directly to the Geological Survey for quality-of-water investigations.

Assistance in collecting records was given by many municipal, State, and Federal agencies.

DIVISION OF WORK

The quality-of-water program 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 chemical quality and sediment investigations in the Missouri River basin in Colorado, Iowa, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming were begun 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, regional engineer, Lincoln, Nebr. A few chemical analyses of streams in the Hudson Bay basin in North Dakota were made in connection with this program. Any additional analytical data on file for the sampling stations can be obtained by writing or visiting the Quality of Water regional office, 510 Rudge-Guenzel Building, Lincoln, Nebr.

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.

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CHEMICAL ANALYSES, WATER TEMPERATURES, AND SUSPENDED SEDIMENT

PART 5. HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN

SHEYENNE RIVER NEAR WARWICK, N. DAK.

LOCATION.--At gaging station at highway bridge, 3.3 miles south of Warwick, Benson County.

DRAINAGE AREA.--2,100 square miles approximately.

RECORDS AVAILABLE.--Chemical analyses: January to September 1951.

Water temperatures: January to September 1951.

EXTREMES, January to September 1951.--Dissolved solids: Maximum, 690 ppm June 17 to July 14; minimum, 180 ppm Mar. 29.

Hardness: Maximum, 363 ppm Mar. 27; minimum, 86 ppm Mar. 29.

Specific conductance: Maximum daily, 1,140 micromhos June 16, 18; minimum daily, 244 micromhos Mar. 29.

Water temperatures: Maximum, 79°F July 24.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples on file in the regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1208.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./ml.	Non-carbonate, mg./ml.				
Jan. 8-31, 1951...	10.8	28	0.10	78	35	68	5.8	450	88	16	0.2	2.8	0.13	590	0.80	17.2	338	0	30	865	7.8	10
Feb. 1-28.....	6.88	28	10	79	32	67	5.2	432	100	14	.2	2.3	.10	576	.79	10.4	330	0	30	832	7.9	10
Mar. 1-26.....	8.38	28	10	78	31	60	4.9	420	117	13	.2	3.3	.09	556	.76	12.6	324	0	30	816	7.9	13
Mar. 27.....	30	34	--	87	35	77	8.4	469	112	9.1	--	--	--	--	--	--	363	0	31	919	8.1	8
Mar. 28.....	64	12	.02	83	38	62	2.4	110	123	31	5.0	3.8	.05	180	.24	46.7	362	--	33	962	7.6	--
Mar. 29.....	90	12	.02	21	5.1	19	2.4	110	31	5.0	3.8	3.8	.05	180	.24	46.7	366	0	32	244	8.1	6
Mar. 30-Apr. 6...	223	16	.04	32	14	30	8.2	168	58	9.0	.1	4.4	.07	266	.36	160	138	0	30	412	7.6	50
Apr. 7-10.....	894	14	.04	25	9.6	23	7.1	121	56	5.0	.1	4.0	.08	224	.30	541	102	3	35	340	7.8	45
Apr. 11-12.....	1,200	13	.04	24	10	42	7.1	150	67	5.0	.1	4.4	.10	264	.36	855	102	0	45	399	8.2	45
Apr. 13-17.....	579	14	.04	28	12	44	7.6	166	71	6.0	.1	3.5	.13	282	.38	441	118	0	43	427	8.3	45
Apr. 18-May 16...	167	20	.04	44	24	82	8.2	205	126	13	.3	2.5	.26	504	.69	227	210	0	45	736	8.0	44
May 17-June 16...	62.6	25	.03	61	34	106	8.0	434	144	16	.4	2.2	.28	630	.86	106	291	0	43	935	7.9	31
June 17-July 14...	51.9	21	.02	53	35	138	8.2	450	172	18	.4	2.1	.33	690	.94	96.7	277	0	51	1,020	8.0	32
July 15-Aug. 13...	6.43	17	.02	49	32	136	8.0	455	154	17	.4	1.7	.36	664	.90	11.5	256	0	53	988	8.0	29
Aug. 14-31.....	3.11	21	.02	48	24	80	5.6	354	93	11	.2	1.6	.22	471	.64	3.95	220	0	43	736	8.0	15
Sept. 1-30.....	11.6	15	.02	43	27	110	8.0	410	110	16	.2	1.7	.32	546	.74	17.1	219	0	51	851	8.1	28
Weighted average a	76.4	18	0.04	38	19	64	7.6	251	96	10	0.2	3.2	0.18	403	0.55	83.1	173	0	43	600	--	--

a For period sampled only. Includes estimates where data are missing. Represents 95 percent of runoff for water year October 1950 to September 1951.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN--Continued

SHEYENNE RIVER NEAR WARWICK, N. DAK.--Continued

Temperature (°F) of water, January to September 1951
 /Once-daily temperature measurement, 10 a.m. to 1 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				--	a 33	35	--	59	55	--	70	a 62
2				--	34	33	a 35	59	51	63	72	--
3				--	31	33	a 38	61	--	61	71	a 65
4				--	--	--	a 41	a 60	a 64	a 70	72	61
5				--	--	32	36	58	64	66	--	61
6				--	--	--	35	--	57	66	67	63
7				--	--	35	36	60	58	67	68	65
8				--	a 35	--	--	60	58	--	67	63
9				--	--	a 34	38	58	56	57	67	--
10				--	a 36	34	38	58	--	66	61	67
11				--	--	--	39	61	58	67	65	63
12				--	a 34	a 35	34	61	57	69	--	59
13				35	33	35	40	--	70	73	65	56
14				--	36	35	35	69	69	70	59	53
15				35	35	35	--	64	73	--	61	56
16				35	a 37	--	35	62	71	69	65	--
17				35	37	a 36	35	67	--	69	65	58
18				34	--	--	39	62	68	69	67	59
19				33	34	--	40	65	68	71	--	59
20				32	35	--	40	--	70	74	64	57
21				--	34	--	38	62	67	70	62	52
22				35	a 37	37	--	65	62	--	66	52
23				--	36	36	41	66	67	70	67	--
24				a 34	37	a 36	41	70	--	79	67	48
25				33	--	--	41	65	68	74	68	46
26				33	36	a 36	49	62	--	74	--	46
27				33	35	--	51	--	65	78	64	49
28				--	33	a 35	53	a 68	59	77	64	44
29				--	--	a 36	--	60	59	--	60	40
30				33	--	a 35	56	a 60	62	73	59	--
31				33	--	a 35	--	57	--	73	60	--
Average				--	--	--	40	62	63	70	65	57

a Observations made between 2 p.m. and 6 p.m.

RED RIVER OF THE NORTH BASIN--Continued

SOURIS RIVER NEAR VERENDRYE, N. DAK.

LOCATION.--At gaging station 2.7 miles north of Verendrye, McHenry County, and 7½ miles southwest of (19 miles upstream from) mouth of Wintering River, at mile 210.5 downstream from Canadian border.
 DRAINAGE AREA.--12,200 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: October 1949 to August 1951.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1208.

Chemical analyses, in parts per million, October 1950 to August 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium-sulfate	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
Oct. 28, 1950.....	31	14	0.02	69	31	157		468		190	41	0.4	2.1	0.05	756	1.03		300	0	53	1,120	7.8
Nov. 30.....	140	20	.02	52	24	71		296		110	16	.2	3.5	.05	452	.61		228	0	40	687	7.4
Dec. 22.....	150	25	.02	52	24	72		302		110	15	.2	4.0	.05	456	.62		230	0	41	679	7.4
Jan. 19, 1951.....	140	18	.04	54	21	71		294		103	16	.2	5.5	.10	450	.61		222	0	41	662	7.4
Feb. 16.....	55	20	.04	60	26	76		337		113	18	.2	5.3	.12	512	.70		258	0	39	740	7.5
Mar. 17.....	42	22	.04	76	12	151		430		155	33	.1	6.9	.38	678	.82		238	0	58	1,020	7.7
Apr. 3.....	690	--	--	--	--	59	--	262		101	15	--	--	--	--	--		--	--	38	631	7.8
May 9.....	1,420	--	--	--	--	46	--	218		87	11	--	--	--	--	--		--	--	35	533	7.3
June 7.....	1,590	--	--	--	--	30	--	142		59	2.0	--	--	--	--	--		--	--	36	354	7.3
June 23.....	318	--	--	--	--	74	--	301		117	14	--	--	--	--	--		--	--	41	728	7.9
July 4.....	272	14	.10	48	22	68	--	276		106	13	.1	4.1	.12	434	.99		212	0	41	655	7.7
Aug. 24.....	46	--	--	--	--	79	--	336		110	18	--	--	--	--	--		--	--	41	773	7.6

RED RIVER OF THE NORTH BASIN--Continued
 MISCELLANEOUS ANALYSES OF STREAMS IN THE RED RIVER OF THE NORTH BASIN IN NORTH DAKOTA
 Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million		Tons per acre-foot	Calcium	Non-carbonate			
															Residue at 180°C	Sum						
SHEYENNE RIVER AT SHEYENNE																						
Oct. 14, 1950.....	0.9	32	0.02	92	38	86		470		153	18	0.2	2.0	0.15	672		0.91	386	1	33	961	8.0
Nov. 17	5	24	.04	54	43	159		552		165	20	.2	2.3	.30	744		1.01	310	0	53	1,100	8.0
DES LACS RIVER AT FOXHOLM																						
Oct. 25, 1950.....	27	14	0.02	59	40	259		538		370	30	0.4	5.1	0.20	1,090	1,040	1.48	310	0	65	1,550	7.7
July 4, 1951	41	13	.10	47	25	125		356		173	14	.2	2.7	.08	602		.82	222	0	55	899	8.0

IOWA RIVER BASIN

IOWA RIVER AT IOWA CITY, IOWA

LOCATION --At Benton Street Bridge at Iowa City, Johnson County, 0.5 mile downstream from the dam of University of Iowa and gaging station, 1.0 mile upstream from Ralston Creek, and 3.8 miles downstream from Clear Creek.

DRAINAGE AREA --3,230 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: September 1906 to September 1907, January 1944 to September 1951.

Water temperatures: October 1943 to September 1951.

Sediment records: October 1943 to September 1951.

EXTREMES, 1950-51 --Dissolved solids: Maximum, 384 ppm Dec. 1-31; minimum, 131 ppm Feb. 19-27.

Hardness: Maximum, 308 ppm Dec. 1-31; minimum, 68 ppm Feb. 19-27.

Specific conductance: Maximum, 691 micromhos Jan. 30; minimum, 162 micromhos Feb. 19.

Water temperatures: Maximum, 80°F July 29; minimum, 40°F Jan. 30; minimum, 68 ppm Feb. 19-27.

Sediment concentrations: Maximum daily, 3,040 ppm June 4; minimum daily, 7 ppm Feb. 5.

EXTREMES, 1943-51 --Dissolved solids (1944-51): Maximum, 436 ppm Jan. 26 to Feb. 17, 1948; minimum, 96 ppm Jan. 5-10, 1946.

Hardness (1944-51): Maximum, 345 ppm Dec. 21-31, 1944; minimum, 54 ppm Jan. 5-10, 1946.

Specific conductance (1944-51): Maximum, 739 micromhos Feb. 3, 1948; minimum daily, 108 micromhos Jan. 9, 1946.

Water temperatures: Maximum, 89°F July 4, 1949; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 7,700 ppm June 18, 1950; minimum daily, 4 ppm Feb. 10-25, 1951.

REMARKS: Water samples for chemical analyses collected by discharge records of daily samples available in regional office at Iowa City, Iowa. Flow affected by ice Jan. 8-10, 19, 20, Jan. 25 to Feb. 2, Feb. 12, 13, Feb. 17 to Mar. 5, Mar. 18-25. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1208.

Chemical analyses, in parts per million, water year October 1950 to September 1951

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Chemical analyses, in parts per million, water year October 1950 to September 1951

Chemical analyses, in parts per million, water year October 1950 to September 1951

IOWA RIVER BASIN

Date of collection	Mean dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Car-bonate (CO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per-cent dis-solution ratio	So-lu-bility ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, mg. per liter	Non-carbonate, mg. per liter				
Oct. 1-31, 1950	322	13	0.20	54	21	9.6	4.3	220	2	53	9.5	0.2	5.3	0.00	294	0.40	256	220	36	9	442	8.3
Nov. 1-30	161	13	.04	67	25	14	2.7	256	9	58	11	.2	2.2	.10	338	.46	147	270	45	10	524	8.3
Dec. 1-31	108	12	.02	78	28	16	3.0	291	8	65	16	.2	4.2	.00	384	.52	112	308	56	10	597	8.3
Jan. 1-31, 1951	117	12	.02	74	20	15	4.8	268	0	48	16	.2	5.6	.06	354	.48	112	266	46	11	609	7.4
Feb. 1-18	267	11	.10	52	12	9.6	8.3	172	0	50	10	.2	7.0	.00	262	.36	189	180	39	10	403	7.1
Feb. 19-27	3,156	7.2	.13	263	5.2	2.8	9.7	78	0	33	3.0	.0	5.9	.00	a131	.18	1,120	86	22	6	189	6.7
Feb. 28-Mar. 28	2,754	12	.04	39	11	5.6	5.3	130	0	32	5.0	.3	12	.06	196	.27	1,460	141	34	8	268	7.0
Mar. 29-Apr. 2	7,348	12	.09	28	6.6	4.8	3.4	86	0	28	3.5	.3	12	.07	148	.20	2,940	97	26	9	226	6.9
Apr. 3-5	13,700	9.6	.10	25	6.4	5.3	3.1	83	0	24	2.5	.3	12	.11	132	.18	4,880	89	21	11	162	7.1
Apr. 6-30	7,426	13	.03	43	11	4.5	2.5	185	0	36	3.5	.3	16	.09	226	.31	4,530	154	43	6	320	7.6
May 1-June 2	4,355	16	.04	59	17	5.5	2.6	195	0	51	5.0	.2	19	.02	318	.43	3,740	218	58	5	436	7.5
June 3-7	5,372	11	.07	36	7.8	3.6	2.8	117	0	29	2.5	.2	8.6	.04	186	.25	2,700	122	26	6	263	7.3
June 8-10	10,820	13	.10	43	10	3.3	2.5	142	0	31	2.5	.2	13	.07	290	.40	6,430	149	33	4	311	7.4
June 11-30	4,366	15	.10	59	16	5.4	2.2	198	0	44	4.0	.2	17	.04	326	.60	3,400	212	50	5	435	7.8
June 15 b	3,490	11	.20	57	21	1.4	1.4	235	0	47	5.0	.4	12	--	266	.39	2,690	225	35	12	386	7.9

a Sum of determined constituents.

b Represents 100 percent of runoff for water year October 1950 to September 1951.

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
July 1-31, 1951.....	4,596	18	0.04	55	16	5.2	2.8	198	0	40	4.0	0.2	13	0.07	274	0.37	3,400	203	40	5	407	7.6
Aug. 1-31.....	1,645	17	.04	68	18	7.8	2.8	224	0	45	4.0	.2	8.7	.06	284	.39	1,260	232	38	7	447	7.8
Sept. 1-30.....	1,535	22	.02	72	24	7.8	2.8	281	0	49	6.5	.2	9.2	.05	338	.46	1,400	277	47	6	533	8.0
Weighted average b	2,543	15	0.05	49	14	5.4	3.1	c 168	--	40	4.3	0.2	14	0.06	251	0.34	1,720	180	42	6	365	--

b Represents 100 percent of runoff for water year October 1950 to September 1951.

c Includes carbonate as bicarbonate.

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 7 a.m. and 10 a.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a 68	58	40	37	a 33	36	38	65	70	72	77	74
2	69	55	38	39	33	36	35	64	71	69	77	72
3	64	a 54	35	34	a 35	38	35	66	a 67	71	75	70
4	61	--	36	37	a 35	a 37	37	65	65	68	73	68
5	59	--	39	37	35	37	42	65	63	66	--	68
6	56	52	36	34	36	40	46	58	64	67	--	67
7	58	55	34	a 35	32	41	47	56	60	69	a 76	67
8	58	a 42	36	35	33	36	43	54	60	74	78	66
9	57	44	36	34	32	37	44	62	64	69	--	69
10	58	46	a 37	35	36	36	47	58	66	73	77	67
11	58	40	37	36	40	a 35	a 47	55	64	71	a 79	68
12	58	a 41	34	36	38	34	44	56	68	68	74	73
13	59	38	34	40	32	37	43	a 63	68	68	75	62
14	58	38	34	a 37	a 33	34	42	63	70	71	76	66
15	62	41	35	38	36	34	--	63	70	75	76	64
16	60	42	34	39	36	35	41	67	69	74	74	a 66
17	62	39	a 35	40	36	34	39	67	74	74	76	62
18	63	39	33	38	38	a 33	46	68	74	76	a 74	64
19	64	43	37	38	36	34	42	69	74	74	--	66
20	63	39	36	--	36	33	42	69	71	74	77	66
21	61	a 39	37	a 33	36	33	39	68	72	75	68	67
22	a 64	39	34	34	35	35	47	64	69	66	68	62
23	57	34	35	35	37	38	47	64	68	75	67	63
24	56	34	35	35	37	36	48	64	68	67	68	61
25	54	33	34	34	a 38	38	46	66	67	76	68	58
26	53	36	34	34	35	38	47	63	67	78	68	62
27	54	38	34	34	35	43	50	64	72	78	68	58
28	54	a 36	36	a 34	35	44	55	61	70	78	73	56
29	55	37	36	33	--	a 40	a 50	64	70	a 80	74	54
30	54	a 39	33	32	--	42	63	68	68	77	76	a 61
31	57	--	35	33	--	38	--	67	--	78	78	--
Average	59	42	35	36	35	37	45	63	68	73	74	65

a Observations made between 11 a.m. and 2 p.m.

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	488	135	178	166	80	36	123	43	14
2-----	399	130	140	270	86	63	181	50	24
3-----	453	165	202	177	89	43	100	27	7
4-----	323	125	109	110	90	27	123	21	7
5-----	379	115	118	160	92	a 40	204	34	19
6-----	326	100	88	255	89	61	88	36	9
7-----	264	86	61	123	63	21	90	27	7
8-----	424	107	122	140	63	24	106	31	9
9-----	368	82	81	264	57	41	110	31	9
10-----	361	74	72	101	58	16	110	55	16
11-----	408	72	79	255	45	31	111	29	9
12-----	327	80	71	134	45	16	109	36	11
13-----	383	65	67	181	42	21	111	27	8
14-----	358	74	72	150	28	11	110	22	7
15-----	424	80	92	163	30	13	106	21	6
16-----	402	94	102	238	35	22	100	22	6
17-----	333	100	90	93	38	10	100	18	5
18-----	259	85	59	215	36	21	105	22	6
19-----	305	83	68	120	62	20	107	19	5
20-----	302	80	65	201	97	53	97	15	4
21-----	292	81	64	158	65	28	95	12	3
22-----	285	83	64	214	40	23	101	15	4
23-----	264	87	62	112	35	11	100	19	5
24-----	328	83	74	97	26	7	100	23	6
25-----	250	94	63	101	32	9	100	29	8
26-----	196	60	32	123	35	12	94	31	8
27-----	237	59	38	124	30	10	103	28	8
28-----	175	67	32	124	27	9	100	28	8
29-----	199	62	33	124	23	8	95	25	6
30-----	252	66	45	127	31	11	90	25	6
31-----	229	78	48	--	--	--	83	30	8
Total--	9,993	--	2,491	4,820	--	718	3,362	--	258
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1-----	96	31	8	93	10	3	5,000	720	9,720
2-----	98	28	7	92	9	2	5,800	1,040	16,300
3-----	98	33	9	92	9	2	5,500	520	7,720
4-----	96	33	9	92	8	2	5,400	445	6,490
5-----	96	29	8	92	7	2	6,000	620	b 10,000
6-----	90	24	6	92	8	2	5,830	875	13,800
7-----	92	24	6	92	9	2	4,210	660	7,500
8-----	94	26	7	91	9	2	3,670	590	5,850
9-----	92	23	6	89	15	4	3,760	830	8,430
10-----	92	29	7	88	8	2	3,580	940	9,090
11-----	92	29	7	102	13	4	2,900	555	4,350
12-----	92	32	8	600	22	36	2,100	230	1,300
13-----	92	55	14	360	23	22	1,420	66	261
14-----	92	46	11	445	25	30	1,220	37	122
15-----	92	39	10	570	38	58	1,380	31	116
16-----	93	35	9	372	48	48	1,460	38	150
17-----	95	45	12	450	74	90	1,460	52	205
18-----	140	47	18	1,000	170	sb 670	1,300	90	316
19-----	280	60	45	3,900	548	5,770	1,200	84	272
20-----	230	37	23	3,700	331	3,310	1,000	61	165
21-----	140	37	14	2,500	159	1,070	940	58	147
22-----	149	37	15	2,300	110	683	1,000	69	186
23-----	210	26	15	2,200	83	493	1,150	105	326
24-----	125	23	8	2,100	118	669	1,050	73	207
25-----	130	20	7	4,000	981	10,600	1,000	54	146
26-----	120	20	6	4,000	560	6,050	1,140	50	154
27-----	105	12	3	3,700	565	5,640	1,700	175	803
28-----	100	8	2	4,300	900	10,400	3,400	852	s 8,240
29-----	105	16	5	--	--	--	5,390	1,790	26,000
30-----	100	22	6	--	--	--	6,050	1,600	s 26,300
31-----	95	14	4	--	--	--	6,520	875	15,400
Total--	3,621	--	315	37,512	--	45,666	93,530	--	180,066

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	8,080	880	19,200	5,610	355	5,380	2,260	146	891
2-----	70,700	975	28,200	5,720	252	3,890	2,340	197	1,240
3-----	15,000	1,140	s 46,600	5,720	259	4,000	3,490	1,260	s 13,000
4-----	14,300	595	s 23,400	5,280	349	4,980	4,580	3,040	s 37,100
5-----	11,800	355	11,300	4,980	415	5,580	4,980	2,020	s 27,000
6-----	10,700	317	9,160	4,980	328	4,410	5,610	1,120	17,000
7-----	10,700	395	11,400	5,180	238	3,330	8,200	960	21,300
8-----	10,300	325	9,040	5,390	197	2,870	12,000	720	23,300
9-----	9,630	303	7,880	5,940	178	2,850	11,100	310	9,290
10-----	8,980	255	6,180	7,240	220	4,300	9,370	190	4,610
11-----	8,330	225	5,060	7,960	427	9,180	7,960	165	3,550
12-----	8,460	248	5,660	6,760	350	6,390	6,880	313	s 5,960
13-----	9,110	239	5,880	6,160	260	4,320	5,940	858	s 14,200
14-----	10,000	233	6,290	5,390	320	4,660	4,030	310	3,370
15-----	10,200	212	5,840	4,030	414	s 4,580	3,490	310	2,920
16-----	9,630	176	4,580	3,400	238	2,180	3,760	480	sb 4,930
17-----	8,860	160	3,820	3,060	216	1,780	4,120	1,540	17,100
18-----	8,090	149	3,250	2,960	230	1,850	4,300	1,650	19,200
19-----	7,600	156	3,200	2,740	270	2,000	3,940	901	9,580
20-----	7,000	165	3,120	2,900	304	2,380	3,140	800	6,780
21-----	6,520	205	3,610	3,400	1,260	s 11,800	3,580	1,050	b 10,100
22-----	5,610	238	3,600	2,980	1,750	s 14,300	4,880	2,710	35,700
23-----	4,120	255	2,840	2,660	796	s 5,790	4,860	2,850	37,600
24-----	3,760	255	2,590	2,420	445	2,910	5,610	1,590	24,100
25-----	4,030	280	3,050	2,260	540	3,300	4,980	715	9,610
26-----	4,210	365	4,150	4,680	1,900	s 25,000	3,670	764	s 7,650
27-----	4,480	430	5,200	5,610	2,660	s 40,600	3,140	450	3,820
28-----	4,880	1,090	14,400	5,080	1,530	s 21,300	2,980	475	3,820
29-----	5,080	900	12,300	3,670	844	s 7,530	2,900	525	b 4,130
30-----	5,390	610	8,880	2,580	326	2,270	3,140	1,120	9,500
31-----	--	--	--	2,340	191	1,210	--	--	--
Total--	245,540	--	279,680	139,100	--	216,920	151,250	--	388,551
	July			August			September		
1-----	3,580	1,060	10,200	1,820	265	1,300	3,060	446	3,680
2-----	3,760	990	10,100	1,380	160	596	2,500	263	1,780
3-----	4,300	720	8,360	1,420	112	429	2,260	238	1,450
4-----	4,680	695	8,780	1,380	100	373	2,020	217	1,180
5-----	4,680	450	5,690	1,300	91	319	1,820	162	796
6-----	4,880	380	5,010	1,220	100	329	1,660	130	583
7-----	5,080	400	5,490	1,140	120	369	1,540	116	482
8-----	5,830	568	9,720	1,260	116	395	1,420	196	a 406
9-----	7,600	1,800	36,900	1,020	88	242	1,340	101	365
10-----	7,360	520	10,300	920	103	256	1,420	100	383
11-----	8,330	403	9,060	871	105	247	1,380	77	287
12-----	9,500	368	9,440	822	125	277	1,500	91	369
13-----	8,980	318	7,710	836	104	235	1,980	130	695
14-----	7,720	264	5,500	843	106	241	1,820	145	713
15-----	7,000	250	4,720	885	94	225	1,580	147	627
16-----	6,160	260	4,320	913	97	239	1,580	92	392
17-----	4,980	400	5,380	1,020	87	240	1,660	101	453
18-----	4,390	465	5,510	1,140	85	262	1,580	94	401
19-----	3,940	481	5,120	1,220	81	267	1,540	69	287
20-----	3,580	724	7,000	1,300	81	284	1,500	87	352
21-----	3,140	468	3,970	1,380	87	324	1,460	90	355
22-----	2,900	470	3,680	1,460	105	414	1,380	99	369
23-----	2,660	403	2,890	1,540	109	453	1,220	104	343
24-----	2,500	359	2,420	1,460	101	398	1,140	75	231
25-----	2,340	348	2,200	1,460	156	615	1,060	76	218
26-----	2,260	308	1,880	2,980	496	3,990	1,060	87	192
27-----	2,260	307	1,870	3,060	620	5,120	955	63	162
28-----	2,260	298	1,620	3,490	840	7,920	913	56	138
29-----	2,100	243	1,380	3,850	856	8,900	864	40	93
30-----	1,900	201	1,030	3,850	742	7,710	843	43	96
31-----	1,820	192	943	3,760	690	7,000	--	--	--
Total--	142,470	--	198,393	51,000	--	49,969	46,055	--	17,880

Total discharge for year (cfs-days) 928,253

Total load for year (tons) 1,380,907

s Computed by subdividing day.

a Computed from: estimated concentration graph.

b Computed from partly-estimated concentration graph.

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA

LOCATION.--At Eighth Avenue Bridge on U. S. Highway 30, at Cedar Rapids, Linn County, 500 feet downstream from gaging station, 1 mile below power dam, and 2.6 miles upstream from Prairie Creek.

DRAINAGE AREA.--6 640 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1906 to September 1907, January 1944 to September 1951.

Water temperatures: January 1944 to September 1951.

Sediment records: October 1943 to September 1951.

EXTREMES, 1950-51.--Dissolved solids: Maximum, 392 ppm Jan. 1-31; minimum, 98 ppm Mar. 31 to Apr. 3.

Hardness: Maximum, 264 ppm Dec. 1 to Jan. 31; minimum, 68 ppm Mar. 31 to Apr. 3.

Specific conductance: Maximum daily, 689 microhos Feb. 6; minimum daily, 138 microhos Mar. 31.

Water temperatures: Maximum, 81°F July 28; minimum, 34°F Nov. 24, 25, Dec. 6, Jan. 28, Feb. 2.

Sediment concentrations: Maximum daily, 1,590 ppm Feb. 27; minimum daily, 3 ppm Feb. 19.

Sediment loads: Maximum daily, 77,300 tons Feb. 27; minimum daily, 4 tons Feb. 9, 11, 19.

EXTREMES, 1944-51.--Dissolved solids (1944-51): Maximum, 400 ppm Jan. 1-31, 1950; minimum, 98 ppm Mar. 31 to Apr. 3, 1951.

Hardness (1944-51): Maximum, 334 ppm Jan. 17 to Feb. 1, 1948; minimum, 68 ppm Mar. 31 to Apr. 3, 1951.

Specific conductance (1944-51): Maximum daily, 689 microhos Jan. 24, 1950, Feb. 6, 1951; minimum daily, 137 microhos Jan. 15, 1947.

Water temperatures (1944-51): Maximum, 89°F July 4, 1949; minimum, freezing point on several days during winter months 1944-48.

Sediment concentrations (1944-51): Maximum, 2,050 ppm June 25, 1950; minimum daily, 1 ppm Jan. 20, 21, 1944, Jan. 31, 1945, Feb. 11, 1947.

Sediment loads: Maximum daily, 245,000 tons June 15, 1947; minimum daily, 1.6 tons Jan. 21, 1944.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Flow affected by ice Nov. 22-28, Dec. 6 to Feb. 27, Mar. 15-25. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1208.

Chemical analyses in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Temperature (°F)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent non-carbonate	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Carbonate			
Oct. 1-31, 1950.....	985		9.4	0.20	45	18	20	2.5	186	36	0.2	3.4	0.10	262	0.36	188	27	19	435	7.8
Nov. 1-30.....	648		13	.30	56	20	23	2.8	235	36	.1	3.1	.00	314	.43	222	29	18	526	8.0
Dec. 1-31.....	543		13	.20	71	21	29	2.9	287	34	.1	5.8	.00	376	.51	264	29	19	595	8.3
Jan. 1-31, 1951.....	480		14	.10	76	18	30	2.5	274	42	.1	5.5	.06	392	.53	264	39	20	621	7.6
Feb. 1-24.....	503		15	.02	71	17	28	3.7	254	48	.1	6.7	.00	376	.51	248	40	19	589	7.4
Feb. 25-27.....	10,100		9.6	.30	32	7.8	4.4	6.0	128	6.0	4.0	8.9	.03	142	.19	8,970	112	7	246	7.6
Feb. 28-Mar. 5.....	19,350		9.0	.08	27	6.0	4.7	5.6	98	18	5.0	5.1	.03	140	.19	7,310	92	13	213	7.0
Mar. 6-27.....	4,188		14	.02	47	12	9.9	3.4	163	37	.1	10	.05	239	.32	2,680	168	34	367	7.4
Mar. 28-30.....	19,370		6.6	.04	27	4.5	3.8	2.7	65	20	4.0	6.2	.04	128	.17	6,980	86	10	197	7.3
Mar. 31-Apr. 3.....	32,750		6.2	.02	19	5.0	2.7	2.3	58	15	2.0	7.9	.10	95	.13	5,970	66	20	142	6.9
Apr. 4-7.....	18,080		7.8	.03	29	6.7	5.1	2.2	98	22	5.0	10	.08	152	.21	7,400	100	21	295	7.0
Apr. 8-12.....	42,740		8.3	.03	27	5.5	2.9	2.5	98	12	2.0	9.8	.12	144	.20	16,890	90	18	202	7.1
Apr. 13-18.....	20,320		12	.04	38	9.5	5.4	2.3	117	31	5.5	15	.15	208	.28	14,800	134	38	288	7.2

a includes equivalent of 6 ppm of carbonate (CO₃).

Apr. 19-29, 1951 ...	13	0.03	51	13	6.4	2.4	159	43	6.5	0.3	17	0.12	278	0.38	10,400	181	51	7	7.4
Apr. 30-May 6	13	.04	42	9.0	6.1	2.3	133	37	4.5	.2	12	.05	208	.28	13,100	142	33	9	7.4
May 7-11	16	.03	62	16	6.6	2.2	201	48	7.5	.2	15	.05	304	.41	9,960	219	54	6	449
May 12-June 2	9.4	.02	60	17	8.0	2.2	210	53	9.0	.3	7.2	.21	274	.37	4,270	218	46	7	7.3
June 3-9	11	.02	44	11	5.1	2.2	149	34	4.5	.2	12	.22	206	.28	8,320	154	32	7	7.4
June 10-28	13	.02	63	18	7.7	1.7	222	46	3.0	.1	11	.33	290	.39	4,130	239	47	7	7.7
June 11 b	9.8	.02	61	16	6.7	1.8	207	40	7.0	.1	15	--	288	.39	6,000	219	49	6	440
June 29-July 3	9.0	.02	37	6.2	3.1	1.8	119	22	3.0	.2	5.5	.08	170	.23	10,100	118	20	5	244
July 4-31	14	.08	53	13	7.5	2.6	189	37	8.0	.2	8.0	.03	242	.33	5,700	186	31	8	401
Aug. 1-31	13	.06	52	15	7.7	3.5	193	37	9.0	.1	7.1	.03	242	.33	3,470	190	30	8	395
Sept. 1-30	15	.04	66	19	9.5	2.2	249	43	11	.2	9.1	.04	302	.41	3,510	242	38	8	491
Weighted average b	11	0.05	44	11	6.8	2.6	153	33	7.2	0.2	9.7	0.10	217	0.30	3,720	155	30	9	--

b Represents 100 percent of runoff for water year October 1950 to September 1951.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 2 p. m. and 6 p. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a 70	62	37	35	a 35	a 35	a 35	69	75	a 70	80	a 74
2	a 71	a 59	a 38	35	a 34	a 36	a 36	a 68	71	72	78	a 68
3	62	52	a 37	37	36	a 36	a 36	a 68	a 66	72	79	a 66
4	59	50	37	37	37	a 35	a 39	a 68	a 65	70	a 74	68
5	56	--	35	37	35	a 36	a 41	a 65	a 62	66	74	66
6	60	49	34	--	a 35	a 38	45	a 65	64	68	76	67
7	a 65	50	36	36	a 35	39	a 45	62	64	71	a 75	66
8	a 59	a 48	36	36	36	a 36	45	63	62	a 72	78	a 65
9	60	a 44	36	37	35	a 35	a 42	57	a 65	a 71	78	a 66
10	61	a 40	36	36	37	35	a 42	58	70	a 70	76	66
11	61	39	37	37	a 37	36	a 42	59	71	a 70	a 76	68
12	61	a 38	37	38	35	35	a 41	65	74	a 69	76	68
13	61	38	37	37	36	35	a 42	67	75	a 68	78	66
14	a 61	40	37	a 37	35	35	41	68	75	a 71	73	a 64
15	a 62	45	35	37	37	35	41	71	74	a 71	72	a 62
16	65	a 46	a 35	37	37	35	41	72	75	76	70	a 60
17	67	a 45	36	37	38	a 35	43	73	76	78	72	a 62
18	68	44	35	37	a 38	35	45	70	75	78	70	63
19	67	42	35	37	a 37	35	48	a 71	78	78	a 70	a 62
20	65	40	36	37	37	35	50	70	76	78	68	a 62
21	65	39	37	36	37	36	48	70	72	a 76	68	63
22	a 61	37	37	35	37	37	49	69	69	77	70	a 60
23	58	35	37	35	36	35	50	71	a 68	78	70	60
24	58	34	a 38	35	38	36	50	72	70	80	68	a 58
25	57	a 34	35	35	36	a 39	a 50	71	72	80	a 66	57
26	a 53	a 35	35	35	38	43	a 49	68	75	80	70	60
27	a 54	36	36	36	--	41	55	a 65	76	80	72	56
28	a 54	38	37	34	a 38	a 39	57	68	73	81	79	52
29	a 56	37	36	35	--	a 38	a 60	70	a 72	a 79	a 73	a 51
30	a 57	37	35	a 35	--	a 35	65	a 70	a 71	80	a 76	a 52
31	63	--	35	a 35	--	a 35	--	72	--	80	a 76	--
Average	61	43	36	36	36	36	46	67	71	75	74	63

a Observations made between 7 a. m. and 12 m.

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,200	78	253	802	60	130	530	43	62
2-----	1,090	76	224	730	55	108	570	38	58
3-----	1,110	68	204	778	33	69	622	25	42
4-----	1,140	50	154	706	26	50	560	15	23
5-----	1,120	46	139	778	25	53	540	15	22
6-----	1,050	55	156	730	31	61	530	15	21
7-----	1,050	51	145	694	34	64	510	21	29
8-----	1,120	53	160	778	33	69	400	19	21
9-----	1,140	54	166	706	25	48	420	16	18
10-----	1,080	56	163	766	18	37	480	19	25
11-----	1,200	66	214	658	18	32	520	20	28
12-----	1,120	62	187	718	18	35	470	10	13
13-----	1,120	52	157	694	15	28	460	13	16
14-----	1,120	72	218	682	16	29	440	35	42
15-----	1,050	59	167	718	18	35	470	15	19
16-----	1,020	55	151	778	30	63	600	13	21
17-----	980	52	138	706	31	59	670	15	27
18-----	941	46	117	730	23	45	620	16	27
19-----	876	47	111	778	17	36	540	30	44
20-----	915	49	121	706	15	29	560	36	54
21-----	888	46	110	646	17	30	530	26	37
22-----	889	48	115	660	16	29	500	29	39
23-----	863	40	93	500	18	24	510	23	32
24-----	850	36	83	370	24	24	540	36	62
25-----	850	35	80	300	51	41	640	42	73
26-----	790	32	68	320	41	35	660	31	55
27-----	814	40	88	401	50	54	620	15	25
28-----	814	46	101	540	45	66	600	14	23
29-----	814	49	108	530	47	67	580	32	50
30-----	778	48	101	530	52	74	570	36	55
31-----	754	48	98	--	--	--	560	38	57
Total--	30,547	--	4,390	19,433	--	1,524	16,822	--	1,110
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	550	17	25	430	25	29	22,000	285	16,900
2-----	540	9	13	430	20	23	20,500	255	14,100
3-----	530	15	21	420	18	20	20,500	247	13,700
4-----	520	15	21	420	17	19	16,700	155	6,990
5-----	530	20	29	410	12	13	11,000	172	5,110
6-----	510	18	25	410	6	7	9,100	196	4,820
7-----	490	22	29	410	10	11	9,860	235	6,260
8-----	470	36	46	410	8	9	9,480	208	5,320
9-----	470	18	23	400	4	4	8,530	195	4,490
10-----	470	10	13	400	6	6	7,020	78	1,480
11-----	490	10	13	400	4	4	5,040	53	721
12-----	490	13	17	450	4	5	3,340	58	523
13-----	490	24	32	440	5	6	2,860	32	247
14-----	490	12	16	420	5	6	2,720	36	264
15-----	470	5	6	370	6	6	2,350	23	177
16-----	480	14	18	350	6	6	3,000	44	356
17-----	470	12	15	400	9	10	3,000	55	446
18-----	470	10	13	420	5	6	2,850	45	346
19-----	460	8	10	540	3	4	2,600	32	225
20-----	450	9	11	900	12	29	2,400	15	97
21-----	460	10	12	800	23	50	2,200	24	143
22-----	470	7	9	750	24	49	2,100	25	142
23-----	460	4	5	800	20	43	2,100	30	170
24-----	450	4	5	900	19	46	2,200	25	149
25-----	500	4	5	4,300	191	2,220	2,300	28	174
26-----	470	6	8	8,000	424	9,160	2,390	41	265
27-----	460	12	15	18,000	1,590	77,300	4,160	128	s 1,680
28-----	450	10	12	25,400	598	s 41,200	11,800	658	s 20,700
29-----	450	12	15	--	--	--	19,700	492	s 25,400
30-----	440	21	25	--	--	--	26,600	373	s 27,000
31-----	440	25	30	--	--	--	38,100	274	s 27,700
Total--	14,890	--	537	67,780	--	130,291	279,000	--	186,095

s Computed by subdividing day.

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	37,700	170	17,300	17,100	305	s 14,900	4,060	50	548
2-----	31,700	135	11,600	34,100	540	s 49,100	7,580	332	s 7,890
3-----	23,500	135	8,570	34,500	342	31,900	15,900	1,170	s 51,300
4-----	18,600	115	5,780	23,200	178	11,100	17,100	625	s 29,300
5-----	16,300	114	5,020	19,000	135	6,930	15,900	424	18,200
6-----	16,300	170	7,480	19,700	137	7,290	16,700	270	12,200
7-----	20,900	191	10,800	16,700	120	5,410	15,600	158	6,650
8-----	27,700	189	14,100	13,300	85	3,050	13,300	147	5,280
9-----	37,700	191	19,400	11,000	96	2,850	10,200	150	4,130
10-----	48,100	247	32,100	10,200	98	2,700	8,910	157	3,780
11-----	53,700	242	35,100	9,480	97	2,480	7,770	142	2,980
12-----	46,500	150	18,800	8,910	85	2,000	6,840	124	2,280
13-----	35,700	104	10,000	8,340	72	1,620	5,760	118	1,800
14-----	27,700	85	6,360	7,390	74	1,480	5,400	100	1,460
15-----	24,700	115	7,870	6,660	83	1,490	5,040	102	a 1,390
16-----	23,900	105	6,780	6,120	75	1,240	5,040	136	1,850
17-----	23,900	--	e 6,100	5,760	76	1,180	5,040	138	1,880
18-----	22,000	75	4,460	5,400	75	1,090	4,690	108	1,370
19-----	17,800	91	4,370	5,220	67	944	4,300	101	1,170
20-----	14,400	85	3,300	5,940	110	1,760	4,340	138	1,620
21-----	12,100	70	2,290	6,120	157	2,590	4,520	154	a 1,880
22-----	11,000	77	2,290	5,760	165	2,570	4,860	143	1,880
23-----	10,200	64	1,760	5,400	130	1,900	4,520	117	1,430
24-----	10,600	65	1,860	5,040	79	1,080	4,240	91	1,040
25-----	12,100	94	3,070	4,690	218	s 2,810	3,850	77	a 800
26-----	14,800	90	3,600	6,120	212	3,500	3,640	75	737
27-----	15,900	120	5,150	5,760	150	2,330	3,960	80	855
28-----	16,300	143	6,290	4,690	70	886	7,580	525	s 11,600
29-----	16,700	98	4,420	4,340	53	621	14,800	878	35,100
30-----	16,300	92	4,050	3,880	44	461	30,900	571	s 47,300
31-----	--	--	--	3,780	45	459	--	--	--
Total-	704,800	--	269,870	323,600	--	169,721	282,340	--	259,710
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	27,000	242	17,600	3,880	185	1,940	7,390	100	2,000
2-----	20,500	220	12,200	3,950	129	1,340	6,120	80	1,320
3-----	17,100	168	7,760	3,480	100	940	5,400	65	948
4-----	13,300	172	6,180	2,950	116	924	4,860	66	866
5-----	10,200	173	4,760	2,860	90	695	4,340	69	809
6-----	10,200	197	5,430	2,750	63	468	3,880	66	691
7-----	9,480	448	11,500	2,670	67	483	3,710	64	641
8-----	9,100	716	17,600	2,860	97	749	3,510	63	597
9-----	13,300	618	22,200	3,130	84	710	3,380	56	511
10-----	16,700	502	22,600	3,610	85	828	3,640	61	600
11-----	17,800	380	18,300	4,060	78	855	4,160	71	797
12-----	15,900	276	11,800	3,610	52	507	4,690	72	912
13-----	14,400	238	9,250	3,220	55	478	4,860	75	964
14-----	11,800	168	5,350	3,160	60	512	4,520	69	720
15-----	10,200	172	4,740	3,130	70	592	4,340	51	598
16-----	9,480	264	6,760	3,960	92	984	4,690	55	696
17-----	8,910	266	6,400	5,400	93	1,360	4,860	52	682
18-----	7,960	158	3,400	5,400	105	1,530	5,220	57	803
19-----	6,840	115	2,120	5,040	90	1,220	4,690	65	823
20-----	6,120	137	2,260	4,860	83	1,090	4,060	56	614
21-----	5,580	75	1,130	4,520	74	903	3,680	45	447
22-----	5,940	140	2,250	4,860	79	1,040	3,480	41	385
23-----	6,660	148	2,660	5,040	87	1,180	3,220	35	304
24-----	6,300	135	2,300	4,860	85	1,120	3,040	27	222
25-----	5,580	120	1,810	5,400	88	1,280	2,890	28	218
26-----	5,400	118	1,720	6,300	193	3,280	2,720	30	220
27-----	5,220	113	1,590	8,910	284	6,830	2,640	32	228
28-----	4,520	102	1,240	10,200	265	7,300	2,640	27	192
29-----	4,060	108	1,180	12,500	248	8,370	2,540	25	171
30-----	3,680	110	1,090	15,900	235	10,100	2,460	26	173
31-----	3,610	129	1,260	12,500	136	4,590	--	--	--
Total-	312,840	--	216,440	164,870	--	64,198	121,630	--	19,172
Total discharge for year (cfs-days)									2,318,552
Total load for year (tons)									1,323,058

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

MISSOURI RIVER MAIN STEM
BEAVERHEAD RIVER AT BARRATTS, MONT.

LOCATION.--At gaging station at bridge on local road at junction with U. S. Highway 91, 1 mile upstream from Barratts, Beaverhead County, 2 miles downstream from Grasshopper Creek, and 8½ miles southwest of Dillon.
DRAINAGE AREA.--2,740 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: November 1949 to September 1951.
REMARKS.--Records of discharge for water year October 1950 to September 1951.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Cet. 5, 1950.....	550	23	0.02	68	22	28		287	0	79	13	0.2	1.0	0.20	368	0.50		260	41	19	581	8.0
Cet. 31.....	418	23	.06	68	16	25		238	0	81	13	.2	.8	.05	356	.48		244	49	18	559	7.9
Jan. 2, 1951.....	374	18	.05	70	22	24		235	6	89	12	.3	1.6	--	353	.49		263	60	16	572	8.3
Feb. 6.....	324	18	.04	70	22	23		240	0	95	12	.4	2.1	.03	364	.50		265	68	16	555	7.7
Mar. 8.....	285	18	.04	66	23	24		241	0	94	12	.4	1.6	.04	382	.52		263	65	17	548	7.8
Apr. 5.....	894	--	--	--	--	--		189	0	--	--	--	--	--	--	--		197	12	--	405	7.5
May 1.....	445	--	--	--	--	--		205	0	--	--	--	--	--	--	--		210	42	--	477	7.2
June 7.....	1,040	22	.02	39	11	25		168	0	44	9.0	.4	.9	--	246	.33		144	6	27	378	7.2
June 30.....	332	--	--	--	--	--		217	0	--	--	--	--	--	--	--		270	42	--	510	7.5
Aug. 2.....	463	--	--	--	--	--		278	0	--	--	--	--	--	--	--		273	45	--	596	7.6
Sept. 5.....	286	--	--	--	--	--		244	0	--	--	--	--	--	--	--		261	61	--	583	7.8

a Mean daily discharge.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

MISSOURI RIVER MAIN STEM--Continued

BEAVERHEAD RIVER AT BARRATTS, MONT.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Oct. 5, 1950	550	33	49
Oct. 31	422	14	16
Dec. 7	a 380	49	50
Jan. 2, 1951	374	30	30
Feb. 6	324	68	59
Mar. 8	a 285	31	24
Mar. 28	427	75	86
Apr. 5	889	344	826
Apr. 17	515	52	72
Apr. 26	396	22	24
May 1	440	22	26
May 15	645	87	152
May 18	500	53	72
June 7	1,050	134	380
June 9	680	107	196
June 19	490	46	61
June 30	a 336	18	16
July 16	246	28	19
July 26	320	61	53
Aug. 2	458	72	89
Aug. 15	427	22	25
Sept. 5	286	17	13
Sept. 17	274	15	11

a Mean daily discharge.

MISSOURI RIVER MAIN STEM--Continued
BEAVERHEAD RIVER AT BLAINE, MONT.

LOCATION --At gaging station at bridge on State Highway 41, 11½ miles upstream from Ruby River, and 14½ miles northeast of Dillon, Beaverhead County.
DRAINAGE AREA --3,630 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: February 1950 to September 1951.

REMARKS --Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Cet. 5, 1950	839	21	0.02	79	24	31		289	0	99	15	0.2	1.6	0.10	418	0.57	295	58	19	620	7.9
Nov. 1	524	24	.04	77	23	32		276	0	100	18	.2	1.4	.05	414	.56	288	62	19	644	7.9
Dec. 7	a530	27	.04	61	19	29		190	6	103	13	.4	2.5	.05	362	.49	230	64	22	551	8.2
Jan. 2, 1951	a540	21	.02	77	23	24		261	0	98	14	.3	2.4	--	397	.54	286	72	16	622	8.1
Feb. 6	a430	20	.04	78	24	30		269	0	110	15	.6	3.1	.04	422	.57	394	73	18	619	7.7
Mar. 8	a400	22	.06	77	25	28		274	0	105	14	.6	2.4	.11	424	.58	296	71	17	616	7.9
Apr. 5	990	--	--	--	--	--		213	0	--	--	--	--	--	--	--	209	34	--	483	7.5
May 2	440	--	--	--	--	--		249	0	--	--	--	--	--	--	--	264	60	--	618	7.6
June 7	780	25	.02	63	21	32		242	0	87	15	.4	1.7	--	386	.52	243	45	22	583	7.3
June 30	81	--	--	--	--	--		333	0	--	--	--	--	--	--	--	385	92	--	888	7.7
Aug. 2	135	--	--	--	--	--		315	0	--	--	--	--	--	--	--	345	87	--	790	7.5
Sept. 5	490	--	--	--	--	--		287	0	--	--	--	--	--	--	--	302	67	--	676	7.8

a Mean daily discharge.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT HIGHWAY BRIDGE AT TOSTON, MONT.

LOCATION.--At bridge on U.S. Highway 10N at Toston, Broadwater County, 2 miles upstream from Crow Creek, 2½ miles downstream from gaging station, and 9½ miles downstream from Sixteenmile Creek.

DRAINAGE AREA.--14,000 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.

Water temperatures: May 1949 to September 1951.

Sediment records: March 1949 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 78°F July 31; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 670 ppm Mar. 22, 25; minimum daily, 5 ppm July 12.

Sediment loads: Maximum daily, 12,700 tons Mar. 22; minimum daily, 51 tons Feb. 1.

EXTREMES, 1949-51.--Water temperatures: Maximum, 78°F July 25, 1949, and July 31, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 670 ppm Mar. 22, 1951; minimum daily, 5 ppm July 12, 1951.

Sediment loads: Maximum daily, 12,700 tons Mar. 22, 1951; minimum daily, 51 tons Feb. 1, 1951.

REMARKS.--No appreciable inflow between gaging station and sampling point except during periods of heavy local rains. Records of discharge for gaging station at Toston, Mont., for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonates			
Dec. 7, 1950	3,520	25	0.08	44	11	24	5.1	182		44	15	1.2	0.7	0.10	272	0.37	156	7	24	418	7.9
Jan. 2, 1951	4,010	24	.02	42	12	27	4.3	178		48	14	.9	.7	.09	266	.36	154	8	27	426	8.0
Feb. 6	2,700	27	.03	44	13	27	5.2	184		47	16	1.4	1.0	.30	274	.37	162	11	26	431	7.8
Mar. 7	1,900	33	.04	45	12	18	33	192		45	17	1.6	1.3	.16	300	.41	162	5	31	427	7.8
Mar. 26	6,850	19	.04	42	9.0	18	4.4	157		40	10	.7	1.9	--	234	.32	142	13	21	354	7.7
Apr. 4	5,450	20	.04	40	11	18	3.4	158		40	11	.8	3.5	--	238	.32	144	14	21	361	7.7
May 2	6,440	18	.08	33	8.6	16	2.7	132		34	8.0	.4	1.0	--	196	.27	118	10	22	298	7.9
June 20	10,100	19	.02	23	5.2	13	2.3	98		20	7.5	.7	.6	--	146	.20	79	0	26	219	7.7
July 3	4,610	21	.02	28	8.0	17	2.8	126		30	8.5	.7	.7	--	186	.25	103	0	26	277	8.2
Aug. 1	2,630	25	.06	33	10	19	3.7	151		34	10	1.0	1.4	--	236	.32	124	0	24	337	8.1
Sept. 18	3,450	22	.02	42	14	23	3.9	181		47	11	.8	.7	--	254	.35	162	14	23	407	7.8

a. Mean daily discharge

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT HIGHWAY BRIDGE AT TOSTON, MONT.--Continued

Nitrogen, phosphorus, and related physical measurements, December 1950 to September 1951
(Analytical results in parts per million except as indicated)

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Dec. 7, 1950	3,520	34	30	0.06	0.002	0.2	0.17	0.4	0.03	0.06
Jan. 3, 1951	4,010	32	3	.03	.000	.2	.19	.4	.01	.08
Feb. 6	a 2,700	32	9	.07	.004	.2	.08	.4	.03	.07
Mar. 26	6,650	40	360	.05	.03	.4	.75	1.2	.02	.05
Apr. 4	5,450	51	65	.08	.02	.8	.74	1.6	.08	.09
May 2	6,440	45	25	.00	.002	.2	.25	.5	.04	.08
June 20	10,100	59	20	.00	.001	1.4	.19	1.6	.02	.10
July 3	4,610	65	6	.00	.01	.7	.27	1.0	.03	.05
Aug. 1	2,630	74	4	.26	.005	.3	.33	.9	.008	.10
Sept. 18	3,450	55	6	.01	.000	.2	.13	.3	.01	.08

a Mean daily discharge.

Temperature (°F) of water, water year October 1950 to September 1951

Onee-daily temperature measurement between 1 p. m. and 8 p. m. 7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	43	a 42	--	32	a 32	36	a 47	45	--	61	74	61
2	42	a 43	--	a 32	a 35	39	a 47	46	--	63	--	60
3	a 43	a 41	35	a 32	a 35	33	a 50	57	--	68	73	58
4	48	49	a 33	--	40	35	51	55	--	65	69	59
5	49	a 46	a 32	a 33	a 40	32	50	58	--	--	a 67	63
6	a 47	a 45	a 32	33	--	32	47	57	51	68	75	--
7	a 48	a 43	a 32	a 32	37	32	--	--	a 54	67	--	62
8	a 52	a 36	a 32	32	a 37	33	--	58	54	69	62	63
9	a 49	36	35	a 32	--	a 32	45	a 55	61	60	65	61
10	a 53	32	35	35	42	a 32	44	59	64	60	67	60
11	a 54	a 32	a 34	a 33	35	35	46	61	63	63	63	--
12	a 55	a 32	a 33	34	a 33	35	48	57	a 62	67	70	54
13	a 56	a 32	37	a 33	35	40	49	51	a 63	69	65	56
14	a 56	a 33	33	35	a 35	38	45	a 50	67	70	--	55
15	a 52	32	35	a 36	40	40	45	55	71	70	71	57
16	a 52	a 36	37	33	37	37	48	a 55	a 67	74	70	--
17	52	a 35	36	a 36	38	38	50	60	66	75	--	--
18	a 50	a 35	35	a 33	37	37	a 48	58	69	--	--	a 55
19	a 47	a 37	a 35	33	37	40	a 47	59	62	74	--	61
20	48	a 35	36	a 33	38	40	33	60	61	73	--	55
21	48	35	38	32	35	36	40	61	59	70	70	53
22	a 45	32	36	32	35	33	39	60	62	--	--	53
23	a 48	--	36	a 32	39	35	41	62	62	75	63	52
24	50	a 35	42	a 32	39	35	a 43	59	59	--	64	--
25	a 47	a 45	--	a 35	37	38	a 45	56	60	75	62	55
26	a 47	40	36	32	37	39	a 52	60	--	74	63	49
27	a 48	a 37	36	a 32	39	38	a 55	59	--	72	--	--
28	a 46	a 39	35	32	a 37	41	54	55	61	75	58	53
29	a 47	a 35	a 32	--	--	41	a 54	57	60	75	58	54
30	a 50	36	38	--	--	47	47	50	62	--	65	56
31	--	--	a 32	--	--	48	--	42	--	78	62	--
Average	49	37	35	33	37	37	47	56	--	70	--	57

a Observations made between 8 a. m. and 12 m.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT HIGHWAY BRIDGE AT TOSTON, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951										
Day	October			November			December			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day	
1-----	4,570	9	111	4,550	17	204	4,670	14	156	
2-----	4,630	11	138	4,570			4,610			
3-----	4,690	12	152	4,570			4,420			
4-----	4,790	15	194	4,480			4,480			
5-----	4,770			4,460			3,590			
6-----	4,950			4,420			3,020			
7-----	4,910			4,360			3,550			
8-----	4,850			4,440			4,120			
9-----	4,810			4,440			4,360			
10-----	4,810			4,190			4,460			
11-----	4,770	27	349	4,180			4,690	22	279	
12-----	4,730			4,500	4,750	27	346			
13-----	4,710			4,400	4,710	27	343			
14-----	4,690			4,750	4,310	24	279			
15-----	4,670			4,750	4,290	25	290			
16-----	4,650				4,870	4,300	35	406		
17-----	4,770				4,810	4,400	48	570		
18-----	4,850				4,890	4,400	44	523		
19-----	4,830				4,930	4,400	54	642		
20-----	4,830				4,870	4,450	57	685		
21-----	4,790	20	249	4,870	16	207	4,500	42	510	
22-----	4,770			4,690	4,500	24	292			
23-----	4,710			4,360	4,450	22	264			
24-----	4,750			4,500	4,500	22	267			
25-----	4,590			5,180	4,600	18	224			
26-----	4,570				4,810	20	260	4,600	15	186
27-----	4,530				4,810	14	182	4,500	18	219
28-----	4,500				4,770	11	142	4,300	14	162
29-----	4,480				4,730	11	140	4,270	11	127
30-----	4,460				4,670	13	164	4,250	16	184
31-----	4,480		--	--	--	4,250	15	172		
Total-	145,910	--	8,918	138,820	--	6,645	134,700	--	9,009	
Day	January			February			March			
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	
1-----	4,030	11	120	1,900	10	51	3,800	48	492	
2-----	3,980	6	64	2,000	32	173	3,760	50	508	
3-----	4,100	10	111	2,100	39	221	3,320	23	206	
4-----	4,120	15	a 170	2,200	68	404	3,120	24	202	
5-----	4,010	9	97	2,400	85	421	2,540	66	453	
6-----	3,620	8	78	2,700	60	437	1,900	54	277	
7-----	3,440	11	102	3,200	68	588	1,900	44	226	
8-----	3,250	13	114	3,740	74	747	1,900	37	190	
9-----	3,200	10	86	4,160	95	a 1,100	2,000	23	124	
10-----	3,300	14	125	4,970	260	3,490	2,300	62	385	
11-----	3,400	16	147	6,220	806	10,200	2,700	51	372	
12-----	3,400	13	119	5,510	290	4,310	3,100	29	243	
13-----	3,500	14	132	4,670	140	1,770	3,540	29	277	
14-----	3,830	18	186	4,360	110	1,290	3,850	39	405	
15-----	4,090	24	265	4,520	76	928	4,050	44	481	
16-----	4,180	27	305	4,570	89	1,100	4,000	33	356	
17-----	3,780	18	184	4,440	156	1,870	3,850	28	291	
18-----	3,600	28	272	4,320	86	770	3,820	26	268	
19-----	3,400	37	340	4,270	62	715	3,820	20	208	
20-----	3,200	27	233	4,190	58	656	4,070	29	319	
21-----	3,300	21	187	4,120	80	690	4,590	149	s 2,150	
22-----	3,500	24	227	4,000	73	788	7,000	670	12,700	
23-----	3,500	35	331	3,900	54	569	5,510	265	3,940	
24-----	3,600	72	700	3,940	56	596	5,480	446	6,600	
25-----	3,800	120	1,230	4,070	87	956	6,110	670	11,100	
26-----	3,400	154	1,410	4,100	83	919	6,580	552	9,610	
27-----	2,500	32	216	4,070	68	747	6,760	486	8,870	
28-----	2,000	62	335	3,730	43	433	5,530	208	3,110	
29-----	1,770	--	e 100	--	--	--	4,830	108	1,410	
30-----	1,700			--	--	--	4,850	150	1,960	
31-----	1,800			--	--	--	5,240	179	2,530	
Total-	104,300	--	8,186	108,370	--	37,139	125,820	--	70,461	

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT HIGHWAY BRIDGE AT TOSTON, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5,070	127	1,740	6,680	72	1,290	14,400	--	e 2,500
2-----	4,910	139	1,840	6,300	52	884	14,100	--	e 2,400
3-----	5,090	152	2,090	6,040	43	701	13,400	--	e 2,000
4-----	5,240	150	2,120	5,850	44	695	12,700	--	e 1,700
5-----	5,180	148	2,070	5,950	79	1,270	10,900	--	e 1,300
6-----	5,180	121	1,690	6,190	123	2,060	10,300	40	1,110
7-----	5,260	117	1,680	6,740	110	a 2,000	10,500	45	1,280
8-----	5,240	107	1,510	7,650	115	2,380	10,500	43	1,220
9-----	5,370	106	1,540	8,870	131	3,070	10,300	41	1,140
10-----	5,850	114	1,800	10,000	203	5,480	9,500	49	1,260
11-----	6,190	132	2,210	10,600	195	5,580	8,760	44	1,040
12-----	6,270	132	2,230	11,100	184	5,510	7,540	41	835
13-----	6,090	103	1,690	11,400	160	4,920	7,030	38	721
14-----	6,240	102	1,720	11,400	138	4,250	7,400	38	759
15-----	6,400	105	1,810	11,500	123	3,820	7,790	38	799
16-----	6,350	92	1,580	11,100	125	3,750	9,030	56	1,370
17-----	6,560	110	1,950	10,700	106	3,080	10,300	75	2,080
18-----	6,300	93	1,580	10,700	110	3,180	11,300	82	2,560
19-----	6,300	85	1,450	11,500	150	4,660	10,900	53	1,560
20-----	6,500	89	1,210	12,200	150	4,940	10,300	45	1,250
21-----	6,300	42	714	12,600	134	4,560	9,530	39	1,000
22-----	5,730	40	619	12,700	120	4,110	8,370	28	633
23-----	5,070	42	575	13,100	123	4,350	7,870	25	531
24-----	5,180	44	615	14,100	165	6,280	7,480	27	545
25-----	5,050	47	641	15,400	197	8,190	6,920	22	411
26-----	4,790	48	621	15,600	149	6,280	7,090	20	a 380
27-----	4,890	44	581	15,100	121	4,930	6,430	20	347
28-----	4,970	50	671	15,000	115	4,660	5,950	17	273
29-----	5,140	50	694	15,200	111	4,560	5,620	10	152
30-----	5,710	49	755	15,400	103	4,280	5,070	9	123
31-----	--	--	--	15,000	74	3,000	--	--	--
Total--	168,420	--	41,976	341,450	--	118,700	277,280	--	33,429
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	4,710	12	153	2,680	15	109	4,090	19	210
2-----	4,610	12	149	2,730	15	a 110	4,070	17	187
3-----	4,780	10	129	2,750	14	104	3,870	15	157
4-----	5,120	11	152	2,880	18	140	3,870	14	146
5-----	5,290	10	a 140	3,150	20	170	3,820	13	134
6-----	5,290	12	171	3,370	20	182	3,620	14	137
7-----	5,070	13	178	3,400	25	a 230	3,590	13	126
8-----	4,810	11	143	3,540	23	220	3,640	9	88
9-----	4,210	8	91	3,600	21	204	3,640	10	98
10-----	4,210	7	80	3,570	18	174	3,540	12	115
11-----	4,210	6	68	3,570	22	212	3,640	15	a 150
12-----	4,310	5	58	3,620	26	254	3,620	13	127
13-----	4,400	6	71	3,600	23	224	3,620	7	68
14-----	4,650	7	88	3,490	15	a 140	3,600	7	68
15-----	4,480	6	73	3,350	15	136	3,520	6	57
16-----	4,000	9	97	3,210	16	139	3,520	6	a 55
17-----	3,600	9	87	3,080	16	133	3,440	8	a 75
18-----	3,320	9	81	2,970	14	112	3,490	10	94
19-----	3,150	8	68	2,910	17	134	3,470	13	122
20-----	3,130	9	76	2,780	16	120	3,420	12	111
21-----	3,050	9	74	2,720	18	132	3,490	10	94
22-----	3,020	9	a 75	2,720	20	a 150	3,520	10	95
23-----	2,810	8	61	2,840	30	230	3,800	11	113
24-----	2,960	10	80	3,180	75	644	3,850	10	a 100
25-----	2,880	10	77	3,420	42	388	3,920	13	138
26-----	2,750	10	74	3,500	30	284	4,070	11	121
27-----	2,680	11	80	3,620	30	a 290	3,960	11	118
28-----	2,640	13	93	3,710	26	260	4,000	13	140
29-----	2,590	12	84	3,660	22	217	3,870	22	230
30-----	2,650	14	100	3,660	28	277	3,820	24	248
31-----	2,680	13	94	3,940	23	245	--	--	--
Total--	118,050	--	3,045	101,220	--	6,364	111,390	--	3,722

Total discharge for year (cfs-days) 1,875,730
 Total load for year (tons) 347,594

e Estimated.

a Computed from estimated concentration graph.

MISSOURI RIVER MAIN STEM--Continued
MISSOURI RIVER NEAR GREAT FALLS, MONT.

LOCATION.--At bridge over tailrace of power plant at Black Eagle Dam at Black Eagle, near Great Falls, Cascade County.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1951.
REMARKS.--Discharges obtained from unpublished power-plant data.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°)			Hardness as CaCO ₃		Percent sediment	Specific conductance (micro-mhos at 25° C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Nov. 2, 1950	---	20	0.04	45	16		27	191	55	13	1.1	1.6		280	0.39		177	20	25	437	7.7	0.003
Dec. 8	---	19	.06	48	15		27	196	58	11	1.0	1.2		281	.38		182	21	24	449	8.1	.000
Jan. 4, 1951	3,670	19	.04	49	15		26	197	61	11	.8	1.0		282	.38		186	24	24	462	7.7	.000
Feb. 8	3,700	22	.08	55	11		28	197	56	13	1.0	1.2		288	.39		182	20	25	458	7.6	.000
Mar. 7	4,340	22	.06	49	13		33	196	58	14	1.4	1.4		306	.42		174	13	29	455	7.8	.001
Apr. 4	8,020	21	.01	47	15		31	187	66	14	1.0	2.7		302	.41		178	25	27	464	7.8	.000
May 3	10,400	11	.02	43	16		32	171	95	6.0	.3	1.9		322	.44		180	40	26	460	7.8	.000
June 21	17,200	10	.02	38	11		16	156	38	3.5	.3	1.4		202	.27		140	20	315	315	7.6	.000
July 3	6,500	10	.02	39	11		21	164	46	4.5	.3	2.4		250	.31		156	22	23	375	7.3	.000
Aug. 3	4,340	14	.02	39	11		20	138	43	6.5	.6	1.4		218	.30		141	14	23	357	7.3	.000
Sept. 6	5,360	14	.01	44	14		24	179	56	8.5	1.0	1.4		266	.36		168	21	24	420	7.7	.000

PRICKLY PEAR CREEK BASIN
MISCELLANEOUS ANALYSES OF STREAMS IN THE PRICKLY PEAR CREEK BASIN, MONTANA
Chemical analyses, in parts per million, October to December 1950

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
TENMILE CREEK NEAR HELENA																				
Oct. 4, 1950	12	25	0.02	34	7.1	19	122	0	46	3.5	0.5	1.4	0.11	203	0.28	114	14	27	303	7.5
Dec. 14	6.6	24	.02	33	6.0	19	118	0	42	3.5	.5	1.3	.06	193	.26	107	10	27	288	8.0

MARIAS RIVER BASIN

CUT BANK CREEK NEAR CUT BANK, MONT.

LOCATION.--1 3/4 miles downstream from gaging station and bridge on U.S. Highway 2 at Cut Bank, Glacier County, and 10 1/4 miles upstream from confluence with Two Medicine River.

RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1951.

REMARKS.--No major tributary inflow between gaging station and sampling point. Records of discharge for gaging station at Cut Bank for period May to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	Phenolic material as C ₆ H ₅ OH	
														Parts per million	Tons per acre-foot	Calcium, mg./nestum	Non-carbonate				
Nov. 2, 1950	—	4.5	0.02	28	12	12	137	25	2.0	0.3	0.3	0.3		168	0.23	118	6	18	263	7.7	0.000
Dec. 8	—	6.1	.04	42	18	25	208	54	3.0	.2	1.0	1.0		257	.35	179	8	23	434	8.0	.000
Jan. 4, 1951	—	8.2	.04	49	17	26	217	61	3.0	.2	3.7	3.7		288	.39	192	14	23	461	7.5	.000
Feb. 7	—	5.0	.04	49	16	24	217	54	3.5	.0	2.1	2.1		262	.36	188	10	22	447	7.5	.002
Mar. 7	—	7.4	.06	57	20	34	340	13	3.5	.4	.4	.4		320	.44	224	0	25	543	7.3	.002
Apr. 3	—	7.2	.03	35	7.2	28	154	45	1.5	.2	2.8	2.8		228	.31	117	0	34	339	7.5	.000
May 3	—	8.3	.03	36	25	62	208	142	4.5	.2	1.2	1.2		394	.54	192	21	41	603	7.9	.001
June 6	549	4.8	.04	34	14	24	163	53	2.0	.1	1.1	1.1		218	.30	141	7	27	358	8.0	.000
July 3	1,160	7.4	.02	39	22	68	238	129	2.5	.2	1.1	1.1		404	.55	186	0	44	611	7.8	.009
Aug. 1	217	4.0	.02	32	13	16	157	34	1.0	.2	.5	.5		178	.24	132	3	21	309	7.5	.000
Sept. 6	324	5.0	.01	39	20	44	205	68	3.0	.2	.9	.9		320	.44	180	12	35	510	7.9	.000

MARIAS RIVER BASIN--Continued
MARIAS RIVER NEAR SHELBY, MONT.

LOCATION.--At bridge on U. S. Highway 91, 200 feet upstream from gaging station, 7 miles south of Shelby, Toole County, and 24 miles downstream from Cut Bank Creek.

DRAINAGE AREA.--2,610 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: September 1949 to September 1951.

Water temperatures: October 1949 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 77° Aug. 3; minimum, freezing point on several days during November to February.

Sediment records: September 1949 to September 1951.

Sediment concentrations: Maximum daily, 4,690 ppm June 25; minimum, freezing point on several days during November to February.

EXTREMES, 1949-51.--Water temperatures: Maximum daily, 77° Aug. 3; minimum, freezing point on several days during November to February.

Sediment concentrations: Maximum daily, 4,690 ppm June 25; minimum, freezing point on several days during November to February.

REMARKS.--Flow affected by ice Nov. 7-12, 17-24, Dec. 1 to Apr. 1. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Oct. 4, 1950.....	538	7.2	0.04	55	17	21	194	88	2.0	0.2	0.7	0.30	288	0.39	288	0.39	208	49	18	482	7.7
Nov. 1, 1950.....	941	5.6	0.10	46	14	16	149	78	1.0	0.2	1.0	0.10	240	0.33	240	0.33	172	50	17	396	7.6
Jan. 4, 1951.....	3,400	6.0	0.02	47	18	18	174	81	1.5	0.2	0.7	0.08	266	0.36	266	0.36	190	47	17	432	8.4
Feb. 7, 1951.....	3,300	4.7	0.08	55	19	17	196	85	2.0	0.2	0.9	0.00	290	0.39	290	0.39	216	55	15	445	7.6
Mar. 6, 1951.....	3,350	7.4	0.10	55	18	19	196	84	2.0	0.2	0.7	0.04	286	0.39	286	0.39	210	49	17	441	7.8
Apr. 3, 1951.....	2,900	--	--	--	--	--	197	82	--	--	--	--	--	--	--	--	190	28	--	475	7.3
May 2, 1951.....	6,180	--	--	--	--	--	231	142	--	--	--	--	--	--	--	--	212	23	--	638	7.3
June 2, 1951.....	3,190	--	--	--	--	--	183	129	--	--	--	--	--	--	--	--	215	65	--	545	7.5
July 2, 1951.....	5,710	5.4	0.02	44	15	21	184	61	1.0	0.1	0.9	--	240	--	240	--	171	20	21	407	7.5
July 31, 1951.....	1,300	--	--	--	--	--	170	59	--	--	--	--	--	--	--	--	171	32	--	380	7.6
Sept. 6, 1951.....	1,380	--	--	--	--	--	203	108	--	--	--	--	--	--	--	--	205	39	--	527	7.7

a Mean daily discharge.

MARIAS RIVER BASIN--Continued

MARIAS RIVER NEAR SHELBY, MONT.--Continued

Temperature (°F) of water, water year October 1950 to September 1951

[Once-daily temperature measurement October to March made between 10 a. m. and 3 p. m. and April to September between 6 p. m. and 8 p. m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	38	a 37	36	34	--	34	36	40	--	58	70	55
2	--	36	a 34	--	34	34	38	44	--	58	74	58
3	a 42	36	34	34	34	34	--	44	--	65	77	54
4	45	43	34	32	34	34	42	53	--	62	74	54
5	a 47	--	34	34	32	34	40	58	--	62	70	56
6	45	34	34	34	34	34	40	48	45	62	--	64
7	45	38	34	34	32	--	48	48	48	66	70	61
8	a 45	34	34	34	34	34	48	55	52	60	74	65
9	45	35	34	34	--	a 34	42	56	55	60	67	68
10	44	35	35	34	34	34	42	59	62	58	74	60
11	44	34	35	34	34	a 34	46	60	63	66	70	60
12	50	34	35	34	34	34	50	52	64	65	67	58
13	54	36	35	34	a 34	a 34	46	48	64	70	60	58
14	46	36	34	34	a 34	a 34	40	46	68	70	65	58
15	46	a 35	35	34	32	34	42	50	66	70	67	58
16	40	--	35	34	--	34	45	58	60	70	72	63
17	45	--	35	34	--	34	--	58	64	72	70	62
18	45	36	35	34	--	34	a 36	55	58	76	68	65
19	48	36	35	34	--	34	a 36	55	56	72	68	60
20	46	35	35	34	--	34	36	55	54	70	68	60
21	42	35	35	34	34	--	40	57	55	74	68	60
22	a 42	32	35	34	34	34	40	60	58	72	70	51
23	a 44	34	35	34	34	34	48	60	58	70	60	54
24	40	a 34	35	34	34	a 36	50	55	49	72	60	42
25	a 42	a 36	35	34	34	a 36	55	52	50	72	--	50
26	40	36	34	--	34	38	54	56	52	72	--	42
27	42	38	35	34	--	34	57	58	54	70	--	42
28	42	35	34	34	34	34	51	58	55	72	--	--
29	42	36	35	--	--	34	50	60	58	75	55	49
30	42	34	35	34	--	35	50	55	58	--	55	52
31	40	--	34	34	--	34	--	--	--	72	56	--
Average	44	36	35	34	--	34	45	54	57	66	67	57

a Observations made between 4 p. m. and 6 p. m.

MARIAS RIVER BASIN--Continued

MARIAS RIVER NEAR SHELBY, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	547			941			1,000		
2-----	547			922			900		
3-----	542			1,200			800		
4-----	538			1,060			700		
5-----	538			974			650		
6-----	547	24	35	980	50	124	600	66	125
7-----	538			950			550		
8-----	540			900			550		
9-----	520			700			600		
10-----	500			550			650		
11-----	500			550			750		
12-----	600			550			800		
13-----	626			595			850		
14-----	654			620			850		
15-----	698			590			850		
16-----	692	47	84	575	50	71	800	95	204
17-----	703			550			800		
18-----	708			500			750		
19-----	698			400			750		
20-----	761			350			750		
21-----	856			300			750		
22-----	1,040			300			750		
23-----	967			300			750		
24-----	837			350			800		
25-----	767			487			900		
26-----	714	30	64	779	74	153	1,000	92	200
27-----	676			915			950		
28-----	670			1,340			850		
29-----	664			1,580			750		
30-----	676			1,350			700		
31-----	818			--	--	--	650		
Total-	20,682	--	1,894	22,138	--	3,480	23,800	--	5,480
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	600			275			500		
2-----	500			275			500		
3-----	450			275			500		
4-----	400			275			450		
5-----	350			275			400		
6-----	300	34	41	300	62	47	350	10	11
7-----	350			300			350		
8-----	450			350			300		
9-----	500			350			300		
10-----	550			400			300		
11-----	600			450			300		
12-----	600			500			300		
13-----	600			500			300		
14-----	550			500			350		
15-----	550			500			400		
16-----	500	38	55	550	41	61	400	20	21
17-----	500			600			450		
18-----	500			650			450		
19-----	500			650			500		
20-----	500			650			500		
21-----	500			600			750		
22-----	500			600			1,000		
23-----	500			550			1,500		
24-----	450			550			3,000		
25-----	400			550			4,500		
26-----	350	35	36	550	66	98	3,500	42	85
27-----	350			500			3,000		
28-----	325			500			2,750		
29-----	300			--			2,500		
30-----	275			--			2,250		
31-----	275			--	--	--	2,000	610	3,290
Total-	14,075	--	1,356	13,025	--	1,835	34,650	--	36,705

MARIAS RIVER BASIN--Continued

MARIAS RIVER NEAR SHELBY, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,100	1,330	7,540	6,160	4,600	76,500	2,940	121	960
2-----	2,290	1,340	s 9,900	6,690	2,400	43,400	2,670	130	a 940
3-----	3,200	2,460	21,200	4,490	1,000	12,100	2,370	140	a 900
4-----	2,830	1,380	10,500	3,660	550	5,440	2,390	380	a 2,500
5-----	3,040	1,380	11,300	3,550	420	4,020	2,770	714	5,340
6-----	2,760	1,120	8,350	3,970	1,020	10,900	3,100	793	6,640
7-----	2,210	494	2,690	4,810	1,070	13,300	3,010	322	2,620
8-----	1,960	346	1,630	4,890	780	10,300	3,310	312	2,780
9-----	2,040	358	1,970	5,010	650	8,790	3,710	326	3,260
10-----	1,810	218	1,070	5,240	700	9,900	3,730	262	2,640
11-----	1,520	163	669	5,710	900	13,900	3,780	223	2,280
12-----	1,360	135	496	6,140	1,090	18,100	3,930	235	2,490
13-----	1,360	144	529	6,390	1,120	19,300	4,220	302	3,440
14-----	1,790	265	1,280	5,890	700	11,100	4,470	429	5,180
15-----	1,660	159	713	5,290	490	7,000	4,990	560	7,550
16-----	1,450	99	388	4,590	390	4,940	5,580	632	9,520
17-----	1,510	114	465	4,440	350	4,200	5,600	612	9,250
18-----	1,960	316	1,670	4,750	450	5,770	5,140	455	6,320
19-----	1,960	269	1,420	5,080	490	6,720	4,340	744	8,710
20-----	1,650	169	753	4,830	320	4,170	4,230	372	4,250
21-----	1,540	145	603	4,570	270	3,330	3,930	223	2,360
22-----	1,460	110	434	4,380	280	3,310	3,730	160	1,610
23-----	1,380	86	320	4,630	370	4,620	3,260	124	1,090
24-----	1,360	71	261	5,240	580	8,200	3,530	1,390	s 15,900
25-----	1,410	76	289	5,500	540	8,020	9,370	4,690	119,000
26-----	1,570	102	432	4,870	350	4,600	7,640	1,670	34,500
27-----	2,000	352	1,900	4,180	230	2,590	5,840	801	12,600
28-----	2,630	730	5,180	3,880	230	2,410	5,310	524	7,520
29-----	3,160	930	7,930	3,680	212	2,100	4,730	344	4,390
30-----	3,680	1,320	13,100	3,310	192	1,720	4,140	242	2,700
31-----	--	--	--	3,200	131	1,130	--	--	--
Total--	60,650	--	115,382	148,820	--	331,780	127,760	--	289,240
Day	July			August			September		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3,920	232	2,460	1,220	75	247	1,530	455	1,880
2-----	5,100	749	10,300	1,160	96	300	1,450	320	1,250
3-----	5,200	573	8,050	1,120	97	293	1,560	245	1,030
4-----	4,650	325	4,080	1,080	80	233	1,450	100	392
5-----	4,460	322	3,880	1,050	74	210	1,270	60	206
6-----	4,440	456	5,460	1,010	72	196	1,120	45	136
7-----	4,570	285	3,520	960	64	166	1,030	40	111
8-----	4,140	237	2,650	940	61	155	974		
9-----	4,020	381	4,130	922	61	152	902		
10-----	5,520	1,100	16,400	896	62	150	856		
11-----	6,340	918	15,700	882	58	138	850	26	63
12-----	5,080	358	4,910	934	44	111	889		
13-----	4,420	246	2,940	1,010	60	164	922		
14-----	4,040	213	2,320	1,150	600	1,860	896		
15-----	3,810	246	2,530	954	270	695	870		
16-----	3,610	177	1,720	876	90	213	889		
17-----	3,360	162	1,470	804			882		
18-----	3,200	146	1,260	761			863		
19-----	3,020	146	1,190	725			837		
20-----	2,830	134	1,020	708			850	19	46
21-----	2,600	123	863	714			889		
22-----	2,420	118	771	698	44	86	815		
23-----	2,240	105	635	681			948		
24-----	2,080	100	562	714			1,020		
25-----	1,940	100	524	755			1,090	70	206
26-----	1,820	78	383	720			1,380	105	392
27-----	1,710	78	360	692			1,860	170	853
28-----	1,590	72	309	792			1,760	90	428
29-----	1,480	63	332	1,300	782	s 2,940	1,610	50	218
30-----	1,390	72	270	1,680	460	2,080	1,620	55	240
31-----	1,320	66	235	1,760	368	1,750	--	--	--
Total--	106,320	--	101,234	29,668	--	13,170	35,982	--	8,280
Total discharge for year (cfs-days)									635,570
Total load for year (tons)									909,828

s Computed by subdividing day.

a Computed from estimated concentration graph.

MARIAS RIVER BASIN--Continued
MARIAS RIVER NEAR SHELBY, MONT.--Continued

Particle-size analyses of suspended sediment, March to August 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Mar. 22, 1951 . . .	3:00 p. m.	a 1,000	34	1,500	1,410	30	37	42	50	58	61	62	63		100		BWCM
Mar. 23	3:00 p. m.	a 1,500	34	1,220	912	29	34	39	47	55	66	82	96		100		BWCM
Apr. 1	7:00 p. m.	2,680	36	2,140	1,500	34	40	50	63	78	89	95	98		100		BWCM
Apr. 3	4:46 p. m.	2,890	40	1,980	5,060	--	29	--	44	--	76	90	98		100		SPWCM
Apr. 30	7:00 p. m.	4,140	50	1,880	1,280	--	30	--	45	--	75	96	100		--		SPWCM
May 1	7:00 p. m.	7,220	40	4,730	3,530	--	33	--	56	--	86	--	--		--		SPWCM
May 2	7:06 p. m.	6,140	42	1,890	4,750	--	32	--	52	--	83	--	--		--		SPWCM
May 12	8:00 p. m.	6,710	52	1,260	1,110	20	30	38	49	64	82	94	98		100		BWCM
May 13	7:00 a. m.	6,530	48	1,180	959	22	32	40	53	66	81	93	100		--		BWCM
June 6	9:34 a. m.	3,220	42	953	2,920	41	58	68	75	85	92	95	98		100		BWCM
June 25	10:00 a. m.	9,120	48	4,880	4,430	20	29	38	50	63	82	91	96		98		BWCM
June 25	5:00 p. m.	11,500	50	4,940	3,510	20	32	41	52	66	81	94	99		100		BWCM
June 26	6:00 a. m.	8,230	55	1,940	1,600	24	33	43	54	67	83	96	99		100		BWCM
July 2	3:02 p. m.	5,670	56	813	2,860	17	26	34	44	60	74	86	98		100		BWCM
July 17	6:12 p. m.	3,310	58	154	504	26	32	42	50	62	72	83	94		97		BWCM
Aug. 14	6:20 p. m.	1,070	65	765	2,140	49	63	77	88	92	94	96	98		99		BWCM
Mean daily discharge.																	

a. Mean daily discharge.

MILK RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN THE MILK RIVER BASIN, MONTANA

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Residue at 180°C	Tons per acre-foot	Calcium	Non-carbonate				
																							Sum
MILK RIVER BELOW FRESNO DAM																							
Nov. 6, 1950.....	a70,660	5.6	0.05	26	7.1	8.1	124	0	8.0	0.5	0.1	0.7	0.17	126		0.17	94	0	16	225	8.0		
Jan. 1, 1951.....	a70,290	5.7	.05	27	10	14	142	0	19	.5	.1	1.0	.10	153		.21	109	0	21	261	8.0		
Mar. 17.....	a63,910	5.3	.10	38	11	25	194	0	33	1.5	0	.7	.08	214		.29	142	0	28	338	7.9		
Apr. 14.....	a133,700	6.0	.03	22	8.5	20	126	0	27	1.0	.2	1.8	.05	154		.21	90	0	33	256	7.8		
MILK RIVER AT NASHUA																							
Dec. 8, 1950.....	b75	8.0	0.05	120	43	235	448	0	545	37	0.3	1.4	0.39	1,230	1,210	1.67	478	111	52	1,710	8.1		
Feb. 5, 1951.....	b90	13	.06	118	41	230	440	0	518	41	.3	3.3	.38	1,190	1,180	1.62	462	101	52	1,700	7.9		
Mar. 9.....	b60	11	.04	103	40	205	410	0	458	34	.6	3.2	.35	1,070	1,060	1.46	420	84	51	1,450	7.5		
May 29.....	920	--	--	--	--	69	--	202	0	183	9.0	--	--	--	--	--	--	--	--	41	695	7.5	
July 2.....	526	7.8	.02	50	21	93	229	0	197	12	.3	1.2	--	510	--	.69	210	22	49	776	8.0		
Aug. 3.....	190	--	--	--	--	107	--	275	5	218	15	--	--	--	--	--	--	--	48	892	8.3		
Aug. 27.....	352	--	--	--	--	82	--	263	0	162	10	--	--	--	--	--	--	--	45	740	7.9		
Sept. 25.....	514	--	--	--	--	80	--	214	8	181	9.5	--	--	--	--	--	--	--	45	727	8.4		

a Reservoir storage, in acre-feet.

b Mean daily discharge.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER NEAR WOLF POINT, MONT.

LOCATION ---At gaging station at bridge on State Highway 13, 6 miles southeast of Wolf Point, Roosevelt County, and 6 miles downstream from Wolf Creek. DRAINAGE AREA --83,200 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: March 1949 to September 1951.

REMARKS --Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Oct. 2, 1950	17,500	11	0.05	56	19	56		172	7	165	8.0	0.7	1.3		410	0.56	218	65	36	630	8.4
Nov. 13	8,070	11	.05	60	18	55		169	0	166	8.0	.7	1.1		421	.57	224	69	35	643	8.0
Jan. 16, 1951	10,000	12	.03	60	19	56		190	0	172	9.0	.6	.5		428	.58	227	71	35	662	8.1
Mar. 9	14,200	10	.04	61	20	60		186	0	178	9.0	.8	.7	0.09	442	.60	233	71	36	646	7.8
May 7	13,800	--	--	--	--	--		162	8	159	--	--	--	--	--	--	190	56	--	391	7.3
May 26	6,070	--	--	--	--	--		175	8	168	--	--	--	--	--	--	221	64	--	637	8.4
July 2	6,070	--	--	--	--	--		187	0	162	--	--	--	--	--	--	217	64	--	632	8.2
Aug. 3	15,100	10	.02	53	18	48		179	0	145	8.0	.6	.7		372	.51	207	60	33	588	7.4
Aug. 27	21,500	--	--	--	--	--		181	0	146	--	--	--	--	--	--	208	60	60	590	8.1
Sept. 25	26,000	11	.05	54	18	49		180	0	146	8.5	.6	.8		378	.51	207	59	34	578	8.3

a Mean daily discharge.

YELLOWSTONE RIVER BASIN

YELLOWSTONE RIVER AT LAUREL, MONT.

LOCATION.--At headgate of B. L. & I. Canal, 300 yards downstream from U.S. Highway 12 and half a mile south of Laurel, Yellowstone County.
 RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
 REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium mg./l.	Non-carbonate				
Oct. 11, 1950....		12	0.40	29	11	24		126	51	9.0	0.4	0.7		206	0.28		118	15	31	330	7.7	0.002
Nov. 3.....		13	.02	30	11	25		124	57	7.5	.6	.5		210	.29		120	18	31	329	7.7	.001
Dec. 1.....		9.5	.04	16	5.5	14		63	31	4.0	1.0	2.4		110	.15		63	11	34	188	7.3	.001
Jan. 2, 1951.....		14	.04	32	11	31		130	70	9.0	.4	1.2		238	.32		127	20	35	384	7.9	.000
Feb. 2.....		20	.04	49	15	42		186	101	11	.6	1.7		334	.45		184	31	33	533	7.1	.000
Mar. 7.....		18	.08	52	16	50		182	131	12	.6	1.8		378	.51		197	48	36	584	7.6	.003
Apr. 6.....		13	.02	38	9.2	28		139	63	8.5	.4	2.2		244	.33		133	19	32	374	7.6	.000
May 15.....		14	.03	23	5.0	15		88	29	3.5	.3	2.2		136	.18		78	6	29	211	7.3	.000
June 19.....		11	.04	14	4.9	14		60	30	2.5	.2	1.6		108	.15		55	6	36	161	7.1	.000
July 17.....		10	.04	15	5.5	14		70	27	3.6	.2	.8		113	.15		60	3	34	180	7.1	.000
Aug. 15.....		12	.02	26	9.0	20		109	47	4.5	.2	1.2		198	.27		102	13	30	301	7.3	.000
Sept. 17.....		11	.02	27	1.0	25		124	50	7.0	.4	.7		198	.27		110	8	33	318	7.5	.002

YELLOWSTONE RIVER BASIN--Continued
YELLOWSTONE RIVER AT BILLINGS, MONT.

LOCATION --At gaging station at bridge on U.S. Highway 87, 1 mile northeast of Billings, Yellowstone County, and 12 miles upstream from Pryor Creek.
DRAINAGE AREA --11,870 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: October 1950 to September 1951.

Water temperatures: December 1950 to September 1951. --Dissolved solids: Maximum, 868 ppm Feb. 2; minimum, 96 ppm June 19.

EXTREMES, December 1950 to September 1951. --Dissolved solids: Maximum, 868 ppm Feb. 2; minimum, 96 ppm June 19.

Solids: Maximum, 476 ppm Feb. 2; minimum, 33 ppm June 19.

Specific conductance: Maximum, 471 micromhos Feb. 2; minimum, 140 micromhos June 19.

Temperature: Maximum, 76°F July 22; minimum, 33°F December 19.

Remarks: All samples for chemical analysis completed December 1951. Point on days during December to March.

REMARKS --All samples for chemical analysis completed December 1951. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951.

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per- cent sodium	Specific conductance (micro-mhos at 25°C)	pH	Col- or	Phenolic material as C ₆ H ₅ OH	
														Parts per million	Tons per acre-foot	Calcium, mg./l.	Non-carbonate						
Oct. 11, 1950 ^a	5,320	12	0.02	35	13	26	26	140	66	9.0	0.6	0.7	--	240	0.33	3,450	141	26	29	381	7.8	--	0.001
Nov. 3 ^a	4,280	12	.04	34	14	26	26	135	69	6.5	4	.8	--	236	.32	3,350	137	26	29	368	7.7	--	.000
Dec. 1 ^a	4,480	15	.04	14	4.1	14	14	50	31	3.0	1.2	1.9	--	102	.14	1,240	52	11	37	168	7.0	--	.000
Dec. 15-31	3,888	15	.01	39	13	26	26	149	80	7.0	.4	1.8	0.18	272	.37	2,860	151	29	27	401	7.5	3	--
Jan. 1-30, 1951	2,812	16	.06	47	12	30	33	162	87	9.0	.3	2.1	.24	284	.40	2,230	165	32	28	449	7.7	15	--
Jan. 31-Feb. 28	2,750	13	.04	42	13	33	33	161	85	7.0	.4	1.4	--	274	.37	2,030	160	28	31	455	7.9	--	.000
Feb. 29-Mar. 28	3,511	15	.08	51	14	33	3.6	166	107	7.5	.3	3.0	.24	332	.45	3,150	183	47	28	497	7.5	15	--
Mar. 1-21	2,504	17	.01	45	14	31	2.8	158	97	9.0	.3	2.8	.27	306	.42	2,110	171	41	28	475	7.6	3	.122
Mar. 7 ^a	1,400	16	.06	56	15	42	2.8	184	119	10	.6	1.6	--	370	.50	1,400	200	49	32	551	7.5	--	.002
Mar. 22-23	7,285	15	.01	39	11	27	3.2	149	76	7.5	.4	.9	.17	254	.35	5,000	144	22	28	407	7.7	9	--
Mar. 24-31	6,011	15	.01	43	11	24	3.4	161	63	6.5	.4	1.0	.16	266	.36	4,320	151	19	28	405	7.5	9	--
Apr. 1-30	4,574	14	.01	37	11	23	2.3	145	63	7.0	.1	1.5	.15	232	.32	2,870	138	19	28	380	7.7	4	--
Apr. 6 ^a	4,720	12	.01	39	10	23	2.9	146	68	7.5	.4	2.2	--	246	.33	3,140	140	20	31	383	7.7	--	.000
May 1-8	6,569	16	.02	35	9.6	20	2.2	134	56	5.5	.3	2.5	.13	224	.30	3,970	127	17	25	344	7.7	6	--
May 9-19	11,600	16	.02	27	5.2	11	2.0	102	27	4.0	.3	1.9	.11	158	.21	4,950	89	9	21	284	7.5	8	--
May 15 ^a	11,500	14	.03	24	5.1	15	1.5	88	31	4.5	.3	3.4	.05	146	.20	4,530	80	9	28	214	7.3	8	.000
May 20	19,200	18	.06	30	4.8	8.4	2.2	118	16	1.0	.2	3.2	.05	154	.21	7,980	95	0	16	212	7.4	8	--
May 21-22	17,900	16	.02	21	3.3	8.0	1.6	79	19	1.0	.2	2.1	.07	124	.17	5,990	66	1	20	172	7.7	12	--
May 23	17,400	15	.10	21	4.2	7.5	1.8	86	16	1.0	.2	2.1	.05	130	.18	6,110	70	0	19	177	7.3	8	--
May 24-June 2	25,460	14	.02	21	3.0	7.4	1.3	72	20	2.5	.2	1.8	.04	120	.16	8,250	65	8	19	187	7.4	12	--
June 3-12	15,230	13	.02	30	3.7	12	1.6	86	30	3.5	.2	1.8	.07	122	.17	8,980	68	7	25	216	7.5	7	--
June 13-16	21,180	12	.02	18	4.4	8.8	1.8	74	20	3.0	.2	1.8	.06	122	.17	6,960	73	2	22	170	7.5	8	--
June 17-19	36,370	11	.03	18	2.9	6.7	1.6	66	16	2.5	.2	1.8	.03	104	.14	10,200	57	3	30	147	7.3	13	--
June 19 ^a	34,600	11	.04	16	3.2	10	1.2	64	18	2.0	.2	1.2	.06	96	.13	8,970	53	1	30	140	7.3	9	.000
June 20-24	25,860	12	.04	16	3.6	8.0	1.2	64	18	3.0	.2	1.3	.06	106	.14	7,400	55	3	24	153	7.4	9	--
June 25-30	17,970	13	.04	19	3.3	10	1.4	70	22	3.0	.2	1.4	.08	122	.17	5,920	61	4	25	174	7.7	8	--

^a Not included in weighted average.

YELLOWSTONE RIVER BASIN--Continued
YELLOWSTONE RIVER AT BILLINGS, MONT.--Continued

Chemical analyses, in parts per million, water year October 1950 to September 1951--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Col- or	Phenolic material C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
July 1-4, 1951.....	18,330	12	0.02	16	5.1	9.9	1.6	72	19	3.0	0.4	0.9	0.10	110	0.15	5,440	61	2	25	174	7.3	5	--
July 5.....	22,800	11	.06	21	1.8	9.0	1.4	72	18	2.0	.2	1.8	.09	122	.17	7,510	80	1	24	181	7.2	6	--
July 6-21.....	19,880	13	.02	17	4.5	11	1.6	73	19	3.0	.4	1.2	.09	116	.16	6,230	61	1	28	178	7.4	5	--
July 17 ^a	19,100	9.8	.04	17	4.7	11		72	21	2.9	.2	1.1	--	111	.15	5,720	62	3	28	172	7.2	--	0.000
July 22.....	20,200	16	.04	16	5.4	11	1.5	78	20	3.0	.2	1.2	.09	136	.18	7,420	62	0	27	173	8.1	4	--
July 23-Aug. 11.....	13,280	13	.02	19	6.4	14	2.1	87	29	4.0	.6	1.2	.13	138	.19	4,950	74	3	29	218	7.5	4	--
Aug. 12-25.....	8,833	14	.02	27	8.4	20	2.4	114	44	5.5	.3	1.3	.10	181	.25	4,320	102	9	29	295	7.4	3	--
Aug. 15 ^a	10,500	12	.02	29	7.9	20	2.7	117	43	4.0	.2	1.5	--	184	.25	5,220	105	9	29	297	7.2	--	.000
Aug. 26.....	7,330	15	.12	42	7.2	21	2.7	122	49	5.0	.4	1.1	.15	214	.29	4,240	108	8	29	309	7.7	4	--
Aug. 27-31.....	6,828	14	.02	31	8.4	23	2.4	124	52	6.0	.3	1.1	.14	201	.27	3,700	112	10	30	326	7.9	5	--
Sept. 1-30.....	5,346	13	.02	35	11	26	2.6	136	64	6.5	.3	1.0	.15	231	.31	3,330	131	19	30	373	7.9	5	--
Sept. 17 ^a	4,950	11	.10	35	12	32		166	57	6.0	.4	.5	--	248	.33	3,290	137	1	33	381	6.9	--	.000
Weighted average ^b	9,042	14	0.03	26	6.4	15	2.0	100	38	4.4	0.3	1.6	0.11	187	0.23	4,080	92	10	26	255	--	--	--

^a Not included in weighted average.

^b For period of daily sampling only. Represents 83 percent of runoff for water year October 1950 to September 1951.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER AT BILLINGS, MONT.--Continued

Temperature (°F) of water, December 1950 to September 1951
 /Once-daily measurement made between 4 p. m. and 5 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	32	32	31	--	48	41	61	72	64
2			--	32	33	--	48	52	44	--	a 71	61
3			--	31	34	32	49	55	50	61	--	55
4			--	31	34	--	--	58	54	62	71	59
5			--	32	31	--	50	60	52	65	70	60
6			--	31	31	--	48	57	58	67	68	a 61
7			--	32	32	--	50	59	60	65	69	65
8			--	32	35	--	51	58	58	60	65	62
9			--	32	33	31	41	59	60	a 57	60	61
10			--	33	38	--	42	60	60	51	68	62
11			--	33	32	31	45	60	62	52	66	56
12			--	33	32	--	50	59	60	60	68	55
13			--	32	32	32	50	56	60	65	69	58
14			--	34	34	32	48	56	--	68	67	54
15			--	32	36	33	48	58	63	70	68	56
16			35	--	35	31	48	60	60	70	70	58
17			37	36	34	31	49	68	61	70	71	58
18			34	32	34	32	46	62	53	72	70	60
19			--	32	34	32	44	60	60	70	70	52
20			34	31	35	33	40	55	58	68	68	--
21			40	33	--	33	41	58	55	68	69	51
22			38	32	32	31	45	59	54	76	68	58
23			39	--	34	33	45	61	60	70	68	50
24			--	34	32	33	44	53	56	70	64	51
25			38	33	32	--	50	55	57	67	62	52
26			--	31	32	35	53	55	58	70	60	50
27			--	--	32	--	58	67	57	69	60	48
28			38	--	32	40	58	56	57	71	59	50
29			--	--	--	45	60	55	--	71	61	52
30			35	--	--	44	55	49	--	72	65	55
31			32	--	--	44	--	45	--	72	62	--
Average			--	--	33	--	48	57	57	66	67	56

a Observations made between 6 p. m. and 7 p. m.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER AT BILLINGS, MONT.--Continued

Periodic determinations of suspended-sediment discharge, May to September 1951

Date	Instantaneous discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
May 1, 1951	7,620	544	11,200
May 13	11,500	264	8,200
June 8	14,700	129	5,120
June 20	29,400	360	30,200
June 30	17,600	98	4,710
July 17	18,600	111	5,570
Aug. 15	10,100	332	9,050
Sept. 17	4,900	24	318

YELLOWSTONE RIVER BASIN--Continued
YELLOWSTONE RIVER AT HUNTLEY, MONT.

LOCATION.--At bridge on U.S. Highways 10 and 12, half a mile northwest of Huntley, Yellowstone County, and 1 mile downstream from Pryor Creek.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Oct. 11, 1950.....		12	0.02	36	14	30		145	76	8.0	0.2	1.2		254	0.35	146	29	31	408	7.7	0.002
Nov. 6.....		11	.02	38	14	30		145	81	6.5	.6	1.7		260	.35	151	32	30	406	7.4	.007
Dec. 4.....		13	.04	39	14	33		149	86	7.0	.6	2.6		263	.36	154	32	30	403	7.9	.014
Jan. 2, 1951.....		12	.04	39	13	30		146	82	7.0	.4	3.2		256	.35	152	32	30	423	7.7	.012
Feb. 5.....		16	.04	71	23	59		217	190	8.0	.4	3.2		488	.52	272	95	30	729	7.7	.009
Mar. 7.....		17	.06	56	16	45		191	133	10	.6	3.0		382	.52	215	58	31	583	7.6	.018
Apr. 9.....		12	.01	41	13	32		156	79	8.0	.4	1.5		274	.37	155	27	31	429	7.8	.002
May 15.....		14	.03	26	4.9	14		92	32	3.0	.3	2.2		142	.19	85	10	27	221	7.4	.002
June 19.....		10	.04	16	4.4	11		66	21	2.0	.2	2.4		100	.14	58	4	29	153	7.2	.000
July 18.....	9.5	13	.04	18	5.4	13		75	25	3.0	.4	2.5		118	.16	67	5	29	187	6.9	.000
Aug. 15.....		11	.02	28	9.2	20		117	45	4.5	.2	2.0		190	.26	108	12	29	309	7.3	.000
Sept. 17.....		10	.02	35	13	30		141	78	6.0	.2	1.2		248	.34	142	26	31	400	7.4	.002

YELLOWSTONE RIVER BASIN--Continued

NORTH FORK WIND RIVER NEAR DUBOIS, WYO.

LOCATION.--At gaging station, 1½ miles upstream from mouth and 10 miles southeast of Dubois, Fremont County.
DRAINAGE AREA.--439 square miles.

RECORDS AVAILABLE.--Sediment records: April to July 1951.

EXTREMES, April to July 1951.--Sediment concentrations: Maximum daily, 5,300 ppm June 16; minimum daily, 30 ppm May 2.

Sediment loads: Maximum daily, 50,000 tons June 16; minimum daily, 14 tons May 2.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, April to July 1951

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Apr. 9, 1951.....	150		24	0.04	22	5.9	13		114	10	1.0	0.2	1.2	0.00	140	0.16	80	0	26	199	8.2
Apr. 20	229		26	.10	20	6.1	12		108	8.0	1.0	.2	1.2	.10	148	.20	75	0	25	186	8.4
July 18	1,150		20	.10	13	3.8	3.9		64	1.0	1.0	.2	1.4	.01	80	.11	48	0	15	115	8.0

YELLOWSTONE RIVER BASIN--Continued

NORTH FORK WIND RIVER NEAR DUBOIS, WYO.--Continued

Suspended sediment, April to July 1951

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	207	60	34	941	780	2,000
2-----	--	--	--	176	30	14	685	200	370
3-----	--	--	--	169	50	23	583	170	270
4-----	--	--	--	302	300	240	496	130	170
5-----	--	--	--	522	900	1,300	472		
6-----	--	--	--	678	2,500	4,600	460	95	120
7-----	--	--	--	424	220	250	448		
8-----	--	--	--	370	130	130	402	58	66
9-----	162	130	57	414	190	210	370	210	240
10-----	133	170	61	436	280	330	472		
11-----	111	120	36	655	620	1,100	724	230	450
12-----	118	160	51	1,020	530	s 1,600	836	440	990
13-----	176	200	s 120	662	190	340	1,030	480	s 1,600
14-----	224	300	180	454	90	110	1,800	1,100	s 5,400
15-----	186	170	85	466	110	140	2,060	2,400	sa 18,000
16-----	162	120	52	583	160	250	3,120	5,300	sa 50,000
17-----	224	270	160	659	140	s 310	3,160	4,100	sa 40,000
18-----	306	320	260	1,220	800	2,600	2,600	3,500	s 26,000
19-----	306	260	210	1,190	610	s 2,100	2,380	4,600	s 32,000
20-----	256	160	110	878	230	550	2,140	2,500	14,000
21-----	212	160	92	1,020	270	740	1,970	1,500	8,000
22-----	169	80	37	1,010	290	s 990	1,620	1,200	5,200
23-----	166	80	36	1,880	1,000	s 5,300	1,360	1,200	4,400
24-----	155	50	21	1,860	2,100	11,000	1,390	400	1,500
25-----	144	90	35	1,380	840	3,100	1,450	340	1,300
26-----	199	120	64	1,230	500	1,700	1,430	290	1,100
27-----	186	110	55	1,540	850	3,500	1,500	600	2,400
28-----	233	200	130	2,030	1,100	6,000	1,450	300	1,200
29-----	311	260	220	1,740	1,400	6,600	1,520	250	1,000
30-----	264	100	71	1,590	800	3,400	1,240	160	540
31-----	--	--	--	1,150	440	1,400	--	--	--
Total-	4,403	--	2,143	27,715	--	59,961	40,109	--	218,742
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,260	250	850						
2-----	1,470	340	1,300						
3-----	1,700	700	3,200						
4-----	2,000	950	5,100						
5-----	1,920	930	4,800						
6-----	1,820	870	4,300						
7-----	1,740	1,000	4,700						
8-----	1,580	640	2,700						
9-----	1,390	370	1,400						
10-----	1,240	250	840						
11-----	1,230	650	2,200						
12-----	1,020	600	1,700						
13-----	1,150	320	990						
14-----	1,350	390	1,400						
15-----	1,340	370	1,300						
16-----	1,370	350	1,300						
17-----	1,350	420	1,500						
18-----	1,290	320	1,100						
19-----	--	--	--						
20-----	--	--	--						
21-----	--	--	--						
22-----	--	--	--						
23-----	--	--	--						
24-----	--	--	--						
25-----	--	--	--						
26-----	--	--	--						
27-----	--	--	--						
28-----	--	--	--						
29-----	--	--	--						
30-----	--	--	--						
31-----	--	--	--						
Total-	26,220	--	40,680						

Total discharge for period Apr. 9 to July 18 (cfs-days)..... 98,447

Total load for period Apr. 9 to July 18 (tons)..... 321,526

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

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.

Drainage Area --320 square miles, approximately.

RECORDS AVAILABLE --Chutes: March 1947 to September 1949.

Water temperatures --April 1947 to September 1949.

Sediment records --October 1948 to September 1951.

EXTREMES 1950-51 --Sediment concentrations: Maximum daily, 2,350 ppm May 24; minimum daily, not determined.

Sediment loads: Maximum daily, 30,100 tons June 17; minimum daily, not determined.

EXTREMES, 1947-51 --Dissolved solids (1947-49): Maximum, 358 ppm Apr. 22-29 1947; minimum, 106 ppm July 1-31, 1947.

Hardness (1947-49): Maximum, 216 ppm Mar. 31 to Apr. 10, 1947; minimum, 69 ppm June 1-30, 1948.

Specific conductance (1947-49): Maximum daily, 822 micromhos May 13, 1948; minimum daily, 152 micromhos July 10, 1947.

Sediment concentrations (1948-51): Maximum daily, 2,780 ppm May 18, 1949; minimum daily, not determined.

Sediment loads (1948-51): Maximum daily, 30,100 tons June 17, 1951; minimum daily, not determined.

REMARKS --Flow affected by ice Nov. 9-19, Dec. 4-9, 16-18, Dec. 30 to Jan. 1, Jan. 3-6, Jan. 8 to Mar. 14. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, October to December 1950

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH or Col.
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 10, 1950	1,240	21	0.04	39	8.4	27	27	145	59	5.0	1.0	0.8		234	0.32	132	13	31	351	7.7
Dec. 11	644	19	.04	49	11	23	23	166	79	7.0	.2	.7		286	.39	167	31	27	460	7.7

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,440	793	3,080	830			708		
2-----	1,400	544	2,060	794			644		
3-----	1,230	307	1,020	812			572		
4-----	1,230	332	1,100	724			470	49	70
5-----	1,310	365	1,290	821	27	59	440		
6-----	1,350	456	1,680	812			400		
7-----	1,380	469	1,750	794			450		
8-----	1,190	174	559	839			550		
9-----	1,210	124	405	680			640		
10-----	1,280	145	501	300			660	148	252
11-----	1,200	133	431	360	--	e 50	652		
12-----	1,220	184	606	550			652		
13-----	1,240	153	512	680			636		
14-----	1,220			680	38	69	580		
15-----	1,210			680			524	71	96
16-----	1,140	84	254	660			400		
17-----	1,100			680			450		
18-----	1,050			700			400		
19-----	1,000			740	--	e 80	300		
20-----	950			758			284		
21-----	930	56	138	758			306	50	45
22-----	902			758			318		
23-----	857			724			388		
24-----	848			708			395		
25-----	821			716			451		
26-----	848			732	50	87	451		
27-----	830	28	62	724			416		
28-----	812			708			342	87	73
29-----	785			692			336		
30-----	821			684	--	--	400		
31-----	821			--	--	--	420		
Total-	33,625	--	17,546	21,078	--	2,221	14,635	--	3,107
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	430			325			480		
2-----	437			340	21	19	470		
3-----	400			370			480	--	e 300
4-----	420			400			450		
5-----	450	30	36	450	--	e 50	440		
6-----	470			550			430	430	499
7-----	486			600			440	239	284
8-----	480			600			450		
9-----	490			600			450		
10-----	490			600			450		
11-----	500	46	61	650	140	232	440	37	44
12-----	500			650			430		
13-----	480			550			430		
14-----	470			450			450		
15-----	470			400			479		
16-----	470	213	275	450	50	63	486		
17-----	500			500			486		
18-----	480			520			465	43	55
19-----	500			550			465		
20-----	530			550			472		
21-----	520			500			493		
22-----	520			500			524		
23-----	540	65	96	520	251	351	556		
24-----	590			520			486		
25-----	640			520			486		
26-----	560			520			508	104	141
27-----	520			500			524		
28-----	400			500			500		
29-----	320			--	--	--	451		
30-----	270	15	13	--	--	--	458		
31-----	290			--	--	--	532		
Total-	14,623	--	2,909	14,185	--	5,141	14,661	--	4,386

e Estimated.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	532	99	142	680	140	249	4,810	1,160	15,100
2-----	486	100	131	580			4,340	1,390	16,300
3-----	516	113	157	508	58	82	3,720	910	9,140
4-----	580	256	401	486			3,320	799	7,160
5-----	804	191	311	540	370	sa 640	3,080	681	5,500
6-----	612	211	349	1,000	647	sa 2,080	2,890	504	3,930
7-----	566	143	230	1,140	705	2,170	2,600	390	2,740
8-----	628	124	210	875	307	725	2,380	260	1,670
9-----	628	121	205	884	242	578	2,090	198	1,120
10-----	644	178	310	920	256	636	1,980	149	797
11-----	588	173	275	1,000	326	880	2,150	310	1,800
12-----	532	89	128	1,360	902	sa 3,860	2,480	464	3,110
13-----	532	66	80	1,510	911	3,710	2,840	624	4,780
14-----	628	135	229	1,130	484	1,460	3,670	1,430	sa 15,200
15-----	700	465	879	911	363	893	4,360	1,300	15,300
16-----	636	170	282	1,030	535	1,490	5,080	1,710	23,300
17-----	604	53	86	1,210	437	1,430	6,360	1,750	30,100
18-----	660	85	151	1,450	1,230	sa 5,610	6,950	1,440	27,000
19-----	787	240	497	2,090	1,860	10,500	6,110	1,120	18,500
20-----	794	370	793	2,220	1,580	9,470	5,240	1,030	14,600
21-----	863	620	sa 1,700	2,470	1,920	12,800	4,700	1,010	12,800
22-----	552	580	884	2,700	1,600	11,700	4,110	858	9,520
23-----	580	102	180	2,880	1,910	14,700	3,300	621	5,530
24-----	628			4,080	2,350	25,800	2,500	583	3,940
25-----	604			4,500	2,200	26,700	2,400	702	sa 4,840
26-----	524			4,380	1,570	18,500	2,320	436	2,730
27-----	580			4,410	1,380	16,400	2,280	472	2,910
28-----	532			4,880	1,620	21,300	2,140	320	1,850
29-----	604	100	163	5,770	1,710	26,600	2,180	366	2,150
30-----	740	220	440	5,950	1,240	19,900	2,120	265	1,520
31-----	--	--	--	5,340	1,160	16,700	--	--	--
Total-	18,474	--	9,563	68,804	--	257,747	104,470	--	264,937
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,860	210	1,050	2,760	190	1,420	610		
2-----	1,790	244	1,180	2,610	230	sa 1,700	625		
3-----	2,110	366	2,090	2,600	351	2,460	588		
4-----	2,530	681	sa 5,140	2,530	489	3,340	550		
5-----	2,940	937	sa 7,840	3,080	370	sa 3,200	537		
6-----	2,990	680	5,490	3,020	299	2,440	524		
7-----	2,990	560	4,520	2,550	233	1,600	588		
8-----	3,790	833	8,520	2,050	221	1,220	625		
9-----	3,250	610	5,350	2,160	300	sa 1,800	479		
10-----	3,340	433	3,900	1,420	284	1,090	443		
11-----	3,630	265	2,600	1,160	240	752	367		
12-----	3,390	832	7,620	805	300	652	375		
13-----	2,770	354	2,650	625	218	366	420		
14-----	2,770	310	2,320	473	230	294	415		
15-----	2,940	313	2,480	580	220	345	400		
16-----	3,160	367	3,120	625	155	262	395		
17-----	3,430	878	8,130	665	108	190	367		
18-----	3,510	775	sa 7,740	723	136	265	343		
19-----	3,610	450	4,390	768			343		
20-----	3,840	395	4,100	795			359		
21-----	4,340	400	4,690	786			395		
22-----	4,450	448	5,380	795			420		
23-----	3,920	390	4,130	855	65	145	535		
24-----	3,290	325	2,890	759			363		
25-----	2,820	305	2,320	815			335		
26-----	2,530	261	1,780	1,010			308		
27-----	2,470	174	1,180	845			295		
28-----	2,520	162	1,100	723			288		
29-----	2,710	236	1,730	580			280		
30-----	3,270	410	3,620	580	105	176	295		
31-----	3,060	302	2,500	602			--	--	--
Total-	96,020	--	121,530	40,349	--	25,407	12,887	--	3,012

Total discharge for year (cfs-days)..... 453,791
 Total load for year (tons)..... 717,506

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, May to June 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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	0.350	0.500	1.000
May 25, 1951	4:30 p. m.	4,740		2,020	2,860	--	17	--	29	--	53	71	89	98	100	SPWCM
May 30	5:30 p. m.	5,770		1,130	2,940	--	10	17	23	31	40	56	69	96	100	BWCM
June 18	6:30 p. m.	7,650		1,510	2,550	--	28	--	41	--	58	72	90	99	100	SPWCM
June 29	11:05 a. m.	1,860	57	231	1,900	16	20	26	33	42	52	60	87	100	--	BWCM

BEAVER CREEK NEAR ARAPAHOE, WYO.

LOCATION.--At gaging station, half a mile upstream from mouth and 2½ miles south of Arapahoe, Fremont County.
 DRAINAGE AREA.--410 square miles, approximately.
 RECORDS AVAILABLE.--Sediment records: October 1950 to September 1951.
 EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 23,000 ppm May 16; minimum daily, no flow on many days during July to September.
 Sediment loads: Maximum daily, 11,000 tons May 16; minimum daily, 0 ton on many days during July to September.
 REMARKS.--Flow affected by ice Nov. 9 to Apr. 3. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Date of collection	Chemical analyses, in parts per million, April 1951														Specific conductance (micro-mhos at 25°C)						
	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residues at 180°C)			Hardness as CaCO ₃				
														Parts per million		Tons per acre-foot	Tons per day	Calcium	Non-magnesium	Carbonate	
																					Per cent sodium
Apr. 2, 1951.....	a 23	21	0.04	89	22	77	196	264	211	29	23	0.6	1.6	0.07	622	0.95	313	152	35	902	8.2
Apr. 27.....	33	19	.04	75	20	60	176	211	211	29	23	.6	1.5	.03	524	.71	269	125	32	758	8.4

a Mean daily discharge.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

BEAVER CREEK NEAR ARAPAHOE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	13	--		9.9	--	e 13	13	--	
2-----	15	--		11	--	e 17	12	--	
3-----	13	--		12	--	e 22	10	--	
4-----	15	--		16	--	e 50	8.0	--	
5-----	13	--		12	--	e 24	7.0	160	e 3
6-----	12	--		18	--	e 55	6.5	--	
7-----	12	--		18	1,000	49	7.5	--	
8-----	12	--	e 30	11	--		9.0	--	
9-----	11	--		10	--		10	--	
10-----	9.9	--		9.5	--		11	--	
11-----	9.9	--		10	--		11	--	
12-----	11	--		11	--		11	--	
13-----	11	--		11	--	e 4	11	--	
14-----	9.9	--		12	112		10	--	
15-----	9.9	--		13	168		8.5	154	3
16-----	11	792	24	14	--		7.0	--	
17-----	11	--	e 20	14	--		6.0	--	
18-----	8.5	--	e 16	14	--		5.0	--	
19-----	9.9	--	e 28	15	--		4.5	--	
20-----	7.3	--	e 12	15	--		4.5	--	
21-----	7.3	--	e 11	16	--		4.5	--	
22-----	6.7	--	e 9	17	--		4.5	--	
23-----	8.5	--	e 18	16	--		4.5	--	
24-----	9.9	882	24	16	--	e 12	4.5	--	
25-----	9.2	--	e 17	16	--		4.5	--	
26-----	9.9	--	e 22	15	--		4.3	167	2
27-----	9.2	--	e 19	15	--		4.1	--	
28-----	11	--	e 34	15	--		3.8	--	
29-----	9.9	--	e 30	15	289		3.5	--	
30-----	9.2	1,020	25	14	--		3.0	--	
31-----	9.2	414	10	--	--		2.7	--	
Total-	325.3	--	769	411.4	--	418	216.4	--	82
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2.5	--		0.5	--		10	--	
2-----	2.2	--		.5	--		9.5	--	
3-----	2.2	--		1.1	--		9.0	--	
4-----	2.2	72		1.5	--		8.5	--	
5-----	2.2	64		2.0	--		9.0	46	1
6-----	2.2	--		2.5	58		9.5	--	
7-----	2.1	--		3.0	--		10	--	
8-----	2.0	--		3.5	--		11	--	
9-----	1.9	54		4.5	--		12	--	
10-----	1.7	56		5.5	--		13	--	
11-----	1.5	35		5.0	--	(t)	14	61	2
12-----	1.4	25		5.0	--		15	--	
13-----	1.4	--		5.0	14		16	--	
14-----	1.5	--		5.0	43		17	--	
15-----	1.5	39		5.0	14		19	--	
16-----	1.5	--	(t)	5.5	--		20	--	
17-----	1.3	23		6.0	--		21	--	
18-----	1.1	133		7.0	--		22	--	
19-----	1.0	--		7.5	32		23	--	
20-----	1.0	--		7.7	--		24	175	11
21-----	1.0	--		8.0	--		25	--	
22-----	1.0	--		8.2	--		25	--	
23-----	1.0	--		8.3	--		25	--	
24-----	1.0	--		8.5	48	1	22	--	
25-----	1.0	35		8.8	--		18	--	
26-----	1.0	35		9.0	--		16	--	
27-----	1.0	--		9.5	--		15	--	
28-----	1.0	--		10	--		14	683	28
29-----	1.0	--		--	--		12	--	
30-----	1.0	--		--	--		14	--	
31-----	.5	--		--	--		16	--	
Total-	44.9	--	6	153.6	--	16	494.5	--	318

e Estimated.

t Less than 0.50 ton.

YELLOWSTONE RIVER BASIN--Continued

BEAVER CREEK NEAR ARAPAHOE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	20	--	e 120	76	5,050	1,040	55	1,700	a 250
2-----	23	8,850	550	72	5,500	1,070	78	6,200	sb 2,000
3-----	27	5,580	407	60	3,500	567	135	16,000	sa 5,000
4-----	39	4,300	453	50	2,650	358	129	12,000	a 4,200
5-----	32	4,350	376	39	2,800	a 290	129	12,900	4,490
6-----	41	5,400	598	33	2,900	a 260	114	9,500	2,920
7-----	47	5,400	a 690	45	3,100	a 380	83	4,800	1,080
8-----	45	5,300	a 640	66	3,100	552	63	4,200	714
9-----	37	5,800	379	66	5,150	918	52	3,600	a 510
10-----	45	5,800	705	47	4,800	609	47	3,100	a 390
11-----	37	4,950	495	47	2,100	266	39	3,400	358
12-----	35	4,500	425	47	2,400	a 300	37	1,750	175
13-----	27	7,100	518	47	2,300	a 290	33	1,500	134
14-----	30	5,400	a 440	57	2,250	346	32	1,400	121
15-----	27	5,200	a 380	66	3,000	535	29	1,200	94
16-----	35	5,100	482	139	23,000	sb 11,000	29	1,100	a 86
17-----	32	3,700	320	86	22,000	5,110	26	950	a 67
18-----	29	3,400	266	63	10,300	1,750	24	840	54
19-----	24	4,000	259	66	5,400	a 960	19	975	50
20-----	33	4,600	410	55	3,600	a 530	16	725	31
21-----	60	4,900	a 790	57	3,700	569	14	810	31
22-----	76	5,000	a 1,000	63	6,300	1,070	14	795	30
23-----	57	4,600	708	100	6,300	1,700	18	960	a 47
24-----	43	3,500	406	110	5,200	1,540	18	1,100	a 53
25-----	35	3,350	317	79	4,100	875	18	1,200	58
26-----	35	3,750	354	79	4,400	a 940	17	935	43
27-----	41	2,950	327	76	4,000	a 820	12	620	20
28-----	37	3,000	a 300	66	2,550	454	9.1	570	14
29-----	39	2,700	a 280	47	2,400	305	9.1	590	14
30-----	63	2,600	442	47	1,600	a 200	10	660	a 18
31-----	--	--	--	41	1,950	216	--	--	--
Total-	1,151	--	14,037	1,992	--	35,820	1,308.2	--	25,052
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	9.1	640	a 16						
2-----	9.1	480	12						
3-----	10	440	12						
4-----	8.4	360	a 8						
5-----	6.4	360	6						
6-----	5.2	340	5						
7-----	3.5	280	a 3						
8-----	2.0	260	a 1						
9-----	2.5	190	1						
10-----	3.0	160	a 1						
11-----	7.7	260	5						
12-----	7.0	235	4						
13-----	6.4	220	4						
14-----	3.0	260	a 2						
15-----	4.0	200	a 2						
16-----	5.8	100	2						
17-----	4.0	95	a 1						
18-----	2.5	75	1						
19-----	.4	--							
20-----	.1	--							
21-----	.5	--							
22-----	.1	--							
23-----	0	--	0						
24-----	0	--	0						
25-----	0	--	0						
26-----	0	--	0						
27-----	0	--	0						
28-----	0	--	0						
29-----	0	--	0						
30-----	0	--	0						
31-----	0	--	0						
Total-	100.7	--	86	0	--	0	0	--	0

Total discharge for year (cfs-days) 6,188.0
 Total load for year (tons) 74,604

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.

LOCATION.--Downstream side of bridge on Sand Draw road, a quarter of a mile upstream from gaging station, which is $1\frac{1}{4}$ miles upstream from mouth and 2 miles southeast of Riverton, Fremont County.

DRAINAGE AREA.--2,010 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: March to September 1949.

Sediment records: March 1949 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 2,600 ppm May 17; minimum daily, not determined.

Sediment loads: Maximum daily, 11,700 tons May 29; minimum daily, not determined.

EXTREMES, 1949-51.--Sediment concentrations: Maximum daily, 2,900 ppm Sept. 20, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 17,000 tons June 14, 1949; minimum daily, not determined.

REMARKS.--Flow affected by ice Nov. 9-12, Dec. 4-11, 16, 17, Dec. 30 to Mar. 25. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, water year October 1950 to September 1951

Day	October				November				December			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day				Mean concentration (ppm)	Tons per day	
1-----	652	50	83	441	13	15	375	23	17	19	21	
2-----	631			425			340					
3-----	610			430			281					
4-----	587			405			230					
5-----	624			430			210					
6-----	597	23	36	420	6	7	200	64	47	30	36	
7-----	597			410			230					
8-----	578			420			270					
9-----	590			350			280					
10-----	584			150			300					
11-----	578	14	20	240	27	30	320	29	36	18	21	
12-----	564			340			355					
13-----	564			415			345					
14-----	558			420			328					
15-----	558			425			330					
16-----	545	15	18	395	18	21	300	16	21	21		
17-----	539			420			300					
18-----	521			441			321					
19-----	509			452			326					
20-----	497			463			335					
21-----	497	15	18	480	18	21	321	16	21	21		
22-----	485			491			312					
23-----	474			468			321					
24-----	446			425			321					
25-----	441			452			312					
26-----	452	15	18	468	18	21	326	16	21	21		
27-----	441			458			269					
28-----	430			405			273					
29-----	425			395			238					
30-----	452			390			230					
31-----	441			--	--	--	230					
Total-	16,477	--	1,108	12,334	--	820	9,127	--			571	

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	220			130			210		
2-----	210			175			210		
3-----	160			200			210		
4-----	180			230		e 8	210		
5-----	190	46	23	260			215		
6-----	190			270			215	8	5
7-----	190			260			220		
8-----	190	19	10	270	18		220		
9-----	190			285	14		220		
10-----	190			300		e 12	225		
11-----	190			310			230		
12-----	195			280			235		
13-----	180	11	8	220	8		240	12	8
14-----	190			170			245		
15-----	190			170		e 4	250		
16-----	190			170			250		
17-----	200			190			250		
18-----	180	19	10	210		e 6	250	20	14
19-----	190			220			250		
20-----	200	85	45	220			250		
21-----	220			200			255		
22-----	210			190			265		
23-----	220			215			280		
24-----	230	13	8	215	11	d	280	60	44
25-----	270			210			270		
26-----	220			210			273		
27-----	180			210			257		
28-----	150			210			238		
29-----	140	--	e 6	--	--	--	234	53	35
30-----	120			--	--	--	242		
31-----	130			--	--	--	257		
Total-	5,905	--	355	6,200	--	204	7,456	--	578
	April			May			June		
1-----	265	54	39	474	410	525	3,480	352	3,310
2-----	257	70	49	385	565	608	3,360	360	3,270
3-----	249	160	108	321	380	329	2,870	664	5,150
4-----	253	212	145	303	185	151	2,520	1,290	8,790
5-----	261	205	144	335	130	118	2,160	1,050	6,120
6-----	285	270	208	424	150	172	2,000	678	3,660
7-----	277	330	247	497	223	299	1,910	415	2,140
8-----	277	495	370	468	238	301	1,810	315	1,540
9-----	294	450	357	491	460	610	1,890	250	1,130
10-----	298	350	282	474	300	384	1,600	249	1,080
11-----	308	335	279	468	199	251	1,690	236	1,080
12-----	281	325	247	552	270	402	1,810	244	1,190
13-----	265	475	340	696	379	712	1,980	273	1,470
14-----	253	350	239	652	275	484	2,410	474	3,080
15-----	285	262	202	610	245	404	2,760	446	3,320
16-----	265	248	177	757	1,460	s 3,450	3,190	543	4,680
17-----	249	245	165	867	2,600	6,090	3,960	502	5,370
18-----	261	200	141	792	1,330	2,840	4,270	374	4,310
19-----	298	143	115	903	840	2,050	3,720	305	3,060
20-----	350	165	156	1,000	680	1,840	3,000	277	2,240
21-----	355	315	302	1,380	1,430	s 6,370	2,700	263	1,920
22-----	330	635	566	1,780	1,990	9,560	2,530	253	1,730
23-----	303	630	515	1,570	978	4,150	2,340	213	1,350
24-----	321	355	308	1,840	1,050	5,220	2,090	192	1,080
25-----	335	200	181	2,290	1,110	6,860	1,920	172	892
26-----	321	172	149	2,470	943	6,290	2,170	183	1,070
27-----	335	209	181	2,760	888	6,620	1,910	158	815
28-----	339	145	129	3,460	1,040	9,720	1,820	140	688
29-----	365	165	163	4,680	924	11,700	1,860	140	703
30-----	425	212	243	4,780	497	6,410	1,820	112	550
31-----	--	--	--	3,690	381	3,700	--	--	--
Total-	8,951	--	6,747	42,079	--	98,620	73,350	--	76,778

e Estimated.

s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued
POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, April to June 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Apr. 6, 1951	10:00 a.m.	285		370	1,050	55	72	86	95	99	100	--	--		--	EWCM
May 8	11:40 a.m.	458		186	613	56	67	76	87	97	100	--	--		--	EWCM
May 23	12:15 p.m.	3,440		989	2,430	19	25	29	37	46	64	74	94		99	EWCM
June 6	11:25 a.m.	2,039		686	1,670	40	50	58	64	70	80	88	97		100	EWCM

YELLOWSTONE RIVER BASIN--Continued

KIRBY DRAW NEAR RIVERTON, WYO.

LOCATION.--At gaging station, 2 miles upstream from mouth and 7 miles northeast of Riverton, Fremont County.

DRAINAGE AREA.--155 square miles.

RECORDS AVAILABLE.--Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,000 tons (estimated) May 16; minimum daily, 0 ton on many days.

REMARKS.--Maximum observed suspended-sediment concentration during period, 61,400 ppm June 5. Records of discharge for period April to September 1951 given in Water-Supply Paper 1239.

Monthly and annual summary of water and suspended-sediment discharge April to September 1951

Month	Discharge (cfs - days)	Runoff - (acre-feet)	Load (tons)	Suspended sediment				
				Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
April 23-30	0	0	0	0	0	0	--	--
May	4.7	9.3	a1,300	42	e1,000	0	95,400	59,800
June	10.2	20	a1,100	35	e500	0	38,500	61,400
July	0	0	0	0	0	0	--	--
August	0	0	0	0	0	0	--	--
September	0	0	0	0	0	0	--	--
Period Apr. 23 to Sept. 30, 1951	14.9	29	a2,400	15	1,000	0	57,500	61,400

e Estimated.

a Mostly estimated.

YELLOWSTONE RIVER BASIN--Continued

MUSKRAT CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 1 1/2 miles upstream from mouth and 7 miles southwest of Shoshoni, Fremont County.

DRAINAGE AREA.--760 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: June 1950 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 150,000 tons (estimated) July 22; minimum daily, 0 ton on many days.

EXTREMES, June 1950 to September 1951.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 150,000 tons (estimated) July 22, 1951; minimum daily, 0 ton on many days each year.

REMARKS.--Maximum observed suspended-sediment concentration during water year, 59,700 ppm June 5. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Monthly and annual summary of water and suspended sediment discharge, water year October 1950 to September 1951

Month	Discharge (cfs-days)	Runoff (acre-feet)	Load (tons)	Suspended sediment				
				Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October.....	0	0	0	0	0	0	--	
November.....	0	0	0	0	0	0	--	
December.....	0	0	0	0	0	0	--	
January.....	0	0	0	0	0	0	--	
February.....	9.1	18	a 2	.1	(t)	0	81	
March.....	9.4	19	a 5	.2	(t)	(t)	197	
April.....	2.4	4.8	a 1	.03	(t)	0	154	
May.....	16.1	32	e 1,820	59	e 1,300	0	40,400	
June.....	62.1	123	a 8,720	281	e 3,500	0	50,100	
July.....	755	1,500	e 230,400	7,430	e 150,000	0	105,000	
August.....	0	0	0	0	0	0	--	
September.....	0	0	0	0	0	0	--	
Water year 1950-51	854.1	1,700	a 240,948	660	e 150,000	0	--	59,700

e Estimated.

t Less than 0.50 ton.

a Load mostly estimated.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.

LOCATION.--At gaging station, 1,000 feet upstream from Wyoming Canal siphon and 4 miles north of Pavillion, Fremont County.
DRAINAGE AREA.--143 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

Water temperatures: October 1949 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Minimum, 42° F., May 21; maximum daily, no flow on many days during November to March. Sediment concentrations: Minimum, 11, 35, 600, 62,000 PPM, May 6, 11, 16, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 1950; minimum daily, no flow on many days each year.

EXTREMES, 1949-51.--Sediment concentrations: Maximum daily, 123,000 tons Sept. 20, 1950; minimum daily, 0 ton on many days each year. Sediment loads: Maximum daily, 123,000 tons Sept. 20, 1950; minimum daily, 0 ton on many days each year.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in the regional office at Lincoln, Neb. Flow affected by ice Nov. 8-23, Nov. 26 to Mar. 29. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Temperature (°F)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Bo-ron (B)	Dissolved solids		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Non-carbonate			
Oct. 1-31, 1950	1.22						615		200	2,800	67								41	4,920	7.6
Nov. 1-15	1.55						615		201	2,840	67								42	4,900	7.5
Nov. 16-30	1.33						780		249	3,160	77								47	5,460	7.7
Dec. 1-30	1.23						740		237	2,970	71								48	5,170	7.7
Feb. 7-10, 1951	2.08						768		242	3,450	92								43	5,750	8.1
Feb. 11-28	1.83						574		232	3,080	74								36	4,940	7.8
Mar. 1-Apr. 3	1.67						490		175	2,500	57								38	4,130	7.6
Apr. 4-22	.77						568		210	3,000	68								42	5,010	7.7
Apr. 23-26	1.68						628		207	2,830	65								39	4,700	7.8
Apr. 27-May 3	3.01						600		203	2,990	70								40	4,980	7.8
May 4-10	1.57						572		196	2,890	69								40	4,860	7.7
May 11-22	4.60						564		216	2,720	57								40	4,550	7.6
May 23-26	1.05						564		194	2,800	64								39	4,630	7.9
May 27-June 13	1.68						504		174	2,510	57								38	4,350	7.6
June 14-25	.71						590		179	2,780	64								41	4,720	7.3
July 11-30	.59						476		241	2,590	59								35	4,410	7.3
Sept. 7	.4						544		183	2,540	56								41	4,430	7.3
Weighted average a							597		208	2,820	65								41	4,750	--
Weighted average b	1.18						554		208	2,680	60								40	4,540	--

a Represents 85 percent of runoff for water year October 1950 to September 1951.

b Includes estimates for missing data for water year October 1950 to September 1951.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951

Once-daily temperature measurement between 2 p.m. and 7 p.m.

Many days of no flow in January, February, June to September/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	40	a 34		--	--	48	46	--			
2	59	33	--		--	--	a 39	48	--			
3	53	39	--		--	--	47	50	49			
4	61	43	a 32		--	--	--	60	40			
5	--	40	--		--	a 32	45	50	--			
6	--	a 40	a 32		--	33	a 55	52	--			
7	--	40	--		--	32	--	54	--			
8	a 37	--	a 36		--	--	44	52	--			a 47
9	52	--	--		a 32	33	37	40	--			
10	35	--	--		--	32	37	42	--			
11	52	--	33		--	31	41	46	--	56		
12	61	--	--		--	--	47	--	59			
13	52	--	a 32		a 32	--	--	--	--			
14	a 51	--	--		--	33	42	--	67			
15	45	35	a 32		--	32	36	--	--			
16	a 48	--	--		a 32	32	42	--	--			
17	53	--	--		--	32	51	--	--			
18	a 40	--	31		--	32	50	--	--			
19	56	--	--		a 32	--	--	--	--			
20	--	a 32	--		--	32	36	--	--			
21	52	--	--		--	32	34	60	--			
22	54	a 32	a 32		--	--	--	a 69	--			
23	52	--	--		a 32	--	a 40	54	--			
24	54	a 32	--		--	--	34	53	75			
25	36	--	--		--	--	46	--	--			
26	43	--	33		32	a 42	52	50	--			
27	43	--	33		a 32	--	52	--	--			
28	44	--	--		--	34	54	58	--			
29	44	a 32	a 32		--	--	54	--	--			
30	a 35	--	--		--	36	a 65	49	--			
31	40	--	--		--	38	--	--	--			
Average	48	--	--		--	--	45	--	--			

a Observations made between 8 a.m. and 12 m.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1.8	--	e15	0.8			1.5	658	3
2-----	2.9	2,250	18	1.1			1.0	--	e2
3-----	2.0	1,960	11	.5			.7	--	e1
4-----	1.9	2,030	10	.7			.5		
5-----	1.9	1,960	10	1.0	503	1	.4		
6-----	1.5	1,420	6	.9			.3	79	(t)
7-----	.8	--	e2	1.0			.2		
8-----	1.9	999	5	1.0			.3		
9-----	1.8	780	4	.3			.8		
10-----	1.1			.1			2.0	--	e3
11-----	.1			.1			4.0	1,920	21
12-----	.2			.2			2.0	--	e4
13-----	.2			.2			.5		
14-----	.7			.2		(t)	.5	255	(t)
15-----	.8			.2			.5		
16-----	.8			.3			.6		
17-----	.7			.4			.8		
18-----	.6			.4			.9		
19-----	.7			.5			1.0		
20-----	1.2			.5	320		1.1	521	2
21-----	1.1	408	1	.6			1.2		
22-----	1.3			.9	630		1.0		
23-----	1.4			1.0		e1	1.5		
24-----	1.3			1.7	220		3.0	--	e10
25-----	1.4			1.6			5.0	--	e34
26-----	1.3			3.0	--	e6	4.0	2,780	30
27-----	1.4			4.0	1,280	a14	1.0		
28-----	1.1			2.5	--	e5	.5		
29-----	1.5			1.5	518	2	.1	126	(t)
30-----	1.2			1.0	--	e1	.1		
31-----	1.3			--	--	--	0	--	0
Total--	37.9	--	103	28.2	--	43	37.0	--	124
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				0	--	0	0.5		
2-----				0	--	0	.3		
3-----				0	--	0	.1		
4-----				0	--	0	.2	495	(t)
5-----				0	--	0	.5		
6-----				0	--	0	.7		
7-----				.3	--	e1	1.0	810	2
8-----				4.0	1,400	a15	2.0	1,070	6
9-----				2.5	740	a5	7.0	2,200	42
10-----				1.5	--	e2	6.0	860	14
11-----				1.0			5.0	850	11
12-----				.7			4.0	800	9
13-----				.5	370	e1	3.0	1,250	10
14-----				.6	--		4.0	2,150	23
15-----				.8	--		3.0	3,500	28
16-----				1.0	390		.5	800	1
17-----				1.5	--	e2	.3	400	(t)
18-----				3.0	--	e5	.2	400	(t)
19-----				4.5	600	a7	.5	5,150	7
20-----				2.0	500	a3	.7	5,400	10
21-----				1.5	430	a2	.8	3,250	7
22-----				4.0	--	e6	.9	3,050	7
23-----				5.0	940	a13	.5	--	e1
24-----				4.0	--	e6	1.0	--	e4
25-----				2.0	--	e3	2.0	--	e20
26-----				.4	920	a1	2.0	7,500	a40
27-----				.2			1.5	--	e10
28-----				.2	--	(t)	1.0	2,200	a6
29-----				--	--	--	1.0	--	e6
30-----				--	--	--	1.0	4,650	13
31-----				--	--	--	2.0	6,750	36
Total--	0		0	41.2	--	78	53.2	--	316

e Estimated.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1.5	2,550	10	1.6	13,800	60	8.0	15,000	324
2-----	1.2	2,850	9	.6	7,000	11	6.0	18,300	296
3-----	1.0	4,000	11	.9	5,650	14	2.9	8,350	65
4-----	1.3	4,100	14	.9	6,150	15	2.6	4,100	29
5-----	1.2	4,200	14	1.0	4,250	11	1.6	2,950	13
6-----	1.1	4,300	13	1.2	5,500	18	1.0	2,000	5
7-----	1.2	7,500	24	1.6	6,150	33	.6	875	s 2
8-----	1.0	7,650	21	1.9	6,700	34	0	--	0
9-----	.9	7,300	18	2.3	5,950	37	.5	1,170	2
10-----	.4	3,500	4	2.0	3,500	19	.2	--	e 1
11-----	.7	3,350	6	1.9	2,200	11	.6	2,200	4
12-----	.5	2,500	3	1.9	3,800	19	1.5	3,250	13
13-----	.4	2,800	2	1.9	1,300	7	1.4	1,800	7
14-----	.4	3,700	4	1.9	3,350	17	.6	800	s 2
15-----	.3	3,850	3	2.6	3,550	25	0	--	0
16-----	.4	2,000	2	5.0	4,500	61	0	--	0
17-----	.4	4,400	5	5.0	2,300	31	0	--	0
18-----	.6	6,800	11	3.5	1,300	b 12	0	--	0
19-----	.8	3,400	7	2.0	1,550	8	0	--	0
20-----	.7	4,200	8	3.5	5,500	sb 90	0	--	0
21-----	1.8	4,150	20	19	62,000	sa 3,600	0	--	0
22-----	.7	5,350	10	7.0	25,000	472	.6	1,600	s 8
23-----	1.1	5,250	16	3.5	6,500	61	5.6	26,100	s 422
24-----	1.9	14,500	74	.7	1,210	s 5	1.0	11,200	30
25-----	1.5	9,900	40	0	--	0	.7	3,900	7
26-----	2.2	14,100	s 138	0	--	0	0	--	0
27-----	1.9	6,000	31	.2	1,800	sb 3	0	--	0
28-----	1.8	4,500	22	1.0	5,350	14	0	--	0
29-----	2.3	7,700	48	0	--	0	0	--	0
30-----	12	16,700	s 917	.4	600	b 1	0	--	0
31-----	--	--	--	1.7	7,000	32	--	--	--
Total--	43.1	--	1,505	76.8	--	4,721	35.4	--	1,230
	July			August			September		
1-----	0	--	0	0	0	0	0.1	--	e 1
2-----	0	--	0	0	0	0	0	--	0
3-----	0	--	0	0	0	0	0	--	0
4-----	0	--	0	0	0	0	0	--	0
5-----	0	--	0	0	0	0	0	--	0
6-----	0	--	0	0	0	0	63	30,000	sa 35,000
7-----	0	--	0	0	0	0	.4	3,750	s 6
8-----	0	--	0	0	0	0	0	--	0
9-----	0	--	0	0	0	0	0	--	0
10-----	0	--	0	0	0	0	0	--	0
11-----	8.3	19,000	sa 600	0	0	0	0	--	0
12-----	1.9	16,000	82	0	0	0	0	--	0
13-----	.6	5,000	sb 12	0	0	0	0	--	0
14-----	0	--	0	0	0	0	0	--	0
15-----	0	--	0	0	0	0	0	--	0
16-----	0	--	0	0	0	0	0	--	0
17-----	0	--	0	0	0	0	0	--	0
18-----	0	--	0	0	0	0	.1	--	(t)
19-----	0	--	0	0	0	0	0	--	0
20-----	0	--	0	0	0	0	.1	--	0
21-----	0	--	0	0	0	0	.3	--	(t)
22-----	0	--	0	0	0	0	.4	--	
23-----	0	--	0	0	0	0	.4	--	
24-----	0	--	0	0	0	0	.4	114	
25-----	0	--	0	0	0	0	.2	--	(t)
26-----	0	--	0	0	0	0	.1	--	
27-----	0	--	0	0	0	0	0	--	
28-----	.2	1,600	sb 5	0	0	0	0	--	
29-----	.8	5,000	sb 32	0	0	0	0	--	0
30-----	0	--	0	.3	5,710	e 20	0	--	0
31-----	0	--	0	.3	5,710	s 18	--	--	0
Total--	11.8	--	731	0.6	--	38	65.5	--	35,008

Total discharge for year (cfs-days)..... 430.7
 Total load for year (tons)..... 43,897

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.--Continued

Particle-size analyses of suspended sediment, November 1950 to June 1951
(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 of collection	Time	Instantaneous discharge (cfs)	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	0.350		0.500	1.000
Nov. 27, 1950.....	2:50 p.m.	5.0	1,320	1,080		43	50	55	61	70	80	89		96		BWCM
Feb. 8, 1951.....	5:10 p.m.	e 12	4,780	3,050		34		55		82	--	--		--		SPWCM
Mar. 19.....	5:30 p.m.	.5	35,000	4,810		19		31		64	86	96		99	100	SPWCM
Apr. 3.....	6:15 p.m.	1.7	11,200	7,830		60		78		90	--	--		--		SPWCM
Apr. 5.....	5:30 p.m.	1.6	12,600	4,240		60		74		91	--	--		--		SPWCM
Apr. 9.....	11:00 a.m.	.9	14,200	5,780		68		86		93	--	--		--		SPWCM
Apr. 14.....	5:00 p.m.	.8	6,130	4,930		86		92		95	--	--		--		SPWCM
Apr. 18.....	7:20 p.m.	.6	8,170	6,820		84		96		98	--	--		--		SPWCM
Apr. 24.....	8:20 a.m.	2.3	17,800	9,650		35		52		88	84	96		100		SPWCM
Apr. 26.....	5:15 p.m.	9.5	40,000	6,530		32		55		84	--	--		--		SPWCM
Apr. 30.....	4:40 p.m.	45	35,400	5,560		32		51		84	--	--		--		SPWCM
May 21.....	6:10 p.m.	21	70,600	10,700		31		73		90	97	100		--		SPWCM
June 23.....	6:00 p.m.	1.2	37,500	6,830		69		89		94	96	100		--		SPWCM

e Estimated.

e Estimated.

YELLOWSTONE RIVER BASIN--Continued
FIVEMILE CREEK NEAR RIVERTON, WYO.

LOCATION.--At gaging station, 3 miles downstream from Ocean drain, 12½ miles north of Riverton, Fremont County, and 13 miles upstream from mouth.
DRAINAGE AREA.--342 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1950 to September 1951.

Sediment records: October 1949 to September 1951.

EXTREMES, 1950-51.--Specific conductance: Maximum daily, 4,720 micromhos Apr. 27; minimum daily, 1,090 micromhos June 28.

Water temperatures: Minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 71,800 ppm May 5; minimum daily, 100 ppm Jan. 5.

Sediment loads: Maximum daily, 35,000 tons Sept. 6; minimum daily, 8 tons Jan. 5.

EXTREMES, 1949-51.--Sediment concentrations: Maximum daily, 89,500 ppm Sept. 20, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 199,000 tons Sept. 20, 1950; minimum daily, 3 tons Jan. 5, 16, 17, 1950.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Investigations indicate that practically all the total sediment load is transported in suspension at this contracted section of the Creek. Flow affected by ice Nov. 10 to Dec. 10, Dec. 28, 29, Jan. 2 to Feb. 27. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209. Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue on evaporation at 180°C)	Percent Sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1950.....	29.8															
Nov. 1-30.....	38.4					574		172	1,670	80				63	3,530	7.6
Dec. 1-31.....	34.5					556		167	1,570	80				64	3,280	7.7
Jan. 1-31, 1951.....	26.9					574		170	1,590	83				65	3,390	7.6
Jan. 30 a.....	20.0					668		154	1,650	92				66	3,560	7.5
Feb. 1-9.....	26.8							196	1,790	92				67	3,760	7.5
Feb. 10-26.....	25.9					596		165	1,650	91				65	3,490	8.0
Mar. 1-Apr. 4.....	27.3					594		165	1,770	85				62	3,550	7.6
Apr. 5-22.....	16.4					604		170	1,780	83				62	3,580	7.6
Apr. 23-27.....	16.8					646		176	1,800	86				66	3,710	7.7
Apr. 28-May 4.....	47.6					734		210	2,240	94				61	4,360	7.5
May 5-11.....	62.9					396		189	1,520	50				48	2,970	7.6
May 12-23.....	58.3					272		153	1,140	32				44	2,310	7.5
May 24-27.....	59.0					252		147	940	33				48	1,970	8.1
May 28-June 14.....	66.4					208		136	725	26				50	1,620	7.8
June 15-29.....	119					217		157	760	26				49	1,730	7.7
June 30-July 30.....	173					133		148	455	16				47	1,210	7.5
July 31-Aug. 29.....	156					185		132	555	19				47	1,320	7.5
Aug. 30-Sept. 20.....	86.9					221		113	703	31				55	1,640	7.5
Sept. 21-30.....						250		128	760	35				57	1,770	7.7
Weighted average b	67.0					282		145	850	41				58	1,960	7.8
						300		142	933	41				57	2,070	--

a Not included in weighted average.

b Represents 100 percent of runoff for water year October 1950 to September 1951.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 9 a. m. and 11 a. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a 43	a 45	a 35	--	--	--	36	41	52	70	--	62
2	45	a 38	--	a 32	32	32	36	a 47	51	67	--	--
3	41	a 45	a 35	a 32	32	--	37	--	--	63	72	--
4	52	a 50	a 35	a 32	32	32	42	54	a 68	70	--	61
5	a 60	a 45	a 35	--	a 32	32	39	53	--	65	72	72
6	50	a 45	a 35	--	32	32	37	50	--	64	70	71
7	a 52	a 45	--	--	32	34	47	49	--	68	a 76	68
8	a 55	a 50	a 35	--	33	32	52	51	--	60	87	71
9	a 55	--	--	a 33	--	32	49	61	66	a 77	60	75
10	a 55	--	a 35	--	32	32	33	51	69	54	65	a 65
11	a 60	--	a 35	a 32	32	32	44	60	--	--	75	56
12	a 55	--	a 35	a 32	32	32	41	58	66	--	--	56
13	a 55	a 32	--	--	32	--	45	54	65	--	69	60
14	a 65	a 34	a 35	--	32	42	37	56	66	--	64	49
15	a 54	--	a 36	a 32	a 32	32	46	53	85	--	69	50
16	a 59	a 35	a 36	--	32	32	46	51	--	a 82	71	58
17	a 59	--	a 35	a 32	32	--	64	56	71	--	58	--
18	a 59	a 35	a 35	--	32	32	52	54	50	--	60	52
19	a 51	a 35	32	--	32	32	--	51	59	a 84	60	51
20	a 55	--	a 33	--	32	32	--	61	58	--	61	50
21	a 55	a 40	a 32	--	32	44	--	59	53	--	63	53
22	a 57	--	a 32	--	32	32	--	66	64	--	64	53
23	a 58	--	a 36	a 32	31	--	51	64	--	a 80	64	52
24	--	--	a 32	--	32	33	43	61	62	a 81	--	51
25	a 55	a 35	--	a 33	32	34	47	56	59	--	68	56
26	a 55	a 35	34	32	32	34	52	63	a 73	--	66	56
27	a 55	a 35	--	31	32	33	50	74	62	--	69	48
28	a 55	a 35	--	32	a 32	34	51	70	63	--	--	--
29	a 50	--	a 32	a 32	--	--	40	54	63	--	56	--
30	a 50	a 35	--	38	--	34	48	54	62	--	60	51
31	a 45	--	--	41	--	35	--	--	--	a 80	60	--
Average	54	--	--	--	32	--	46	56	--	--	--	58

a Observations made between 2 p. m. and 6 p. m.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	44	16,200	1,920	24	4,660	302	33	11,700	1,040
2-----	41	13,800	1,530	30	6,430	521	32	3,850	333
3-----	36	12,200	1,190	30	7,370	597	33	8,190	730
4-----	37	12,600	1,260	28	4,030	305	34	4,970	456
5-----	41	11,200	1,240	28	3,360	254	35	3,040	287
6-----	39	11,600	1,220	29	8,000	626	35	2,480	234
7-----	37	11,400	1,140	27	--	e 460	34	2,000	184
8-----	33	13,200	1,180	25	6,280	424	34	1,520	140
9-----	30	12,000	972	22	--	e 130	34	4,900	450
10-----	29	11,400	893	20	1,440	78	35	12,100	1,140
11-----	29	9,110	713	25	451	30	37	15,500	1,550
12-----	29	6,770	530	30	561	45	37	12,400	1,240
13-----	28	10,100	784	37	736	74	31	9,320	780
14-----	28	7,320	a 550	42	644	73	33	7,440	663
15-----	28	7,080	a 540	45	359	44	35	9,570	904
16-----	28	9,320	705	50	248	33	30	9,570	775
17-----	25	10,700	722	60	414	67	28	8,640	653
18-----	25	9,090	a 610	53	368	53	30	7,930	642
19-----	24	7,910	a 510	48	819	106	33	6,020	536
20-----	25	7,910	a 530	45	626	76	28	7,430	562
21-----	26	4,960	348	47	1,360	173	36	8,690	845
22-----	27	8,360	609	50	1,380	186	35	5,150	487
23-----	28	5,140	389	45	294	36	38	5,610	576
24-----	29	8,850	693	50	865	117	39	5,670	597
25-----	24	--	e 500	46	1,070	133	37	4,980	498
26-----	25	--	e 600	45	1,520	185	39	6,240	657
27-----	23	--	e 400	44	2,750	327	39	4,620	508
28-----	24	8,560	500	44	3,510	417	38	3,680	378
29-----	27	7,700	561	44	10,200	1,210	37	5,700	569
30-----	28	5,660	428	39	16,700	1,760	36	2,420	235
31-----	28	1,980	150	--	--	--	36	--	680
Total-	925	--	23,947	1,152	--	8,842	1,071	--	18,729
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	25	--	e 60	17	750	34	23	9,950	618
2-----	23	760	47	19	740	38	34	10,400	955
3-----	25	225	15	23	1,350	84	17	9,070	416
4-----	30	120	10	27	1,140	83	29	7,790	610
5-----	30	100	8	29	1,340	105	28	10,200	771
6-----	30	120	10	30	1,750	142	26	6,440	452
7-----	30	--	e 10	31	1,550	130	31	5,080	425
8-----	30	120	10	32	3,800	328	30	5,340	433
9-----	29	125	10	33	2,300	205	33	7,180	640
10-----	29	170	13	33	3,200	285	29	8,330	652
11-----	29	220	17	31	5,600	469	25	8,740	590
12-----	29	180	14	26	4,600	323	33	8,160	727
13-----	29	210	16	22	2,750	163	27	4,800	350
14-----	29	210	16	22	2,600	154	28	7,700	582
15-----	28	300	23	23	2,450	152	37	14,500	1,450
16-----	29	580	45	24	1,650	107	28	10,500	794
17-----	30	710	58	25	1,800	122	23	6,100	379
18-----	30	1,300	105	26	2,550	179	25	5,110	345
19-----	30	1,420	115	26	3,250	228	27	7,950	580
20-----	29	--	e 100	25	3,200	216	27	10,300	751
21-----	28	--	e 90	25	4,650	314	28	11,300	854
22-----	26	1,270	89	25	3,200	216	29	9,800	787
23-----	25	2,260	153	26	7,000	491	30	5,460	442
24-----	24	1,430	93	26	7,300	512	30	9,500	770
25-----	24	2,640	171	26	11,300	793	30	11,200	907
26-----	24	3,270	212	27	11,100	809	27	9,990	728
27-----	24	730	47	27	10,300	751	24	6,960	451
28-----	24	410	27	27	6,600	481	23	5,400	335
29-----	23	330	20	--	--	--	22	4,800	285
30-----	20	510	28	--	--	--	28	7,070	534
31-----	18	420	20	--	--	--	26	7,900	597
Total-	833	--	1,652	733	--	7,914	859	--	19,190

e Estimated.

a Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	30	8,160	661	70	51,600	10,900	116	27,300	8,550
2-----	25	7,080	478	25	18,700	1,260	100	25,100	6,760
3-----	22	7,180	426	27	14,700	1,070	65	23,800	4,180
4-----	21	6,300	471	40	13,100	1,410	62	23,200	3,880
5-----	20	5,060	273	90	71,800	18,100	71	22,200	4,260
6-----	20	4,900	265	74	61,600	12,800	76	24,600	5,050
7-----	19	3,480	179	84	61,400	14,400	72	23,800	4,630
8-----	18	3,640	177	58	39,600	6,430	70	19,800	3,740
9-----	18	4,050	197	45	30,200	3,670	65	14,800	2,600
10-----	16	3,360	145	46	23,200	2,880	71	14,500	2,780
11-----	16	3,200	138	43	21,200	2,460	63	18,600	3,160
12-----	17	3,400	156	45	22,600	2,750	47	15,700	1,990
13-----	18	3,280	159	45	14,700	1,790	52	14,200	1,990
14-----	16	2,770	120	47	13,700	1,740	45	16,300	1,880
15-----	15	3,280	133	47	18,300	2,320	64	21,400	3,700
16-----	16	3,140	136	71	29,400	5,640	73	18,400	3,630
17-----	16	3,100	134	61	26,600	4,380	75	19,900	4,030
18-----	15	4,400	178	54	18,000	2,620	81	23,200	5,070
19-----	14	3,570	135	49	14,000	1,850	85	24,100	5,530
20-----	14	2,610	99	61	24,600	4,050	86	25,300	5,870
21-----	14	2,200	83	98	34,500	9,470	101	26,700	7,280
22-----	14	2,640	100	63	29,900	5,090	124	30,500	10,200
23-----	14	2,670	101	58	21,300	3,340	169	36,000	17,000
24-----	18	3,920	191	52	21,300	2,990	164	36,300	16,700
25-----	18	7,920	365	58	21,000	3,290	189	32,200	17,000
26-----	16	6,030	260	58	18,900	2,960	157	31,300	13,300
27-----	18	12,400	s 657	68	20,100	3,690	130	29,200	10,200
28-----	44	20,400	2,420	67	18,700	3,380	137	25,900	9,580
29-----	49	21,200	2,800	47	16,200	2,060	144	30,700	11,900
30-----	78	38,600	s 9,240	43	15,700	1,620	145	29,300	11,500
31-----	--	--	--	63	21,100	3,590	--	--	--
Total-	649	--	20,897	1,757	--	144,200	2,899	--	208,060
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	145	30,300	11,900	179	24,900	12,000	150	20,500	8,300
2-----	141	28,000	10,700	179	26,400	12,800	145	17,600	6,890
3-----	130	24,500	8,600	168	24,400	11,100	158	18,300	7,610
4-----	132	29,000	10,300	208	25,700	14,400	161	19,800	8,610
5-----	140	25,000	9,450	210	26,900	15,300	144	17,200	6,690
6-----	144	26,000	10,100	210	29,700	16,800	176	33,000	sa25,000
7-----	141	29,800	11,300	211	32,900	19,400	152	52,000	sa25,000
8-----	138	28,400	10,600	187	31,500	15,900	119	26,700	8,580
9-----	147	27,400	10,900	185	27,500	13,700	120	25,800	8,360
10-----	161	27,900	12,100	162	25,700	11,200	124	25,600	8,570
11-----	214	32,500	19,500	155	28,200	11,800	123	22,600	7,510
12-----	216	36,500	22,100	154	25,200	10,500	119	22,000	7,070
13-----	200	32,800	18,400	152	23,500	9,640	127	22,700	7,780
14-----	180	36,500	18,400	150	23,000	9,320	115	21,500	6,680
15-----	170	34,400	16,400	145	23,900	9,360	111	19,300	5,780
16-----	155	28,600	12,000	138	22,000	8,200	114	20,500	6,310
17-----	161	30,200	13,100	130	22,000	7,720	110	17,800	5,290
18-----	187	31,900	sa18,500	128	24,800	8,640	103	19,200	5,340
19-----	168	35,200	16,600	143	23,000	8,880	99	13,900	3,720
20-----	168	33,800	15,900	144	21,800	8,480	92	16,900	4,200
21-----	185	36,600	19,000	137	19,500	7,210	90	19,700	4,790
22-----	230	38,100	24,500	136	17,800	6,540	87	16,000	4,230
23-----	217	32,000	19,400	115	19,900	6,180	91	13,200	3,240
24-----	186	30,500	15,300	121	19,400	6,340	87	15,600	3,660
25-----	172	31,400	14,600	124	21,700	7,270	81	14,900	3,260
26-----	192	32,000	17,200	143	22,400	8,650	92	16,500	4,100
27-----	193	28,000	14,600	145	20,800	8,140	81	13,200	2,890
28-----	214	25,000	14,400	123	19,700	6,540	88	12,000	2,850
29-----	206	24,500	13,600	111	17,600	5,270	88	10,100	2,400
30-----	180	26,000	12,800	115	20,000	6,210	84	12,000	2,720
31-----	180	26,200	12,700	132	20,700	7,380	--	--	--
Total-	5,393	--	454,750	4,741	--	310,870	3,431	--	217,630
Total discharge for year (cfs-days)									24,443
Total load for year (tons)									1,436,681

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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. 9, 1950.....	1:45 p.m.	30	--	11,400	10,700	--	19	--	29	--	49	70	88	97	99	100	SPWCM
Oct. 16.....	1:45 p.m.	28	--	10,000	9,130	--	16	--	24	--	41	64	82	95	99	100	SPWCM
Oct. 23.....	1:40 p.m.	28	58	7,590	7,890	--	--	--	25	31	43	66	87	96	99	99	SPNM
Oct. 30.....	1:30 p.m.	29	55	5,920	7,520	--	24	--	36	--	55	79	96	100	--	--	SPWCM
Nov. 6.....	1:00 p.m.	30	--	9,990	7,280	--	16	--	23	--	37	58	80	94	98	100	SPWCM
Nov. 13.....	2:50 p.m.	42	32	2,700	1,740	--	26	--	32	--	40	56	84	98	100	--	SPWCM
Dec. 5.....	3:00 p.m.	a 35	--	7,060	3,300	--	14	--	18	--	24	41	86	99	100	--	SPWCM
Dec. 11.....	12:40 p.m.	34	34	15,800	6,820	--	1	3	21	28	42	70	93	99	100	--	SPNM
Dec. 11.....	12:40 p.m.	34	34	15,800	2,890	24	26	30	34	39	49	68	90	100	--	--	BWCM
Jan. 25, 1951...	1:35 p.m.	a 24	33	4,220	--	--	--	--	--	--	28	36	64	94	97	100	S
Feb. 13.....	4:45 p.m.	a 22	--	4,380	1,160	--	23	--	29	--	38	50	88	100	--	--	SPWCM
Feb. 23.....	5:45 p.m.	a 26	32	11,200	5,820	--	27	--	42	--	65	74	90	98	100	--	SPWCM
Mar. 21.....	11:30 a.m.	28	--	13,100	6,200	--	23	--	33	--	51	64	84	96	99	--	SPWCM
Mar. 26.....	5:02 p.m.	35	45	18,900	14,400	--	1	2	53	66	74	92	96	100	--	--	SPN
Mar. 26.....	5:02 p.m.	35	45	18,900	6,300	33	40	50	50	66	83	93	98	100	--	--	SPWCM
Mar. 27.....	11:48 a.m.	20	34	8,960	4,660	1	6	29	32	52	71	86	98	100	--	--	SPN
Mar. 27.....	11:48 a.m.	20	34	8,960	4,040	19	25	28	36	42	56	72	88	97	100	--	SPWCM
Apr. 24.....	9:40 a.m.	18	43	3,920	2,800	--	47	--	70	--	88	--	--	--	--	--	SPWCM
Apr. 25.....	9:40 a.m.	20	47	14,500	9,220	--	43	--	60	--	70	79	90	99	100	--	SPWCM
Apr. 26.....	9:20 a.m.	39	51	21,900	5,660	--	36	--	53	--	74	75	91	99	100	--	SPWCM
May 1.....	9:30 a.m.	74	--	58,000	8,370	26	33	40	49	58	76	86	94	99	100	--	SPWCM
May 1.....	12:45 p.m.	70	51	54,400	8,380	30	38	47	57	--	85	93	98	100	--	--	SPWCM
May 1.....	3:55 p.m.	67	--	54,300	7,870	30	37	45	54	66	81	89	96	99	100	--	SPWCM
May 1.....	4:10 p.m.	64	--	54,100	6,480	30	38	47	58	68	85	93	97	99	100	--	SPWCM
May 9.....	3:45 p.m.	41	--	30,600	23,100	--	--	--	45	59	73	89	98	100	--	--	SPNM
May 9.....	3:45 p.m.	41	--	30,600	16,000	23	31	38	47	55	70	88	99	100	--	--	BWCM
May 15.....	10:00 p.m.	46	53	17,800	11,900	--	1	9	37	48	68	90	98	100	--	--	SPNM

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued
FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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 15, 1951.....	10:00 a. m.	46	53	17,800	3,650	22	27	33	36	48	71	94	98	SPWCM	--
June 12.....	1:30 p. m.	45	--	16,000	11,300	--	--	2	44	53	66	86	97	SPNM	--
June 12.....	1:30 p. m.	45	--	16,000	4,490	21	29	36	41	50	62	75	97	BWCM	--
June 6.....	12:40 p. m.	154	75	25,700	6,590	22	29	36	43	52	68	84	95	SPWCM	100
July 12.....	1:40 p. m.	232	71	34,600	7,710	--	35	--	50	--	76	89	96	SPWCM	--
July 16.....	3:50 p. m.	162	--	29,000	5,380	--	34	--	--	72	87	87	95	SPWCM	--
July 19.....	1:55 p. m.	168	84	33,300	9,030	23	32	38	46	55	69	85	95	SPWCM	100
July 21.....	4:25 p. m.	211	--	32,300	23,000	--	1	2	52	64	75	89	96	SPNM	100
July 23.....	4:25 p. m.	211	--	32,300	7,630	25	33	41	50	60	70	78	93	BWCM	--
July 31.....	4:20 p. m.	180	80	27,200	5,350	--	42	--	62	--	87	--	--	SPWCM	--
Aug. 3.....	3:52 p. m.	182	75	25,300	6,680	21	27	33	40	47	62	81	92	SPWCM	100
Aug. 7.....	1:20 p. m.	228	76	28,400	4,660	--	30	--	42	--	62	82	93	SPWCM	--
Aug. 13.....	3:50 p. m.	147	--	23,300	5,390	20	28	34	40	49	62	76	96	BWCM	--
Aug. 14.....	12:28 p. m.	154	71	22,000	7,980	20	25	30	36	43	56	75	92	SPWCM	100
Aug. 20.....	4:40 p. m.	145	73	21,400	13,900	--	25	--	39	--	62	81	94	SPWCM	--
Aug. 27.....	4:30 p. m.	137	--	20,300	10,100	--	23	--	34	--	52	70	88	SPWCM	100
Sept. 6.....	2:00 p. m.	145	--	17,500	10,900	--	25	--	37	--	56	73	90	SPWCM	99
Sept. 14.....	1:28 p. m.	119	66	19,800	--	21	27	33	39	47	60	76	91	SPWCM	100
Sept. 21.....	3:00 p. m.	92	--	15,900	8,750	--	22	--	31	--	49	71	91	SPWCM	--
Sept. 28.....	2:20 p. m.	91	--	15,100	7,800	--	1	4	32	40	54	73	88	SPNM	98
Sept. 28.....	2:20 p. m.	91	--	15,100	2,130	26	30	33	36	45	56	69	87	BWCM	--

YELLOWSTONE RIVER BASIN--Continued
FIVEMILE CREEK NEAR SHOSHONI, WYO.

LOCATION --At gaging station, 2 1/4 miles upstream from mouth and 5 miles west of Shoshoni, Fremont County.

DRAINAGE AREA--997 square miles.

RECORDS AVAILABLE--Chemical analyses: September 1949 to September 1951.

Water temperatures: August 1948 to September 1951.

Sediment temperatures: August 1948 to September 1951.

EXTREMES 1950-51: Specific conductance: Maximum daily, 4,860 micromhos Feb. 2; minimum daily, 1,270 micromhos July 22.

Water temperatures: Maximum daily, 77° F. July 30; minimum, freezing point on many days during November to April.

Sediment concentrations: Maximum daily, 54,500 ppm May 12; minimum daily, 10 ppm Jan. 31.

EXTREMES 1948-51: --Dissolved solids (1949-50): Maximum, 3,500 ppm Dec. 12-31, 1949; minimum, 1,140 ppm July 1-24, 1950.

Hardness (1949-50): Maximum, 1,030 ppm Sept. 15-24, 1950; minimum, 431 ppm July 1-24, 1950.

Specific conductance (1949-51): Maximum daily, 4,860 micromhos Feb. 2, 1951; minimum daily, 1,270 micromhos July 22, 1951.

Water temperatures: Maximum, 84° F. June 10, 1949; minimum, freezing point on many days during winter months each year.

Sediment concentrations: Maximum daily, 136,000 ppm June 12, 1949; minimum daily, 10 ppm Jan. 31, 1951.

Sediment loads: Maximum daily, 350,000 tons (estimated) Sept. 19, 1948; minimum daily, less than 0.50 ton Jan. 31, 1951.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Neb. Flow affected by ice Nov. 10-13, Jan. 28 to Feb. 4, Mar. 1-5. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951.

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Non-carbonate	Percent sodium		
Oct. 1-31, 1950...	55.3					600		243	0	1,730	73							62	3,670	7.7
Nov. 1-30	58.1					612		241	0	1,800	81							61	3,790	7.6
Dec. 1-31	47.6					576		221	0	1,690	79							61	3,600	7.7
Jan. 1-31, 1951...	35.9					630		230	0	1,750	83							64	3,740	7.7
Feb. 1-10	30.9					738		257	0	2,160	99							62	4,300	7.7
Feb. 11-28	43.9					630		224	0	1,920	82							60	3,820	8.2
Mar. 1-Apr. 3	41.5					636		229	0	1,880	80							61	3,850	7.6
Apr. 4-23	28.9					668		242	0	2,010	86							60	4,050	7.5
Apr. 24-26	35.4					674		240	0	2,060	86							60	4,100	7.7
Apr. 29-May 5	112					362		194	0	1,230	47							52	2,630	7.7
May 6-12	121					276		165	0	1,030	36							48	2,210	8.1
May 13-24	110					281		181	8	875	34							51	1,960	8.4
May 25-28	122					245		185	0	790	30							52	1,810	7.6
May 29-June 15	149					212		167	0	655	25							54	1,580	7.7
June 16-30	228					170		172	0	550	20							50	1,360	7.5
July 1-31	284					182		156	0	600	22							50	1,430	7.7
Aug. 1-30	276					225		147	0	675	27							57	1,620	7.4
Aug. 31-Sept. 21	246					241		165	0	745	31							55	1,760	7.8
Sept. 22-30	180					298		185	0	870	38							58	2,020	7.6
Weighted average ^a	119					305		b 178	--	932	38							57	2,080	--

^a Represents 100 percent of runoff for water year October 1950 to September 1951.

^b Includes carbonate as bicarbonate.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement made between 8 a.m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	35	33	32	33	33	32	--	36	--	64	--
2	49	--	32	34	34	33	35	36	--	58	71	52
3	47	32	32	32	33	33	36	41	--	56	63	55
4	44	--	32	33	34	33	52	52	64	58	--	61
5	47	35	32	32	33	33	58	58	70	57	--	55
6	43	--	33	32	32	--	40	45	66	57	61	61
7	38	--	33	32	33	33	36	44	57	--	59	58
8	46	32	34	32	32	33	--	44	61	--	59	--
9	45	35	33	33	32	33	43	42	50	56	69	--
10	42	34	32	32	35	33	34	44	--	53	71	55
11	48	32	33	32	36	33	33	42	53	48	--	54
12	45	34	33	34	32	33	36	51	54	51	--	53
13	46	34	33	32	33	34	35	53	56	55	70	52
14	47	--	32	32	34	33	36	59	54	--	58	56
15	46	--	32	--	34	34	35	48	55	63	66	--
16	42	34	32	--	35	35	34	49	64	74	66	--
17	46	32	32	32	34	34	38	--	68	62	57	62
18	45	--	32	32	35	34	--	53	63	61	--	--
19	42	34	32	--	33	33	--	--	56	76	--	54
20	40	33	32	32	33	--	35	--	69	76	64	--
21	38	33	33	31	34	35	34	52	64	63	63	53
22	44	--	33	34	34	37	38	52	68	58	75	--
23	48	33	--	--	33	31	43	61	55	60	64	44
24	37	--	--	32	33	34	36	59	--	74	61	--
25	44	33	--	32	33	40	--	52	51	68	--	--
26	41	32	34	34	33	36	--	--	69	66	--	--
27	39	34	32	32	--	43	45	--	55	68	52	34
28	36	33	32	32	33	32	--	72	52	--	66	49
29	43	32	32	32	--	32	45	56	65	--	62	57
30	48	34	32	33	--	--	46	50	53	77	67	47
31	43	--	33	33	--	38	--	51	--	68	63	--
Average	44	--	32	32	33	34	39	51	59	63	--	--

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	69	17,000	a 3,200	47	10,200	1,290	55	10,800	1,600
2-----	64	16,200	2,800	46	9,390	1,170	52	7,500	1,050
3-----	62	13,000	2,180	45	9,200	1,120	48	8,120	1,050
4-----	62	12,900	2,160	47	9,110	1,160	44	5,500	653
5-----	62	12,100	2,030	48	8,800	1,140	43	3,650	424
6-----	59	12,200	1,940	49	10,000	1,320	44	3,550	422
7-----	58	14,000	a 2,200	50	9,100	1,230	48	4,900	635
8-----	60	13,000	a 2,100	48	14,700	s 2,000	49	5,800	767
9-----	63	12,100	2,060	38	2,350	241	50	6,400	864
10-----	62	11,800	1,980	37	1,520	152	52	8,300	1,170
11-----	59	10,500	1,670	42	1,850	210	51	9,550	1,310
12-----	59	9,380	1,490	46	2,600	323	55	12,600	s 1,940
13-----	56	8,830	1,340	51	3,750	516	50	9,850	1,330
14-----	56	9,200	1,390	64	3,360	s 600	52	6,240	s 888
15-----	55	10,500	1,560	74	3,080	s 648	50	5,750	776
16-----	54	11,300	1,650	78	3,600	758	51	5,920	s 643
17-----	54	9,670	1,410	90	7,190	1,750	49	3,500	463
18-----	52	9,020	1,270	78	6,340	s 1,380	51	5,870	s 836
19-----	52	9,210	1,290	60	7,720	1,250	51	6,140	645
20-----	52	9,400	1,320	53	4,860	s 738	51	7,560	s 1,080
21-----	52	10,200	1,430	70	7,710	s 1,550	48	6,080	s 820
22-----	50	9,780	1,320	70	6,560	s 1,380	49	6,720	s 941
23-----	50	9,310	1,260	62	4,000	670	48	--	e 900
24-----	50	8,650	1,170	85	4,900	1,120	51	--	e 1,600
25-----	50	7,710	1,040	75	5,670	1,150	50	--	e 1,500
26-----	49	8,370	1,110	68	6,480	s 1,270	46	11,700	1,450
27-----	50	9,220	1,240	54	8,680	s 1,310	43	5,090	591
28-----	49	10,100	1,240	57	9,180	s 1,480	41	3,830	424
29-----	49	9,890	1,310	56	8,750	1,320	38	4,230	434
30-----	48	9,700	1,260	56	9,900	1,500	35	4,370	413
31-----	48	10,600	1,370	--	--	--	30	2,220	180
Total-	1,715	--	50,890	1,744	--	31,744	1,475	--	28,192
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	32	2,660	230	18	208	10	50	12,900	1,740
2-----	31	1,960	164	22	340	20	50	6,200	837
3-----	36	2,990	291	26	620	43	41	5,500	609
4-----	37	1,870	187	30	660	53	42	6,250	709
5-----	38	2,380	244	32	440	38	42	10,900	s 1,350
6-----	35	1,820	172	33	490	44	43	9,690	s 1,290
7-----	34	1,550	142	35	400	38	43	12,800	s 1,610
8-----	37	2,580	258	36	880	64	43	12,500	s 1,610
9-----	38	3,000	308	38	600	62	43	17,000	s 2,190
10-----	37	2,640	264	39	3,240	s 364	41	11,200	s 1,280
11-----	39	2,910	306	50	4,290	578	38	11,600	s 1,260
12-----	41	2,890	320	44	2,830	337	38	13,300	s 1,480
13-----	40	3,270	353	38	2,800	286	38	14,900	s 1,620
14-----	41	2,900	321	36	1,210	s 134	41	16,000	1,770
15-----	39	2,700	284	40	1,250	s 176	43	18,500	s 2,220
16-----	40	2,580	279	42	1,410	s 171	42	13,500	1,530
17-----	40	3,300	s 372	44	1,360	s 183	41	10,100	s 1,210
18-----	42	3,640	413	47	1,600	s 234	44	12,800	s 1,760
19-----	41	3,270	362	48	3,410	s 461	46	14,000	s 1,890
20-----	38	2,040	209	45	3,540	s 455	49	16,500	2,180
21-----	42	1,800	204	44	3,860	s 503	49	20,000	2,650
22-----	48	3,330	431	41	4,000	443	46	21,900	2,720
23-----	43	2,940	341	43	7,460	s 912	42	15,500	s 1,800
24-----	42	3,260	370	44	8,180	s 1,040	41	16,200	s 1,890
25-----	41	3,040	s 343	48	12,200	s 1,630	41	16,400	1,820
26-----	39	6,380	s 707	43	13,100	s 1,620	41	17,000	1,880
27-----	28	1,820	138	45	14,400	s 1,880	39	17,000	1,780
28-----	19	348	18	49	12,200	s 1,820	38	9,850	s 1,080
29-----	18	283	14	--	--	--	39	11,500	1,210
30-----	18	146	t	--	--	--	39	14,300	1,510
31-----	18	10	(t)	--	--	--	37	17,200	1,720
Total-	1,112	--	8,052	1,100	--	13,599	1,310	--	50,215

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	35	11,200	1,060	112	54,500	s 17,600	273	25,800	s 21,800
2-----	34	14,800	1,360	100	26,800	s 7,800	242	26,600	17,400
3-----	32	15,700	1,360	107	16,500	s 4,800	167	18,600	8,390
4-----	33	14,400	1,280	118	13,100	4,170	132	14,600	5,200
5-----	33	13,000	1,160	231	25,000	s 17,400	132	16,400	5,850
6-----	33	13,700	1,220	167	44,600	20,900	132	15,600	5,560
7-----	33	14,300	1,270	171	44,500	21,300	132	14,300	5,100
8-----	32	9,400	811	100	25,500	6,880	128	15,500	5,360
9-----	32	11,300	976	98	16,200	4,290	151	15,900	6,480
10-----	32	10,400	899	114	18,300	5,630	155	16,300	6,820
11-----	31	9,800	820	100	16,800	4,540	159	15,500	6,650
12-----	30	10,200	826	100	19,200	5,180	121	14,000	4,570
13-----	29	11,300	885	104	17,000	4,770	147	12,700	5,040
14-----	27	8,300	605	98	16,700	4,420	135	14,500	5,290
15-----	26	9,400	660	92	16,000	3,970	167	14,200	6,400
16-----	24	8,300	538	135	21,600	7,870	188	15,000	7,610
17-----	23	9,900	615	114	18,800	5,790	163	15,200	6,690
18-----	22	7,800	463	124	16,800	5,620	175	17,900	8,460
19-----	24	8,100	525	118	14,500	4,620	163	20,900	9,200
20-----	26	7,200	505	118	13,300	4,240	159	21,000	9,020
21-----	27	8,150	594	139	21,700	8,140	175	21,600	10,200
22-----	29	6,200	485	95	24,700	6,330	211	23,500	13,400
23-----	31	6,900	578	92	18,300	4,550	292	27,000	21,300
24-----	38	11,100	1,140	95	18,000	4,620	252	27,000	a 18,000
25-----	35	14,200	1,340	95	18,000	4,620	278	29,200	21,900
26-----	32	11,100	959	110	17,000	5,050	283	30,500	23,300
27-----	32	11,200	968	155	15,100	6,320	252	27,000	18,400
28-----	40	19,000	2,050	128	14,800	5,110	265	26,800	19,200
29-----	43	26,400	3,070	82	13,800	3,060	278	28,000	21,000
30-----	73	34,500	s 10,000	100	13,100	3,540	283	26,900	20,600
31-----	--	--	--	124	14,300	4,790	--	--	--
Total-	971	--	39,022	3,636	--	217,820	5,790	--	344,190
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	270	24,300	17,700	319	27,500	23,700	283	18,400	14,100
2-----	283	24,700	18,900	337	26,700	24,300	283	19,400	14,800
3-----	265	24,300	17,400	319	23,900	20,500	301	18,600	15,300
4-----	252	23,400	15,900	346	27,700	25,900	314	19,600	16,600
5-----	247	23,800	15,900	350	27,400	25,900	306	20,100	16,600
6-----	238	24,100	15,500	346	27,900	26,100	307	21,300	s 18,700
7-----	247	24,100	16,100	364	26,100	25,700	323	50,000	sb 65,000
8-----	242	26,100	17,100	337	27,000	24,600	218	23,000	13,500
9-----	247	25,900	17,300	314	26,300	22,300	216	20,000	11,700
10-----	247	27,500	18,300	306	24,000	19,800	229	20,500	12,700
11-----	310	32,000	27,800	288	23,800	18,500	216	20,100	11,700
12-----	324	32,800	29,800	270	22,900	16,700	211	21,100	12,000
13-----	296	30,700	24,500	260	21,400	15,000	224	21,800	13,200
14-----	292	29,400	23,200	252	19,800	13,500	216	20,900	12,200
15-----	288	29,100	22,600	252	20,200	13,700	220	19,100	11,300
16-----	265	27,800	19,900	260	19,100	13,400	242	17,600	11,500
17-----	234	26,300	16,600	252	19,700	13,400	238	15,600	10,000
18-----	224	27,000	16,300	260	19,700	13,800	238	15,600	10,000
19-----	297	35,000	s 30,600	274	20,700	15,300	224	14,000	8,470
20-----	296	27,900	22,300	270	21,000	15,300	202	14,300	7,800
21-----	448	33,000	s 45,600	260	20,000	14,000	202	15,000	8,180
22-----	373	33,300	34,800	247	18,100	12,100	188	14,000	7,110
23-----	368	30,500	30,300	229	16,500	10,200	198	13,100	7,000
24-----	342	28,300	26,100	242	18,200	11,900	188	13,600	6,900
25-----	301	26,100	21,200	224	17,100	10,300	184	12,100	6,010
26-----	301	26,900	21,900	229	18,600	11,500	193	15,600	8,130
27-----	306	28,400	23,500	238	20,300	13,000	163	16,100	7,080
28-----	332	29,800	26,700	220	17,800	10,600	171	16,200	7,480
29-----	332	29,300	26,300	206	17,000	9,460	171	15,600	7,200
30-----	332	28,100	25,200	216	15,800	9,220	167	14,500	6,540
31-----	328	27,800	24,600	247	17,900	11,900	--	--	--
Total-	9,127	--	709,900	8,534	--	511,580	6,836	--	378,800
Total discharge for year (cfs-days)									43,350
Total load for year (tons)									2,384,111

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, water, year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per-centage (° F)	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. 9, 1950	4:30 p. m.	62	58	12,200	8,100	--	25	--	37	--	66	89	99	100	--	--	SPWCM
Oct. 16	4:00 p. m.	55	58	11,500	6,780	1	2	5	30	38	58	86	99	100	--	--	SPNM
Oct. 16	4:00 p. m.	55	58	11,500	3,190	23	28	32	38	43	60	80	94	98	--	--	BWCM
Oct. 23	11:00 a. m.	52	48	8,730	6,360	--	25	--	35	--	61	89	99	100	--	--	SPWCM
Oct. 30	11:30 a. m.	48	48	9,280	5,280	--	--	6	29	35	57	85	99	100	--	--	SPNM
Oct. 30	11:30 a. m.	48	48	9,280	6,560	18	20	26	30	37	64	87	99	100	--	--	SPWCM
Nov. 6	2:45 p. m.	48	48	10,800	6,050	--	20	--	29	--	51	80	98	100	--	--	SPWCM
Nov. 13	12:00 m.	a51	36	7,480	2,960	--	16	--	19	--	38	71	98	100	--	--	SPWCM
Nov. 21	1:45 p. m.	90	--	17,200	5,680	--	1	5	17	21	31	65	96	100	--	--	SPNM
Nov. 21	1:45 p. m.	90	--	17,200	4,500	12	15	17	20	22	30	50	--	--	--	--	BWCM
Nov. 27	10:50 a. m.	50	34	10,900	4,890	--	19	--	27	--	46	74	98	100	--	--	SPWCM
Dec. 5	12:30 p. m.	41	32	6,300	5,280	--	19	--	28	--	44	70	96	100	--	--	SPWCM
Dec. 11	10:55 a. m.	51	35	11,800	8,170	1	1	2	24	32	49	76	96	100	--	--	SPNM
Dec. 11	10:55 a. m.	51	35	11,800	5,050	--	20	23	28	34	46	68	92	98	--	--	BWCM
Dec. 19	12:10 p. m.	51	34	9,140	4,730	--	17	--	23	--	44	74	98	100	--	--	SPWCM
Dec. 22	4:45 p. m.	56	--	17,300	8,220	--	26	--	41	--	71	92	99	100	--	--	SPWCM
Dec. 26	10:10 a. m.	47	34	10,400	6,280	--	19	--	28	--	54	80	98	100	--	--	SPWCM
Jan. 2, 1951	2:45 p. m.	33	35	3,560	4,040	--	21	--	33	--	50	72	95	100	--	--	SPWCM
Jan. 8	12:20 p. m.	35	32	3,360	2,640	--	13	--	18	--	30	47	88	100	--	--	SPWCM
Jan. 15	12:05 p. m.	39	--	3,620	3,790	--	18	--	26	--	43	62	92	100	--	--	SPWCM
Jan. 22	3:15 p. m.	52	34	7,870	4,040	1	1	7	28	33	44	--	--	--	--	--	SPNM
Jan. 22	3:15 p. m.	52	34	7,870	4,580	18	23	25	36	44	66	97	100	--	--	--	BWCM
Jan. 26	5:40 p. m.	44	--	13,900	5,580	--	29	--	43	--	68	87	99	100	--	--	SPWCM
Feb. 12	12:25 p. m.	40	32	3,470	1,300	--	38	--	45	--	54	73	97	100	--	--	SPWCM
Feb. 19	4:55 p. m.	50	33	6,940	6,300	--	--	4	79	86	92	--	--	--	--	--	SPNM
Feb. 19	4:55 p. m.	50	33	6,940	8,140	37	48	62	72	79	93	--	--	--	--	--	SPWCM
Feb. 25	4:30 p. m.	53	--	41,400	13,600	--	19	--	33	--	59	88	99	100	--	--	SPWCM
Feb. 27	2:10 p. m.	46	33	35,600	18,100	--	--	1	30	35	54	83	98	--	--	--	SPNM
a Mean daily discharge.																	

a. Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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. 27, 1951.....	2:10 p. m.	46	33	35,600	5,370	--	20	24	29	36	54	--	--	--	--	BWCM
Feb. 28.....	6:00 p. m.	68	--	18,000	9,280	--	31	--	50	--	80	95	100	--	--	SPWCM
Mar. 6.....	2:20 p. m.	52	35	27,200	17,100	--	--	1	27	44	66	89	99	100	--	SPNM
Mar. 6.....	2:20 p. m.	52	35	27,200	6,460	--	28	31	39	48	66	85	99	100	--	BWCM
Mar. 13.....	11:45 a. m.	37	34	18,600	8,110	--	--	20	30	--	59	86	98	100	--	SPWCM
Mar. 20.....	12:50 p. m.	54	43	27,100	6,260	22	28	35	42	55	76	93	99	100	--	SPWCM
Mar. 20.....	12:50 p. m.	54	43	27,100	26,300	--	1	2	17	58	71	87	98	100	--	BNM
Mar. 27.....	11:00 a. m.	38	43	18,200	7,210	--	33	--	49	--	76	91	99	100	--	SPWCM
Apr. 3.....	3:10 p. m.	33	62	14,500	12,500	--	1	2	50	67	85	96	100	--	SPNM	
Apr. 3.....	3:10 p. m.	33	62	14,500	4,220	30	37	46	56	68	84	95	100	--	BWCM	
Apr. 10.....	11:50 a. m.	34	--	11,600	7,980	--	--	3	44	55	75	93	100	--	SPNM	
Apr. 10.....	11:50 a. m.	34	--	11,600	5,500	23	30	36	45	54	71	92	100	--	BWCM	
Apr. 17.....	3:50 p. m.	21	60	8,180	6,980	--	--	13	59	66	82	--	--	--	--	SPNM
Apr. 17.....	3:50 p. m.	21	60	8,180	2,780	32	40	50	60	70	84	96	100	--	BWCM	
Apr. 25.....	12:50 p. m.	34	60	13,700	9,910	--	--	1	58	67	80	95	100	--	SPNM	
Apr. 25.....	12:50 p. m.	34	60	13,700	6,560	30	41	50	56	65	77	90	100	--	BWCM	
Apr. 28.....	7:15 a. m.	44	42	19,800	5,040	--	37	--	52	--	74	91	100	--	SPWCM	
Apr. 29.....	7:25 a. m.	44	45	27,000	6,960	--	43	--	60	--	78	93	100	--	SPWCM	
Apr. 30.....	5:45 p. m.	62	--	21,000	6,300	--	22	--	67	--	88	--	--	--	SPWCM	
May 1.....	4:20 p. m.	78	50	48,400	38,700	--	--	2	66	77	94	94	99	100	--	SPNM
May 1.....	4:20 p. m.	78	50	48,400	3,220	27	35	44	55	63	74	86	97	99	--	BWCM
May 7.....	12:25 p. m.	155	57	46,800	38,100	--	--	2	54	68	81	98	100	--	SPNM	
May 7.....	12:25 p. m.	155	57	46,800	2,950	28	36	43	55	69	81	94	100	--	BWCM	
May 14.....	11:55 a. m.	121	65	18,400	8,590	--	--	1	3	45	67	82	97	98	100	SPWCM
May 14.....	11:55 a. m.	121	65	18,400	7,540	19	23	29	38	47	71	91	99	100	--	SPWCM
May 21.....	10:55 a. m.	139	52	22,800	15,300	--	28	--	37	--	68	--	--	--	--	SPWCM
May 21.....	10:45 a. m.	135	69	10,600	5,260	--	20	--	28	--	49	75	94	99	100	SPWCM

June 21, 1951	4:50 p. m.	175	65	20,600	8,210	--	33	--	48	--	73	87	98	100	--	SPWCM
June 25	5:10 p. m.	301	73	27,000	19,300	--	1	2	48	57	72	86	95	100	--	SPNM
June 25	5:10 p. m.	301	73	27,000	3,950	24	32	40	47	56	69	82	97	100	--	BWCM
July 2	5:00 p. m.	278	69	22,700	8,400	--	22	--	41	--	60	--	--	--	--	SPWCM
July 5	11:30 a. m.	292	71	21,000	7,100	--	26	--	39	--	64	81	92	99	100	SPWCM
July 12	10:50 a. m.	373	--	30,500	18,500	--	1	2	--	47	60	72	92	99	100	SPNM
July 13	10:50 a. m.	373	--	30,500	4,200	19	26	32	38	45	59	74	91	98	--	BWCM
July 16	11:00 a. m.	306	74	24,300	9,540	--	28	--	42	--	65	82	93	99	100	SPWCM
July 19	4:10 p. m.	270	82	25,400	5,900	--	34	--	49	--	74	87	95	99	100	SPWCM
July 23	1:25 p. m.	420	78	28,600	5,000	--	26	--	40	--	68	84	98	100	--	SPWCM
July 30	11:10 a. m.	378	77	27,400	4,910	--	27	--	42	--	64	83	94	100	--	SPWCM
Aug. 2	11:05 a. m.	373	71	27,800	4,280	--	23	--	34	--	56	81	94	100	--	SPNM
Aug. 13	11:30 a. m.	283	70	18,700	11,700	--	--	2	39	46	63	84	97	100	--	SPNM
Aug. 13	11:30 a. m.	283	70	18,700	5,860	22	28	34	40	50	67	85	98	100	--	SPWCM
Aug. 20	11:20 a. m.	278	64	19,600	6,040	--	23	--	34	--	53	75	92	99	100	SPWCM
Aug. 23	10:40 a. m.	266	64	15,600	5,520	--	23	--	34	--	57	79	95	99	100	SPWCM
Aug. 30	10:55 a. m.	224	52	16,700	5,100	--	19	--	33	--	57	75	93	98	100	SPWCM
Sept. 1	8:40 a. m.	224	52	21,000	12,100	--	18	1	32	37	52	75	94	99	100	SPNM
Sept. 13	9:40 a. m.	224	52	21,000	8,000	18	23	27	32	40	53	69	99	100	100	BWCM
Sept. 24	4:45 p. m.	188	63	11,600	6,850	--	21	--	31	--	54	78	94	99	100	SPWCM
Sept. 26	10:35 a. m.	175	49	19,700	8,400	--	15	--	24	--	42	63	87	97	99	SPWCM

YELLOWSTONE RIVER BASIN--Continued

POISON CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 1 mile west of Shoshoni, Fremont County, and 2 miles upstream from mouth.

DRAINAGE AREA.--319 square miles.

RECORDS AVAILABLE.--Water temperatures: March to June 1949.

Sediment records: March 1949 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 350 tons (estimated) Apr. 24; minimum daily, 0 ton on many days.

EXTREMES, 1949-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 8,000 tons (estimated) July 23, 1950; minimum daily, 0 ton on many days each year.

REMARKS.--Maximum observed suspended-sediment concentration during water year, 29,800 ppm Apr. 24. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, March to April 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent suspended (micro-mhos at 25°C)	pH	
															Parts per million	Residue at (180°C)	Sum	Tons per acre-foot	Calcium			Non-carbonate
Mar. 30, 1951.....	0.3	14	0.04	207	85	790	288	2,180	49	1.0	7.6	0.18	3,540	4.80	4.81	3,540	4.81	868	630	66	4,320	8.2
Apr. 27.....	1.0	15	.04	233	107	1,040	306	2,830	63	1.2	4.9	.23	4,510	6.13	6.13	4,510	6.13	1,020	769	69	5,350	8.2

YELLOWSTONE RIVER BASIN--Continued

POISON CREEK NEAR SHOSHONI, WYO.--Continued

Monthly and annual summary of water and suspended sediment discharge, water year October 1950 to September 1951

Month	Discharge (cfs - days)	Runoff (acre-feet)	Load (tons)	Suspended sediment				
				Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October.....	12.4	25	e 6	0.2		--	179	6,980
November.....	12.0	24	e 6	.2		--	185	551
December.....	10.8	21	e 4	.1		--	137	323
January.....	6.2	12	e 1	.03		0	60	141
February.....	28.0	56	e 50	1.8		0	661	2,620
March.....	31.0	61	e 200	6.5		--	2,390	2,710
April.....	19.5	39	e 480	16		--	9,120	29,800
May.....	31.0	61	e 360	12		--	4,300	12,000
June.....	7.0	14	e 2	.07		--	110	187
July.....	3.1	6.1	(t)	.01		--	40	60
August.....	1.5	3.0	(t)	.003		0	25	82
September.....	2.2	4.4	(t)	.003		0	25	26
Water year 1950-51	164.7	326.5	e 1,110	3.0		0	--	29,800

e Estimated.

t Less than 0.50 ton.

YELLOWSTONE RIVER BASIN--Continued

POISON CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, October 1950 to May 1951

(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 of collection	Time	Instantaneous discharge (cfs)	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		0.350	0.500	1.000
Oct. 24, 1950	3:40 p. m.	0.3	6,960	5,760	79	98	99								SPWCM
Apr. 24, 1951	1:20 p. m.	4.1	29,800	11,700	48	80	94								SPWCM
May 16	11:50 a. m.	6	12,000	12,500	33	49	65	81	92	97					SPWCM

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.

LOCATION.--At gaging station at Bonneville, Fremont County, 5½ miles upstream from mouth.
DRAINAGE AREA.--790 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 82,000 ppm Sept. 7; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 50,000 tons Sept. 7; minimum daily, 0 ton on many days.
EXTREMES, 1947-51.--Sediment concentrations: Maximum daily, 108,000 ppm July 11, 1949; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 69,800 tons June 2, 1949; minimum daily, 0 ton on many days each year.

REMARKS.--Flow affected by ice Feb. 16-19, Mar. 3, 4. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.5	31,000	a 42	0	--	0	0.2	700	(t)
2-----	.2	16,700	9	0	--	0	.1	470	(t)
3-----	2.0	43,700	s 555	0	--	0	0	--	0
4-----	.1	24,700	s 14	0	--	0	0	--	0
5-----	0	--	0	0	--	0	0	--	0
6-----	0	--	0	.1	--	e 2	0	--	0
7-----	0	--	0	.2	9,650	5	0	--	0
8-----	0	--	0	.1	--	e 2	0	--	0
9-----	0	--	0	0	--	0	0	--	0
10-----	0	--	0	0	--	0	0	--	0
11-----	0	--	0	0	--	0	0	--	0
12-----	0	--	0	0	--	0	0	--	0
13-----	0	--	0	0	--	0	0	--	0
14-----	0	--	0	0	--	0	0	--	0
15-----	0	--	0	0	--	0	0	--	0
16-----	0	--	0	0	--	0	0	--	0
17-----	0	--	0	0	--	0	0	--	0
18-----	0	--	0	0	--	0	0	--	0
19-----	0	--	0	0	--	0	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	0	--	0	0	--	0	0	--	0
22-----	0	--	0	0	--	0	0	--	0
23-----	0	--	0	0	--	0	0	--	0
24-----	0	--	0	0	--	0	0	--	0
25-----	0	--	0	0	--	0	0	--	0
26-----	0	--	0	0	--	0	0	--	0
27-----	0	--	0	0	--	0	0	--	0
28-----	0	--	0	.2	128	(t)	0	--	0
29-----	0	--	0	.3	1,280	s 2	0	--	0
30-----	0	--	0	.3	2,200	2	0	--	0
31-----	0	--	0	--	--	--	0	--	0
Total--	2.8	--	620	1.2	--	13	0.3	--	1

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				0	--	0	8.0	2,650	s 107
2-----				0	--	0	11	838	s 55
3-----				0	--	0	2.0	200	1
4-----				0	--	0	3.0	1,200	s 20
5-----				0	--	0	10	1,250	s 62
6-----				0	--	0	11	1,010	s 42
7-----				0	--	0	13	2,850	s 159
8-----				.1	--	e 2	10	3,520	s 182
9-----				.2	1,200	s 2	12	4,150	s 256
10-----				5.0	3,300	45	10	4,810	s 185
11-----				5.0	1,100	15	8.8	--	e 150
12-----				7.0	2,900	55	10	3,150	s 204
13-----				.5	75	(t)	13	3,620	s 213
14-----				1.0	1,000	s 5	15	4,720	s 280
15-----				3.0	1,400	sb 22	12	3,720	s 152
16-----				5.0	1,100	sb 21	11	5,000	148
17-----				6.0	--	e 50	7.8	2,780	s 96
18-----				7.0	3,560	s 97	5.7	2,430	s 70
19-----				8.0	2,100	s 59	13	5,460	s 335
20-----				9.7	1,450	s 95	14	5,320	s 298
21-----				8.9	3,180	s 111	11	--	e 200
22-----				8.0	--	e 80	17	--	e 400
23-----				15	3,880	s 278	17	7,100	326
24-----				13	5,760	s 307	26	8,180	s 668
25-----				16	--	e 250	20	7,570	s 452
26-----				15	2,750	s 155	32	19,200	s 2,630
27-----				11	--	e 100	58	7,500	1,170
28-----				11	1,210	s 87	62	7,250	s 1,370
29-----				--	--	--	46	3,790	s 588
30-----				--	--	--	45	7,100	863
31-----				--	--	--	32	6,000	518
Total-	0		0	155.4	--	1,816	566.3	--	12,160
Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	24	2,700	175	35	10,200	964			
2-----	21	7,700	437	15	3,800	154			
3-----	18	6,400	311	12	3,000	97			
4-----	13	4,400	154	10	2,500	68			
5-----	11	4,400	131	14	2,700	102			
6-----	12	4,000	130	26	6,720	s 498			
7-----	11	4,400	131	32	6,790	s 673			
8-----	10	3,600	97	17	3,300	151			
9-----	9.3	2,700	68	10	2,150	58			
10-----	8.4	1,100	25	6.2	2,900	49			
11-----	9.0	1,700	41	4.1	1,300	14			
12-----	9.0	2,600	63	2.6	750	5			
13-----	8.4	2,600	59	1.6	400	2			
14-----	8.4	1,000	23	.8	600	1			
15-----	8.4	1,300	29	1.6	240	1			
16-----	9.9	2,000	53	2.8	2,300	17			
17-----	10	2,400	65	2.4	1,570	10			
18-----	9.0	1,500	36	2.0	500	3			
19-----	14	4,310	s 182	0	--	0			
20-----	16	5,500	238	0	--	0			
21-----	14	5,500	208	0	--	0			
22-----	13	4,400	154	0	--	0			
23-----	9.9	3,000	80	0	--	0			
24-----	12	5,850	s 184	0	--	0			
25-----	10	5,000	135	0	--	0			
26-----	12	3,200	104	0	--	0			
27-----	16	3,800	164	0	--	0			
28-----	20	7,000	378	0	--	0			
29-----	36	18,500	s 1,940	0	--	0			
30-----	42	17,600	2,000	0	--	0			
31-----	--	--	--	0	--	0			
Total-	424.7	--	7,795	195.1	--	2,867	0		0

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----							0	--	0
2-----							0	--	0
3-----							0	--	0
4-----							0	--	0
5-----							0	--	0
6-----							0	--	0
7-----							154	82,000	sb 50,000
8-----							0	--	0
9-----							0	--	0
10-----							0	--	0
11-----							0	--	0
12-----							0	--	0
13-----							0	--	0
14-----							0	--	0
15-----							0	--	0
16-----							0	--	0
17-----							0	--	0
18-----							8.7	24,000	sa 3,000
19-----							5.0	55,000	770
20-----							0	--	0
21-----							0	--	0
22-----							0	--	0
23-----							0	--	0
24-----							0	--	0
25-----							0	--	0
26-----							0	--	0
27-----							0	--	0
28-----							0	--	0
29-----							0	--	0
30-----							0	--	0
31-----							0	--	0
Total-	0		0	0		0	187.7	--	53,770

Total discharge for year (cfs-days) 1,513.5
 Total load for year (tons) 79,042

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Particle-size analyses of suspended sediment, October 1950 to May 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Oct. 3, 1950	5:25 p. m.	a. 2. 0		52,800	18,000	--	75	--	97	--	100	--	--	--	--	SPWCM
Nov. 7	8:00 a. m.	45. 2		9,520	3,430	--	63	--	99	--	100	--	--	--	--	SPWCM
Feb. 26, 1951	4:15 p. m.	45		11,000	8,310	1	1	4	33	65	79	--	--	--	--	SPNM
Feb. 28	4:15 p. m.	45		11,000	6,440	21	27	35	49	60	82	--	--	--	--	SPWCM
Mar. 5	3:30 p. m.	49		3,840	4,130	--	22	--	35	--	54	66	88	99	100	SPWCM
Mar. 9	2:15 p. m.	27		11,000	7,960	25	32	47	63	81	93	98	100	--	--	BWCM
Mar. 19	3:25 p. m.	21		22,600	18,800	--	--	1	20	60	79	91	98	100	100	SPNM
Mar. 19	3:25 p. m.	21		22,600	6,070	20	32	32	44	60	81	92	98	100	100	SPWCM
Mar. 23	3:20 p. m.	14		8,380	13,700	--	33	--	57	--	86	--	--	--	--	SPWCM
Mar. 26	4:10 p. m.	11		19,400	37,700	--	20	--	43	--	84	94	99	100	100	SPWCM
Mar. 28	3:00 p. m.	72		14,700	12,300	1	1	3	41	78	90	97	100	--	--	SPNM
Mar. 28	3:00 p. m.	72		14,700	4,020	32	44	53	69	80	90	--	--	--	--	SPWCM
Apr. 2	3:50 p. m.	17		9,200	17,900	--	34	--	57	--	91	--	--	--	--	SPWCM
Apr. 6	3:55 p. m.	10		5,520	12,000	--	45	--	69	--	89	--	--	--	--	SPWCM
Apr. 9	2:10 p. m.	8. 4		4,580	8,030	--	43	--	65	--	86	--	--	--	--	SPWCM
Apr. 24	1:40 p. m.	13		6,830	4,100	--	47	--	60	--	87	--	--	--	--	SPWCM
Apr. 29	1:00 p. m.	40		17,400	4,660	--	36	--	54	--	79	--	--	--	--	SPWCM
Apr. 30	7:00 a. m.	45		23,000	6,610	--	36	--	55	--	83	--	--	--	--	SPWCM
May 1	12:20 p. m.	48		11,200	9,250	--	1	10	51	65	82	92	100	--	--	SPNM
May 1	12:20 p. m.	48		11,200	9,030	26	34	41	51	64	81	90	98	100	100	SPWCM
May 4	1:20 p. m.	9. 9		3,960	7,110	--	47	--	69	--	92	--	--	--	--	SPWCM

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.

LOCATION.--At gaging station, three-quarters of a mile upstream from Wyoming Canal siphon, 3 miles downstream from Sheep Creek, and 9½ miles northeast of Pavilion, Fremont County.

DRAINAGE AREA.--257 square miles.

RECORDS AVAILABLE.--Water temperatures: March to July 1949.

Sediment records: March 1949 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 45,200 ppm May 21; minimum daily, no flow on several days during July and August.

Sediment loads: Maximum daily, 90,000 tons July 21; minimum daily, 0 ton on several days during July and August.

EXTREMES, 1949-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on several days during summer months 1950-51.

Sediment loads: Maximum daily, 140,000 tons (estimated) July 4, 1950; minimum daily, 0 ton on several days during summer months 1950-51.

REMARKS.--Maximum observed suspended sediment concentration during water year, 153,000 ppm July 21. Flow affected by ice Nov. 8, Nov. 10 to Mar. 31. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, October 1950 to April 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids			Hardness as CaCO ₃	Percent sodium-sulfate ratio	Specific conductance (micro-mhos at 25° C)	pH	
														Parts per million		Tons per acre-foot					
														Boiron (B)	Residue at 180° C	Sum					Calcium-magnesium
Oct. 13, 1950.....	6.8	17	0.10	159	76	121	244	725			12	0.8	0.6	0.24	1,320	1,230	1.80	710	510	1,590	7.9
Mar. 30, 1951.....	a 5.0	14	.10	160	85	146	194	845	16		16	.8	2.8	.12	1,510	1,370	2.05	740	590	1,750	8.3
Apr. 18.....	5.0	14	.04	168	93	167	278	920	14		14	.8	2.3	.18	1,670	1,530	2.27	847	619	1,920	8.2

a Mean daily discharge.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day
1-----	6.2	--	e 24	7.4	617	10	6.5	417	a 5
2-----	5.6	--	e 17	7.4			6.0		
3-----	6.2	1,280	21	5.0			5.0		
4-----	5.6	1,110	17	4.6			4.0		
5-----	5.6			5.0			3.5		
6-----	5.0	881	13	5.6	952	a 14	4.0	567	8
7-----	5.0			5.6			4.5		
8-----	5.0			5.6			5.0		
9-----	5.6			5.6			5.0		
10-----	5.6			2.0	190	a 1	5.0		
11-----	5.0	816	12	2.5	--	e 1	5.5	410	a 4
12-----	5.0			3.0	--	e 2	5.5		
13-----	5.6			3.5	--	e 4	5.5		
14-----	5.6			4.0	491	a 6	6.0		
15-----	6.2			4.0			6.0		
16-----	6.2	722	13	4.5			5.5		
17-----	5.6			4.5			5.5		
18-----	5.6			5.0			5.0		
19-----	4.6			5.0			5.0		
20-----	6.2			5.5			5.0		
21-----	6.8	742	12	5.5	444	a 7	5.0	410	a 4
22-----	6.8			5.5			4.5		
23-----	7.4			5.0			4.5		
24-----	6.8			4.5			4.0		
25-----	6.2			5.5			4.0		
26-----	6.2	660	13	6.0	--	--	3.5	--	--
27-----	6.8			6.5			3.0		
28-----	7.4			7.0			3.0		
29-----	7.4			7.0			3.0		
30-----	7.4			7.0			3.0		
31-----	7.4	--	--	--	--	--	2.5	--	--
Total--	187.6	--	427	154.8	--	224	143.0	--	178
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day
1-----	2.5	230	1	0.1	--	(t)	10	353	7
2-----	2.5			.2	160		4.5		
3-----	2.0			.5	--		4.0		
4-----	1.5			1.0	--		5.0		
5-----	1.5			2.5	--		6.0		
6-----	1.5	141	1	3.5	199	3	7.0	--	e 20
7-----	1.5			6.0			8.0		
8-----	2.0			8.0			10		
9-----	2.5			8.5			11		
10-----	2.5			9.0	--	e 6	11		
11-----	2.0	205	1	9.5	--	e 10	10	850	e 18
12-----	2.0			8.5	--	e 8	7.0		
13-----	1.5			7.5	--	--	7.0		
14-----	1.5			7.0	388	7	10		
15-----	1.5			5.0			12		
16-----	1.5	168	(t)	5.5			12	2,500	81
17-----	1.5			6.0			11		
18-----	1.5			5.0			9.0		
19-----	1.5			4.5			8.0		
20-----	1.0			7.5			7.0		
21-----	.5	205	1	8.0	458	a 14	14	3,960	149
22-----	.5			9.0			15		
23-----	1.0			10			8.0		
24-----	2.0			11			9.0		
25-----	3.0			12			10		
26-----	3.0	168	(t)	12	--	--	5.0	6,600	89
27-----	1.5			12			3.0		
28-----	.4			12			2.0		
29-----	.2			--			2.0		
30-----	.1			--			5.0		
31-----	.1	--	--	--	--	--	20	--	e 600
Total--	47.8	--	27	191.3	--	194	262.5	--	2,043

e Estimated.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	28	--	e 1,100	11	12,500	371	5.6	--	e 65
2-----	21	16,100	913	6.2	6,750	113	5.0	--	e 60
3-----	16	21,900	946	5.6	5,800	88	4.2	--	e 36
4-----	12	18,500	599	5.0	6,300	85	4.2	3,190	36
5-----	7.4	13,700	274	4.6	6,200	b75	4.2	2,350	27
6-----	5.6	9,750	146	4.6	5,600	b70	4.2	2,390	27
7-----	5.0	9,300	b130	4.6	5,300	66	4.2	2,900	33
8-----	5.6	10,000	b150	4.6	6,000	75	3.4	2,620	24
9-----	5.0	10,800	146	5.0	6,400	86	2.2	2,600	b15
10-----	3.0	11,500	93	4.2	4,500	51	2.6	2,500	b18
11-----	3.4	13,100	121	4.6	4,100	b50	1.8	2,250	11
12-----	3.0	14,200	115	3.8	4,000	41	3.4	1,900	17
13-----	4.2	9,000	102	3.4	3,400	b32	4.2	1,500	17
14-----	3.8	--	e 95	3.0	2,700	22	6.0	14,900	s 259
15-----	5.0	--	e 140	2.6	3,750	26	3.8	3,750	38
16-----	4.2	9,750	111	3.0	3,900	32	2.2	3,200	b19
17-----	5.0	10,600	143	2.2	3,250	19	2.6	3,100	b22
18-----	4.6	8,250	102	2.2	3,500	21	2.6	3,060	21
19-----	4.6	8,700	108	2.6	3,300	b24	2.6	2,890	20
20-----	5.0	10,100	136	3.4	3,500	b32	1.8	2,550	12
21-----	6.2	10,000	b170	20	45,200	s 4,520	2.2	2,600	15
22-----	6.8	10,000	b180	11	17,500	s 603	3.8	2,400	25
23-----	4.2	9,990	113	4.2	5,250	60	3.4	3,200	b30
24-----	7.4	9,250	185	2.6	4,200	29	3.0	2,200	b18
25-----	6.8	8,100	149	2.6	3,500	25	1.8	2,200	11
26-----	7.4	7,050	141	2.6	3,400	b24	1.8	2,210	11
27-----	6.2	7,250	121	3.0	3,100	b26	1.8	2,180	11
28-----	5.0	6,900	b95	3.8	3,250	33	2.2	2,060	12
29-----	5.0	6,000	b80	3.8	3,200	33	2.6	1,820	13
30-----	11	11,000	sa 500	4.6	3,600	b44	2.6	1,900	b13
31-----	--	--	--	5.0	4,400	59	--	--	--
Total-	215.4	--	7,405	149.4	--	6,835	96.0	--	936
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2.2	19,000	b11	0.6	--	--	2.2	1,200	sb 34
2-----	8.0	10,000	sa 510	.8	--	--	4.2	800	b9
3-----	1.0	7,700	21	.9	133	(t)	1.4	--	--
4-----	.7	6,400	b12	1.8	--	--	1.8	82	(t)
5-----	.6	3,320	5	.8	--	--	1.4	--	--
6-----	.6	1,550	3	.5	--	--	43	11,600	s 4,830
7-----	.4	1,300	b1	.1	59	(t)	7.9	3,890	s 130
8-----	.2	890	(t)	.1	--	--	1.0	1,000	b3
9-----	0	--	0	.5	--	--	.7	320	b1
10-----	1.0	1,500	sb7	.4	--	--	.6	65	(t)
11-----	8.4	9,300	sa 290	.2	--	--	.6	430	1
12-----	5.6	11,400	s 202	.3	--	--	1.8	540	3
13-----	5.6	3,700	56	.1	14	(t)	1.8	200	1
14-----	5.0	3,200	b44	.1	--	--	1.4	125	--
15-----	3.4	1,900	b17	.2	--	--	1.0	--	(t)
16-----	0	--	0	.2	--	--	1.0	--	--
17-----	0	--	0	0	--	0	.9	100	--
18-----	0	--	0	0	--	0	11	8,800	sb1,700
19-----	0	--	0	0	--	0	13	19,000	sa 1,000
20-----	0	--	0	0	--	0	2.6	2,800	b20
21-----	147	39,900	s 90,000	.2	--	--	2.6	900	6
22-----	46	24,500	s 3,180	.3	--	--	2.2	--	--
23-----	3.0	3,340	27	.2	--	(t)	2.2	--	e 3
24-----	.9	--	--	.2	--	--	2.2	450	--
25-----	.5	--	--	.2	--	--	1.4	--	--
26-----	.6	288	1	0	--	0	.8	320	--
27-----	.6	--	--	0	--	0	.9	--	--
28-----	1.8	--	--	0	--	0	1.4	320	e 1
29-----	6.4	2,700	sb 80	0	--	0	1.0	--	--
30-----	3.4	2,250	21	0	--	0	.9	--	--
31-----	.8	200	(t)	0	--	0	--	--	--
Total-	253.7	--	94,492	8.7	--	3	114.9	--	7,758

Total discharge for year (cfs-days) 1,825.1
 Total load for year (tons) 120,522

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Particle-size analyses of suspended sediment, November 1950 to June 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per-centage (° F)	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	0.350		0.500	1.000
Nov. 30, 1950.....	3:05 p. m.	7		1,060	1,550		25		33		49	62	92	100	SPWCM
Mar. 21, 1951.....	1:10 p. m.	230		16,400	10,400		35		63		90	--	--	--	SPWCM
Mar. 27.....	2:40 p. m.	3		23,900	11,800		22		34		62	84	98	100	SPWCM
Mar. 30.....	11:40 a. m.	5		8,950	5,870		35		55		81	--	--	--	SPWCM
Apr. 4.....	2:20 p. m.	13		18,300	6,350		38		54		87	--	--	--	SPWCM
Apr. 12.....	4:20 p. m.	4.2		14,400	2,380		51		71		93	--	--	--	SPWCM
May 21.....	2:40 p. m.	48		120,000	8,810		38		59		83	94	99	100	SPWCM
June 14.....	10:00 a. m.	6.8		29,400	5,520		74		91		96	--	--	--	SPWCM

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSONI, WYO.

LOCATION.--At gaging station, 5 miles upstream from mouth and 9 miles northwest of Shoshoni, Fremont County.

DRAINAGE AREA.--340 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: March to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 119 000 ppm July 22; minimum daily, no flow on many days during January and February.

EXTREMES, 1949-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.

REMARKS.--Maximum observed suspended-sediment concentration during water year 1951 given in Water-Supply Paper 1209.

Mar. 23. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, October 1950 to August 1951.

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million		Tons per acre-foot	Calcium, mg.	Non-carbonate, mg.			
															Residue at 180°C	Sum						
Oct. 13, 1950.....	5.0	16	0.04	207	96	177	246	246	1,020	20	1.0	1.2	0.30	0.30	1,830	1,660	2.49	910	708	30	2,070	7.7
Apr. 18, 1951.....	3.5	14	.04	257	130	250	268	268	1,400	25	1.2	3.8	.23	.23	2,410	2,210	3.28	1,180	960	32	2,610	8.1
June 3.....	80	--	--	--	45	--	--	140	235	3.0	--	--	--	--	478	--	.68	--	--	27	497	8.0
July 16.....	41	--	--	--	26	--	--	142	118	4.0	--	--	--	--	310	--	.42	--	--	23	475	8.2
Aug. 20.....	45	--	--	--	27	--	--	134	122	5.0	--	--	--	--	312	--	.42	--	--	24	467	8.1

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	6.0	3,400	55	2.2	1,650	10	7.0	420	8
2-----	7.0	4,600	87	2.7	1,510	11	7.0	--	e8
3-----	5.6	3,450	52	2.2	1,230	7	6.5	--	e7
4-----	5.6	3,500	53	3.0	--	e14	1.5	420	a2
5-----	5.0	3,200	43	4.3	--	e28	1.5	--	--
6-----	3.7	2,800	28	4.0	--	e28	1.5	--	--
7-----	3.2	1,800	b16	4.0	2,450	28	1.5	--	--
8-----	4.0	2,800	b30	2.4	1,610	10	1.5	--	--
9-----	3.7	3,100	31	1.5	--	e5	.9	--	--
10-----	3.7	2,600	26	.2	--	--	.6	--	--
11-----	3.5	2,400	23	.1	--	--	.4	--	--
12-----	3.0	2,400	19	.1	--	--	.4	--	--
13-----	3.0	3,100	25	.1	--	--	.3	--	--
14-----	3.0	2,700	b22	.2	--	--	.3	158	(t)
15-----	3.0	2,200	b18	.2	90	(t)	.3	--	--
16-----	3.0	2,500	20	.2	--	--	.3	--	--
17-----	3.2	2,500	22	.3	--	--	.4	--	--
18-----	3.0	1,950	16	.4	--	--	.4	--	--
19-----	2.7	1,800	13	.6	--	--	.6	--	--
20-----	3.0	2,250	18	1.0	--	--	.8	--	--
21-----	3.2	--	e20	13	--	e15	1.0	--	--
22-----	3.2	--	e22	14	690	a26	1.5	--	--
23-----	3.5	2,600	25	13	--	e20	1.5	--	--
24-----	3.5	2,300	22	8.0	--	--	2.0	--	--
25-----	3.2	2,200	19	6.5	--	--	2.0	--	--
26-----	3.5	2,200	21	7.0	--	--	2.0	--	--
27-----	3.0	1,850	15	7.5	401	8	2.0	236	1
28-----	3.0	1,800	b15	7.5	--	--	2.0	--	--
29-----	2.7	2,100	b15	7.5	--	--	1.5	--	--
30-----	2.4	2,150	14	7.0	--	--	1.5	--	--
31-----	1.9	1,820	9	--	--	--	1.5	--	--
Total--	111.0	--	814	120.7	--	255	52.3	--	41
Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	1.0	--	--	0	--	0	2.0	--	--
2-----	1.0	--	--	0	--	0	1.5	--	--
3-----	1.0	217	1	0	--	0	1.0	--	--
4-----	.8	--	--	0	--	0	1.5	172	1
5-----	.6	--	--	0	--	0	2.0	--	--
6-----	.5	--	--	0	--	0	2.5	--	--
7-----	.4	155	(t)	.2	--	--	2.0	452	2
8-----	.4	--	--	.5	--	(t)	1.5	269	1
9-----	.3	--	--	8.0	180	a4	2.0	260	1
10-----	.2	--	--	10	--	e12	3.0	--	e10
11-----	.2	33	(t)	13	--	e24	4.0	--	e26
12-----	.1	--	--	10	550	15	5.0	2,900	39
13-----	.1	--	--	4.0	--	--	5.0	4,500	61
14-----	0	--	0	4.0	--	--	7.0	3,500	66
15-----	0	--	0	4.0	--	--	9.0	4,000	97
16-----	0	--	0	5.0	--	--	9.0	4,990	121
17-----	0	--	0	5.0	--	--	8.0	--	e90
18-----	0	--	0	4.0	--	--	7.0	--	e70
19-----	0	--	0	1.5	--	--	5.0	3,800	51
20-----	0	--	0	2.0	--	--	6.0	--	e200
21-----	0	--	0	2.0	183	2	10	--	e450
22-----	0	--	0	3.0	--	--	11	19,900	591
23-----	0	--	0	3.0	--	--	7.0	10,700	202
24-----	0	--	0	4.0	--	--	17	13,200	606
25-----	0	--	0	5.0	--	--	18	--	e800
26-----	0	--	0	6.0	--	--	9.0	18,500	450
27-----	0	--	0	7.0	--	--	8.2	18,500	410
28-----	0	--	0	3.0	--	--	4.3	7,100	82
29-----	0	--	0	--	--	--	8.6	7,200	167
30-----	0	--	0	--	--	--	15	15,600	632
31-----	0	--	0	--	--	--	12	--	e500
Total--	6.6	--	5	104.2	--	87	204.1	--	5,731

e Estimated.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	7.0	--	e 280	17	37,000	1,760	79	18,900	4,030
2-----	8.0	18,000	389	5.5	29,800	443	87	21,000	4,930
3-----	7.0	25,600	484	4.0	17,100	185	80	21,700	4,690
4-----	6.5	25,400	446	3.5	10,600	100	82	18,800	4,180
5-----	7.2	27,000	525	3.4	11,000	b 100	75	17,200	3,480
6-----	7.5	23,400	474	5.5	17,000	sb 500	71	15,200	2,910
7-----	6.5	22,000	b 390	21	26,900	1,530	63	15,200	2,590
8-----	5.8	22,000	b 340	41	48,000	sa 5,700	67	13,900	2,510
9-----	5.8	20,100	315	54	48,700	7,380	64	11,800	2,000
10-----	4.2	15,400	175	51	30,800	4,240	54	10,100	1,470
11-----	4.5	13,800	168	47	27,000	3,430	53	8,900	1,270
12-----	4.5	14,000	170	55	31,300	4,650	53	9,990	1,430
13-----	5.0	14,500	196	54	23,000	3,350	38	8,250	735
14-----	3.0	10,500	85	44	17,400	2,070	30	10,200	828
15-----	4.2	--	e 150	40	17,100	1,850	44	10,800	1,280
16-----	3.8	14,200	146	53	24,100	3,450	32	8,400	726
17-----	4.8	14,600	189	77	32,200	6,940	16	7,600	328
18-----	4.0	14,600	158	71	34,200	6,800	24	8,900	577
19-----	3.2	16,200	140	67	33,200	6,230	18	7,800	379
20-----	3.0	9,750	79	64	32,200	5,770	9.9	6,500	174
21-----	3.8	8,800	b 90	82	28,600	6,330	9.6	6,100	158
22-----	4.0	13,000	b 140	96	44,900	12,000	21	7,800	442
23-----	4.8	15,900	208	79	38,700	8,560	34	8,500	760
24-----	8.0	16,800	363	75	31,200	6,320	48	7,300	946
25-----	8.8	16,000	428	74	28,000	5,590	50	9,100	1,230
26-----	6.2	16,500	276	79	--	e 6,000	54	10,400	1,520
27-----	4.8	16,100	209	74	22,000	b 4,400	45	8,990	1,090
28-----	4.0	15,000	b 160	79	22,000	4,690	40	8,400	907
29-----	2.8	12,000	b 90	69	20,400	3,800	35	8,400	794
30-----	8.5	20,000	sa 690	62	18,200	3,050	45	9,800	1,190
31-----	--	--	--	63	17,000	2,890	--	--	--
Total-	161.2	--	7,951	1,609.9	--	130,068	1,416.5	--	49,552
	July			August			September		
1-----	61	11,000	1,810	97	21,300	5,580	34	4,500	413
2-----	61	9,600	1,580	94	16,100	4,090	44	7,600	903
3-----	61	26,600	s 5,010	82	13,500	2,990	37	5,800	579
4-----	59	15,100	2,410	62	11,800	1,980	36	4,500	437
5-----	62	15,500	2,590	66	12,200	2,170	33	3,600	321
6-----	56	14,400	2,180	66	10,300	1,840	38	5,850	s 688
7-----	55	14,000	b 2,100	60	11,200	1,810	97	38,600	s 14,600
8-----	45	12,000	b 1,000	67	10,400	1,880	40	9,250	999
9-----	42	10,200	1,160	67	11,600	2,100	43	9,400	1,080
10-----	27	7,400	539	61	11,700	1,930	46	8,750	1,090
11-----	37	11,800	1,180	52	8,800	1,210	43	7,600	882
12-----	54	18,400	2,680	50	7,000	945	45	7,200	875
13-----	41	13,900	1,540	51	9,200	1,270	48	8,150	1,060
14-----	42	11,200	1,270	46	8,200	1,020	47	8,200	1,040
15-----	40	11,300	1,220	42	6,800	771	42	6,800	771
16-----	36	10,300	1,000	44	6,900	820	37	5,850	584
17-----	26	7,800	548	41	6,400	708	33	5,400	481
18-----	24	12,800	829	37	5,900	589	41	14,000	sb 2,300
19-----	20	11,800	626	41	6,450	714	63	37,000	sa 7,300
20-----	24	7,700	499	43	6,200	720	43	10,200	1,180
21-----	308	66,000	sa 170,000	47	7,150	907	40	8,150	880
22-----	387	119,000	s 193,000	44	7,200	855	37	6,250	624
23-----	117	36,000	11,800	48	8,300	1,080	36	5,200	505
24-----	118	35,500	11,700	53	8,000	1,140	30	5,100	413
25-----	111	32,800	10,200	51	7,550	1,040	18	3,250	158
26-----	103	30,500	8,480	36	5,600	544	17	3,700	170
27-----	103	28,300	7,870	31	5,150	431	29	7,200	b 580
28-----	100	22,100	5,970	30	5,100	413	40	7,450	805
29-----	126	31,800	10,800	25	3,800	256	42	6,700	780
30-----	115	21,100	6,550	16	2,400	104	48	7,250	940
31-----	103	23,600	6,620	23	3,700	230	--	--	--
Total-	2,564	--	475,261	1,573	--	42,137	1,227	--	43,408

Total discharge for year (cfs-days)..... 9,150.5
 Total load for year (tons)..... 755,330

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
 MUDDY CREEK NEAR SHOESONI, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Suspended sediment												Methods of analysis	
			Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
					Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Oct. 23, 1950	4:25 p.m.	5.0	3,660	2,290	31	38	47	55	65	81	93	100			BWCM	
Nov. 7	11:50 a.m.	3.5	2,560	1,420	51	63	75	85	89	92	95	98		100		BWCM
Nov. 30	1:07 p.m.	a7.0	798	2,770	--	38	--	55	--	81	95	100		--		SPWCM
Feb. 12, 1951	4:35 p.m.	e18	1,700	1,160	58	71	84	92	93	94	96	100		--		BWCM
Mar. 16	1:15 p.m.	a9.0	8,240	4,670	--	34	--	46	--	75	94	100		--		SPWCM
Mar. 20	2:30 p.m.	e15	11,700	6,210	--	38	--	64	--	72	95	100		--		SPWCM
Mar. 22	2:55 p.m.	e6	19,000	9,370	--	33	--	48	--	70	87	98		100		SPWCM
Mar. 23	4:40 p.m.	e20	10,200	7,990	--	51	--	77	--	98	--	--		--		SPWCM
Mar. 27	2:05 p.m.	7.0	24,000	15,000	--	36	--	50	--	80	97	100		--		SPWCM
Mar. 30	1:15 p.m.	22	21,000	8,380	--	46	--	63	--	86	97	100		--		SPWCM
Apr. 3	12:55 p.m.	5.0	25,800	8,000	--	43	--	62	--	80	--	--		--		SPWCM
Apr. 6	12:25 p.m.	7.8	22,400	7,450	--	42	--	60	--	81	--	--		--		SPWCM
Apr. 23	1:05 p.m.	4.5	15,900	5,350	--	51	--	77	--	89	--	--		--		SPWCM
Apr. 25	3:05 p.m.	8.5	15,600	9,150	--	51	--	77	--	92	--	--		--		SPWCM
May 1	1:40 p.m.	24	38,300	35,900	--	--	--	1	66	83	90	99	100		--	SPNM
May 1	1:40 p.m.	24	38,300	6,400	37	50	56	70	78	89	--	--		--		SPWCM
May 21	12:35 p.m.	77	23,600	17,100	--	--	2	41	54	75	95	99		100		SPNM
May 21	12:35 p.m.	77	23,600	8,660	23	29	36	44	54	76	95	100		--		SPWCM
June 14	12:42 p.m.	29	6,580	4,760	--	--	11	37	56	78	--	--		--		SPNM
June 14	12:43 p.m.	29	6,580	2,390	29	29	36	47	60	80	98	100		--		SPWCM
June 28	12:40 p.m.	49	7,420	6,120	--	28	--	42	--	74	95	100		--		SPWCM
July 5	2:12 p.m.	65	16,700	5,780	--	--	24	--	36	--	60	80	95	100		SPWCM
July 12	12:47 p.m.	63	18,700	11,400	--	--	2	38	41	54	77	96		100		SPNM
July 12	12:47 p.m.	63	18,700	5,970	20	25	31	36	41	57	80	96		99		SPWCM
July 12	12:47 p.m.	63	18,700	4,930	20	28	35	35	37	54	71	96		100		BWCM
July 20	10:47 a.m.	20	6,900	4,710	--	23	--	32	--	55	75	93		100		SPWCM
July 22	2:15 p.m.	203	77,300	8,910	--	36	--	54	--	81	94	99		100		SPWCM

e Estimated.
 a Mean daily discharge.

July 23, 1951	3:10 p. m.	115	34,200	14,200	--	32	--	49	--	80	94	99	100	SPWCM
July 30	1:05 p. m.	115	21,800	8,160	--	31	--	46	--	72	90	98	100	SPWCM
Aug. 6	1:05 p. m.	69	8,830	8,150	--	30	--	42	--	72	95	100	--	SPWCM
Aug. 9	1:10 p. m.	73	12,100	7,710	--	1	14	28	36	56	80	96	100	SPNM
Aug. 9	1:10 p. m.	73	12,100	3,920	18	24	27	33	40	59	82	96	100	SPWCM
Aug. 16	1:15 p. m.	47	7,640	6,160	--	21	--	30	--	57	83	97	100	SPWCM
Aug. 27	2:45 p. m.	36	5,280	3,720	--	27	--	38	--	68	87	98	100	SPWCM
Sept. 6	11:30 a. m.	35	4,070	3,830	--	20	--	27	--	47	77	96	100	SPWCM
Sept. 7	2:05 a. m.	274	64,200	8,070	--	31	--	45	--	75	91	99	100	SPWCM
Sept. 13	10:37 a. m.	48	7,790	7,400	--	26	--	36	--	61	86	98	100	SPWCM

YELLOWSTONE RIVER BASIN--Continued

DRY COTTONWOOD CREEK NEAR BONNEVILLE, WYO.

LOCATION --At gaging station, 3 miles upstream from mouth and 10 miles northwest of Bonneville, Fremont County. DRAINAGE AREA--200 square miles, approximately.

RECORDS AVAILABLE--Sediment records: March to September 1949, October 1950 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment discharge: Maximum daily, 33,000 tons Sept. 16; minimum daily, 0 ton on many days.

EXTREMES, 1949-50.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.

Sediment discharge: Maximum daily, 33,000 tons Sept. 16, 1951; minimum daily, 0 ton on many days each year.

REMARKS--Maximum observed sediment concentration during water year, 31,600 ppm Sept. 6. No flow October to March; record is deleted. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, July to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonylate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃	Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot				
July 17, 1951.....	3.7					36		126		58	4.0			222	0.30		46	333	8.1
Sept. 19.....	15					101		184		168	10			436	.59		65	679	8.3

YELLOWSTONE RIVER BASIN--Continued

DRY COTTONWOOD CREEK NEAR BONNEVILLE, WYO.--Continued

Suspended sediment, April to September 1951

Suspended sediment, April to September 1951									
Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				0	--	0	0.1	--	} (t)
2-----				0	--	0	.1	--	
3-----				0	--	0	.1	--	
4-----				0	--	0	.1	1,820	
5-----				0	--	0	0	--	
6-----				0	--	0	0	--	0
7-----				0	--	0	.1	--	} (t)
8-----				0	--	0	.1	--	
9-----				0	--	0	.1	--	
10-----				0	--	0	.1	--	
11-----				0	--	0	.1	--	
12-----				0	--	0	.1	686	
13-----				0	--	0	0	--	0
14-----				0	--	0	0	--	0
15-----				0	--	0	0	--	0
16-----				4.0	--	e 150	0	--	0
17-----				3.7	--	e 80	0	--	0
18-----				1.9	--	e 20	0	--	0
19-----				1.6	--	e 15	0	--	0
20-----				2.1	--	e 24	0	--	0
21-----				3.1	--	e 50	.1	--	(t)
22-----				3.1	6,000	50	4.2	7,200	82
23-----				3.1	2,700	23	7.5	6,200	a 130
24-----				3.5	3,200	30	5.3	5,100	a 73
25-----				2.2	1,200	7	4.4	4,700	56
26-----				0	--	0	4.0	4,100	44
27-----				0	--	0	3.9	3,600	38
28-----				.1			3.7	3,400	34
29-----				.1	} 1,500	(t)	3.7	3,200	32
30-----				.1			4.2	3,200	a 36
31-----				.1			--	--	--
Total--	0		0	28.7	--	451	42.0	--	528
</									

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.

LOCATION.--At Broadway Street Bridge at gaging station at Thermopolis, Hot Springs County, upstream from principal hot springs inflow and half a mile downstream from small tributary.

DRAINAGE AREA.--8,080 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1951.

Water temperatures: April 1947 to September 1951.

Sediment records: March 1946 to September 1951.

EXTREMES, 1950-51.--Dissolved solids (January to September): Maximum, 644 ppm Sept. 1-30; minimum, 192 ppm June 18-21.

Hardness (January to September): Maximum, 285 ppm Apr. 3; minimum, 104 ppm June 22-24.

Specific conductance (January to September): Maximum daily, 1,220 micromhos Sept. 8; minimum daily, 259 micromhos June 22.

Water temperatures: Maximum, 76° F July 16, 30; minimum, freezing point on several days during November to February.

Sediment concentrations: Maximum daily, 11,100 ppm Sept. 8; minimum daily, 30 ppm Jan. 15.

Sediment loads: Maximum daily, 172,000 tons July 22; minimum daily, 56 tons Jan. 15.

EXTREMES, 1947-49.--Dissolved solids (1947-49, January to September 1951): Maximum, 728 ppm Aug. 1-31, 1948; minimum, 176 ppm July 7-15, 1947.

Hardness (1947-49, January to September 1951): Maximum, 346 ppm Apr. 1-10, 11-20, 1947; minimum, 104 ppm June 22-24, 1951.

Specific conductance (1947-49, January to September 1951): Maximum daily, 1,270 micromhos Apr. 26, 1947; minimum daily, 245 micromhos June 10, 1948.

Water temperatures: Maximum, 76° F July 16, 30; minimum, freezing point on many days during winter months.

Sediment concentrations (1947-51): Maximum, 76° F July 16, 30; minimum daily, 30 ppm Jan. 15, 1951.

Sediment loads: Maximum daily, 350,000 tons Sept. 21, 1950; minimum daily, 6 tons Jan. 7, 1950.

REMARKS.--Daily samples for chemical analysis composites by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Neb. Flow affected by ice Dec. 5-7, Jan. 31 to Feb. 4. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Bo-tons per acre-foot	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per cent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Calcium, mg./l.	Non-carbonate, mg./l.				
Oct. 4, 1950 a...	2,000	--	--	71	14	67	--	172	208	12	--	2.6	0.20	494	0.67	234	234	93	39	646	--
Oct. 9 a...	1,810	13	0.02	56	20	58	--	162	187	14	0.2	1.7	--	458	.62	2,240	222	89	36	668	7.7
Nov. 2 a...	1,370	10	.02	61	22	61	--	176	202	12	.4	1.2	--	478	.65	1,770	241	97	35	697	7.9
Dec. 13 a...	1,070	12	.04	68	22	75	--	184	241	14	.4	2.3	--	534	.73	1,540	282	111	38	806	7.7
Jan. 1-27, 1951 ..	788	--	--	76	25	79	--	210	251	16	--	2.0	.06	638	.86	1,350	294	122	37	904	--
Jan. 8 a...	766	13	.04	75	24	81	--	197	263	15	.4	2.2	--	584	.79	1,210	264	122	38	870	7.7
Jan. 28 a...	722	--	--	71	21	65	--	210	263	15	--	2.8	.53	554	.75	1,080	264	92	33	786	8.0
Jan. 29-Feb. 28...	913	--	--	71	20	65	--	190	211	14	--	2.4	.03	550	.75	1,360	262	106	35	733	--
Feb. 6 a...	1,270	12	.04	64	20	67	--	182	208	13	.4	2.1	--	488	.66	1,670	241	92	36	731	7.8
Mar. 1-31 ..	1,017	--	--	69	23	71	--	180	250	14	--	3.0	.08	555	.75	1,320	266	113	36	804	8.0
Mar. 8 a...	932	11	.06	71	20	71	--	187	230	14	.4	2.7	--	528	.72	1,330	260	107	37	784	7.4
Apr. 1-30 ..	1,666	--	--	66	23	70	--	182	241	12	--	2.6	.10	528	.71	1,710	260	111	36	788	7.8
Apr. 8 a...	2,047	10	.01	58	21	79	--	180	197	16	.4	2.8	--	631	.84	1,680	295	133	37	800	7.6
May-19 ..	2,047	--	--	57	18	57	--	160	197	10	--	2.9	.12	455	.62	2,520	216	85	35	664	7.2
May 7 a...	2,220	11	.02	70	22	69	--	176	239	12	.3	2.6	--	528	.72	3,170	263	119	36	787	7.6

a Not included in weighted average.

b For period of daily sampling only. Represents 86 percent of runoff for water year October 1950 to September 1951.

May 20-24, 1951..	4,742	--	--	46	13	39	--	131	134	5.5	--	4.0	0.06	342	0.47	4,880	187	60	33	502	7.3	--
May 25-29 ..	7,580	--	--	31	7.9	17	--	103	56	3.0	--	1.9	.18	201	.27	4,960	110	26	25	300	7.3	--
May 30	10,100	--	--	42	7.5	17	--	144	48	4.0	--	2.1	.02	222	.30	6,050	136	18	21	332	7.6	--
May 31	10,900	--	--	38	8.0	19	--	134	53	4.0	--	1.9	.08	222	.30	6,530	128	18	24	331	7.9	--
June 1-2	9,645	--	--	31	6.7	18	--	106	54	3.0	--	1.9	.15	206	.28	5,370	105	18	26	286	7.6	--
June 3-17	5,470	--	--	38	8.8	25	--	122	63	4.5	--	2.2	.07	252	.34	3,720	131	31	28	374	8.1	--
June 7 a	4,780	13	--	42	10	33	--	122	68	5.0	0.2	1.9	.07	252	.37	3,120	127	39	33	416	7.8	0.000
June 18-31	10,360	--	--	32	8.3	15	--	111	48	2.5	--	1.9	.07	192	.26	5,370	106	15	22	292	8.0	--
June 22-24	7,083	--	--	32	8.8	19	--	102	58	3.0	--	1.8	.09	203	.27	5,440	104	20	28	293	7.9	--
June 25-July 21	4,905	--	--	33	8.1	27	--	97	90	4.5	--	1.5	.06	242	.33	3,210	116	36	32	358	7.7	--
July 10 a	5,100	11	--	39	7.2	28	--	116	81	4.7	.4	1.0	--	229	.31	3,150	127	32	32	359	7.7	.000
July 22-23	6,635	--	--	41	8.6	36	--	117	114	5.0	--	2.5	.06	296	.40	5,800	138	42	35	438	7.9	--
July 24-31	4,266	--	--	40	8.2	34	--	106	117	5.5	--	2.0	.09	287	.39	3,310	138	51	34	433	7.8	--
July 30 a	4,170	12	--	50	10	--	--	132	128	7.0	.6	1.6	--	329	.45	3,700	168	60	34	488	7.6	.000
Aug. 1-14	3,439	--	--	44	10	41	--	120	135	7.5	--	1.6	.05	328	.44	3,030	153	55	37	492	7.5	--
Aug. 15-31	1,384	--	--	62	18	81	--	158	247	14	--	2.1	.11	544	.74	2,030	239	99	43	791	8.0	--
Sept. 1-30	1,230	--	--	74	22	90	--	180	296	15	--	2.2	.08	644	.88	2,140	274	126	42	918	7.8	--
Sept. 4 a	1,470	11	--	68	19	--	--	172	264	14	.4	2.2	--	570	.78	2,260	248	107	43	828	7.4	.000
Weighted average	2,530	--	--	48	12	41	--	132	136	7.3	--	2.1	0.08	346	0.47	2,360	165	57	34	506	--	--

a Not included in weighted average.

b For period of daily sampling only. Represents 86 percent of runoff for water year October 1950 to September 1951.

YELLOWSTONE RIVER BASIN--Continued
 BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Twice-daily temperature measurements at 7 a. m. or 8 a. m. and 4 p. m. or 5 p. m./

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm
1	47	46	44	41	38	38	33	36	32	33	36	40	44	48	49	51	58	46	58	59	71	74	60	65
2	42	48	45	41	35	39	34	38	33	33	35	--	--	40	48	50	45	40	60	59	70	74	58	66
3	46	48	40	44	32	36	33	37	33	34	35	41	48	50	49	58	45	50	80	68	70	71	60	65
4	45	51	44	41	36	36	34	37	33	34	34	41	45	55	52	62	48	53	85	71	69	71	58	64
5	49	53	41	41	33	32	33	36	33	34	36	44	46	51	57	63	53	59	63	72	68	69	58	65
6	50	51	42	41	35	36	33	38	33	33	35	40	49	52	58	59	53	58	64	71	68	73	60	63
7	46	52	--	--	37	37	33	37	32	33	32	49	54	51	56	55	55	60	65	69	66	71	58	66
8	47	52	--	--	36	37	33	37	33	41	34	38	50	54	53	56	55	58	63	69	64	67	81	65
9	52	52	35	35	36	37	33	38	35	41	34	41	51	48	52	57	54	60	62	66	63	68	57	63
10	49	56	--	--	36	36	33	37	39	44	38	41	41	40	54	61	56	63	81	58	64	67	56	64
11	52	58	34	35	36	39	33	36	39	38	37	41	40	43	52	83	58	62	54	55	64	71	60	56
12	53	59	36	38	38	39	33	37	36	34	36	41	45	49	59	60	58	63	54	62	66	73	51	58
13	56	60	35	36	36	38	33	37	35	37	40	43	47	54	55	59	60	62	59	68	65	71	53	60
14	54	59	34	38	37	36	33	37	34	38	40	42	51	41	52	60	60	66	63	69	68	67	53	60
15	54	56	38	38	38	38	33	38	36	40	38	42	42	42	60	56	61	66	67	69	61	69	55	62
16	58	58	36	38	37	38	34	37	37	41	37	41	41	51	55	57	63	62	70	76	64	71	53	64
17	55	57	41	41	38	40	34	39	36	39	36	39	48	56	52	61	62	62	69	69	66	72	55	64
18	53	52	40	40	37	36	34	38	36	41	36	43	49	53	52	61	62	64	67	75	66	74	58	62
19	51	56	37	37	36	37	34	37	35	39	40	38	48	48	59	62	61	60	69	75	68	69	55	62
20	53	55	36	40	35	39	34	36	36	41	40	41	46	44	59	61	61	62	71	72	64	62	57	53
21	48	56	36	40	37	40	33	36	37	39	39	44	43	43	56	58	58	59	69	69	63	72	49	54
22	49	53	36	38	35	38	35	39	38	40	40	41	48	56	61	56	59	65	68	66	72	51	57	57
23	50	52	35	36	40	40	33	36	38	43	37	43	46	50	56	64	67	62	65	72	65	70	54	57
24	48	52	35	39	38	38	33	38	40	41	37	43	47	47	60	64	60	64	66	74	63	69	50	58
25	50	52	38	41	38	38	34	39	38	41	39	43	45	53	57	60	60	64	68	75	61	68	54	51
26	50	52	38	41	38	38	35	39	37	40	40	43	50	53	56	59	59	63	69	72	61	68	53	56
27	48	48	38	39	34	38	32	32	38	38	40	37	51	56	58	60	60	62	66	71	62	68	50	54
28	47	49	36	39	36	36	32	32	37	41	34	41	53	58	58	62	56	63	67	73	62	68	56	56
29	49	51	36	39	34	38	32	32	--	--	40	46	54	54	56	54	56	61	69	72	62	68	51	56
30	49	52	36	40	35	38	32	32	--	--	43	42	51	50	58	54	59	64	71	68	67	54	59	--
31	48	47	--	--	38	36	32	33	--	--	46	--	--	--	54	55	--	--	70	71	62	61	--	--
Average	50	53	38	39	36	37	33	36	36	38	38	41	47	50	55	59	57	60	65	69	65	70	55	60

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,030	2,850	15,600	1,340	872	3,180	1,160	530	1,680
2-----	2,410	3,910	25,400	1,370	881	3,260	1,150	643	2,000
3-----	2,170	3,330	19,500	1,310	787	2,720	1,020	422	1,180
4-----	2,000	2,600	14,000	1,310	707	2,500	870	357	839
5-----	1,940	2,270	11,900	1,240	550	1,840	700	347	656
6-----	1,970	2,570	13,700	1,320	690	2,460	650	142	249
7-----	1,980	2,320	12,400	1,280	680	2,280	600	295	478
8-----	1,950	2,030	10,700	1,300	650	2,280	739	224	447
9-----	1,810	1,790	8,750	1,320	740	2,640	931	381	908
10-----	1,840	1,640	8,150	1,150	590	1,830	1,090	546	1,610
11-----	1,900	1,610	8,260	505	130	177	1,080	525	1,530
12-----	1,820	1,350	6,640	650	180	316	1,090	590	1,740
13-----	1,860	1,470	7,390	1,010	490	1,330	1,070	552	1,600
14-----	1,890	1,500	7,650	1,230	610	2,030	1,070	445	1,280
15-----	1,900	1,350	6,920	1,180	450	1,410	964	274	714
16-----	1,780	1,480	7,120	1,250	530	1,790	793	133	285
17-----	1,750	1,260	5,950	1,150	400	1,240	811	194	425
18-----	1,680	1,220	5,540	1,240	500	1,670	975	284	747
19-----	1,620	1,040	4,550	1,320	600	2,140	850	184	422
20-----	1,590	1,010	4,340	1,400	590	2,230	748	110	222
21-----	1,540	1,000	4,160	1,380	690	2,570	730	100	197
22-----	1,520	1,000	4,100	1,340	790	2,880	730	100	197
23-----	1,480	1,000	4,000	1,360	670	2,480	690	100	186
24-----	1,440	797	3,100	1,330	490	1,760	748	160	323
25-----	1,380	846	3,150	1,200	600	1,940	811	190	416
26-----	1,360	745	2,740	1,270	690	2,360	860	200	464
27-----	1,370	954	3,530	1,280	750	2,590	880	280	618
28-----	1,360	856	3,140	1,270	700	2,400	714	110	212
29-----	1,320	795	2,830	1,220	610	2,010	666	60	108
30-----	1,280	778	2,680	1,220	550	1,810	690	50	93
31-----	1,360	872	3,200	--	--	--	690	90	168
Total-	53,300	--	241,090	36,725	--	62,063	26,570	--	21,954
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	730	110	217	450	310	377	932	442	1,110
2-----	714	100	193	500	220	297	900	464	1,130
3-----	682	90	166	600	--	e 550	900	334	812
4-----	598	40	64	750	--	e 950	944	323	823
5-----	682	50	92	956	--	e 1,300	870	460	1,080
6-----	730	100	197	1,270	500	1,710	860	374	888
7-----	786	90	186	1,140	460	1,420	880	403	958
8-----	786	90	186	1,030	590	1,640	968	416	1,090
9-----	722	80	156	1,030	460	1,280	968	544	1,420
10-----	748	60	121	1,070	450	1,300	958	664	1,710
11-----	766	80	166	1,330	620	2,230	992	730	1,960
12-----	766	90	186	1,360	608	2,230	1,020	623	1,720
13-----	748	40	81	1,290	555	1,930	920	614	1,520
14-----	706	40	76	1,040	324	910	932	764	1,920
15-----	698	30	56	850	282	647	980	969	2,560
16-----	698	80	151	757	290	593	992	1,020	2,730
17-----	722	80	156	850	317	728	1,030	929	2,580
18-----	811	90	197	992	381	967	1,030	635	1,770
19-----	757	180	368	1,040	440	1,240	900	607	1,460
20-----	811	152	333	1,030	590	1,640	920	730	1,810
21-----	890	90	216	880	602	1,430	980	972	2,580
22-----	860	68	156	880	629	1,490	1,150	1,690	5,250
23-----	850	40	92	944	664	1,690	1,100	1,630	4,840
24-----	920	85	211	932	713	1,800	1,200	1,480	4,800
25-----	1,040	188	472	968	640	1,670	1,200	1,430	4,630
26-----	1,140	218	671	980	608	1,610	1,330	1,870	6,710
27-----	944	284	724	944	546	1,390	1,380	2,020	7,530
28-----	722	510	994	932	547	1,380	1,220	1,680	5,530
29-----	568	520	797	--	--	--	1,060	1,430	4,090
30-----	495	170	227	--	--	--	1,020	1,340	3,700
31-----	450	110	134	--	--	--	980	1,560	4,130
Total-	23,500	--	8,044	26,795	--	36,399	31,514	--	84,841

e Estimated.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,040	1,940	5,480	2,020	4,680	25,600	10,100	1,790	48,800
2-----	1,080	1,480	4,240	1,740	4,350	20,400	9,190	1,880	46,200
3-----	980	1,250	3,310	1,250	2,550	8,620	8,020	2,100	45,500
4-----	968	1,300	3,400	1,020	1,730	4,760	6,620	2,620	46,800
5-----	1,090	1,500	4,410	980	1,500	3,970	5,700	3,040	46,800
6-----	1,140	1,450	4,460	1,180	3,490	11,100	5,130	3,120	43,200
7-----	1,180	1,630	5,200	2,220	7,970	47,800	4,790	2,370	30,700
8-----	1,100	1,280	3,740	2,220	6,480	38,800	4,500	1,780	21,400
9-----	1,170	1,200	3,790	1,820	4,180	20,800	4,170	1,860	18,700
10-----	1,270	1,380	4,730	1,800	3,730	18,100	3,820	1,430	14,800
11-----	1,290	1,350	4,700	1,860	3,640	18,300	3,780	1,590	16,200
12-----	1,170	1,140	3,600	2,000	3,570	19,300	4,080	1,720	18,900
13-----	1,040	1,120	3,140	2,590	5,820	40,600	4,400	2,000	23,700
14-----	980	1,200	3,180	2,870	6,400	49,600	4,930	2,270	30,200
15-----	1,060	1,240	3,550	2,550	3,750	25,800	6,230	3,520	59,200
16-----	1,270	1,490	5,110	2,220	3,250	19,500	7,350	2,570	51,000
17-----	1,070	1,290	3,730	2,640	4,960	35,400	8,530	2,060	47,500
18-----	1,040	1,130	3,170	2,700	5,080	37,000	10,100	1,850	45,000
19-----	1,120	1,070	3,240	3,210	5,850	50,800	11,500	1,290	40,100
20-----	1,420	1,800	6,900	3,950	5,780	61,600	10,900	1,040	30,600
21-----	1,530	2,240	9,250	4,110	4,960	55,000	8,940	970	23,400
22-----	1,650	3,280	14,600	5,160	6,390	89,000	7,960	1,120	24,100
23-----	1,090	2,030	5,970	5,110	6,140	84,700	7,110	1,210	23,200
24-----	1,120	1,780	5,320	5,380	5,360	77,900	6,180	1,560	26,000
25-----	1,220	1,980	6,530	6,700	5,760	104,000	5,380	1,800	26,200
26-----	1,170	1,550	4,900	7,180	4,230	82,000	5,180	1,930	27,000
27-----	1,080	1,200	3,440	7,200	3,280	63,800	5,130	1,770	24,500
28-----	1,120	1,360	4,110	7,740	2,950	61,600	4,860	1,770	23,200
29-----	1,140	1,410	4,340	8,830	2,860	68,200	4,640	1,790	22,400
30-----	1,510	2,920	11,900	10,100	2,900	79,100	4,840	2,020	26,400
31-----	--	--	--	10,900	1,790	52,700	--	--	--
Total--	35,068	--	153,440	121,250	--	1,375,450	194,060	--	971,700
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4,670	1,800	22,600	4,330	2,750	32,200	1,380	1,390	5,100
2-----	4,190	1,700	19,200	3,960	2,560	27,400	1,450	1,820	7,120
3-----	4,140	1,800	20,100	3,820	2,500	25,800	1,480	1,830	7,320
4-----	4,520	2,250	27,400	3,850	2,270	23,600	1,470	1,810	7,160
5-----	5,060	2,340	32,000	4,210	2,790	31,700	1,450	1,850	7,240
6-----	5,580	2,310	34,800	4,670	2,920	36,800	1,400	1,780	6,730
7-----	5,460	1,880	27,700	4,550	2,320	28,500	1,560	4,800	20,200
8-----	5,280	1,850	26,400	3,780	2,190	22,400	1,490	11,100	44,700
9-----	5,680	1,800	27,600	3,350	2,010	18,200	1,410	2,420	9,210
10-----	5,100	1,940	26,700	3,140	1,970	16,700	1,320	2,000	7,120
11-----	5,200	2,080	28,900	2,540	1,940	13,300	1,280	1,890	6,540
12-----	5,280	2,110	30,100	2,310	1,980	12,200	1,180	1,850	5,900
13-----	5,000	2,410	32,500	1,920	1,770	9,180	1,190	1,900	6,100
14-----	4,400	2,370	28,200	1,720	1,950	9,060	1,270	2,020	6,920
15-----	4,210	2,170	24,700	1,450	1,660	8,500	1,230	1,880	6,240
16-----	4,380	2,080	24,600	1,450	1,680	8,580	1,160	1,800	5,010
17-----	4,600	1,940	24,100	1,410	1,650	8,280	1,100	1,500	4,450
18-----	4,810	2,150	28,000	1,370	1,470	5,440	1,100	1,350	4,010
19-----	4,690	2,320	29,400	1,370	1,530	5,660	1,360	4,850	17,800
20-----	4,930	1,960	26,400	1,360	1,660	6,260	1,030	2,090	5,810
21-----	5,230	2,290	32,400	1,380	1,660	6,190	1,070	1,450	4,190
22-----	7,090	9,000	172,000	1,360	1,580	5,800	1,130	1,000	3,050
23-----	6,180	4,890	81,800	1,340	1,580	5,650	1,150	960	2,980
24-----	5,300	2,960	42,400	1,340	1,440	5,210	1,270	1,340	4,590
25-----	4,600	2,880	35,600	1,380	1,500	5,590	1,090	800	2,360
26-----	4,100	2,630	29,100	1,480	1,490	5,950	1,040	670	1,880
27-----	3,760	2,760	28,000	1,550	1,680	8,950	986	770	2,050
28-----	3,760	2,640	26,800	1,420	1,550	5,940	942	700	1,780
29-----	3,920	2,890	30,600	1,310	1,350	4,770	864	610	1,590
30-----	4,170	3,050	34,300	1,250	1,270	3,950	953	590	1,520
31-----	4,520	3,000	36,600	1,290	1,150	4,360	--	--	--
Total--	149,810	--	1,091,000	71,680	--	404,120	36,885	--	216,690

Total discharge for year (cfs-days) 807,157
 Total load for year (tons) 4,666,791

YELLOWSTONE RIVER BASIN--Continued
BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment													Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
Oct. 4, 1950	2:45 p. m.	2,000	49	2,380	2,770	--	19	--	25	--	51	78	99	--	100	--	SPWCM
Oct. 13	10:35 a. m.	1,860	56	1,700	2,490	--	14	--	19	--	46	81	99	--	100	--	SPWCM
Oct. 20	10:35 a. m.	1,590	51	1,130	1,900	--	15	--	19	--	44	78	99	--	100	--	SPWCM
Mar. 13, 1951	9:50 a. m.	920	34	532	1,964	--	45	--	50	--	61	--	--	--	--	--	SPWCM
Mar. 20	2:25 p. m.	900	40	605	1,530	--	50	--	60	--	68	--	--	--	--	--	SPWCM
Apr. 3	12:00 m.	956	48	1,200	2,610	--	41	--	58	--	76	90	100	--	--	--	SPWCM
Apr. 12	12:25 p. m.	1,120	--	1,130	2,240	--	32	--	45	--	69	88	99	--	100	--	SPWCM
Apr. 13	2:25 p. m.	1,000	54	1,030	2,470	--	33	--	49	--	70	89	100	--	--	--	SPWCM
Apr. 19	10:30 a. m.	1,140	47	1,130	2,020	--	29	--	38	--	70	92	100	--	--	--	SPWCM
Apr. 27	12:45 p. m.	1,070	--	1,070	2,110	--	31	--	41	--	64	86	99	--	100	--	SPWCM
May 3	11:00 a. m.	1,220	52	2,320	5,230	--	42	--	57	--	84	94	100	--	--	--	SPWCM
May 10	2:35 p. m.	1,720	39	3,030	4,270	3	4	35	46	54	68	91	100	--	--	--	SPNM
May 10	2:35 p. m.	1,720	39	3,030	2,000	30	35	38	48	55	69	91	100	--	--	--	SPWCM
May 18	3:30 p. m.	2,640	--	4,100	9,000	--	38	--	50	--	68	87	99	--	100	--	SPWCM
May 28	10:30 a. m.	7,790	59	2,900	1,860	10	10	15	21	29	56	70	91	--	100	--	SPNM
May 28	10:30 a. m.	7,790	59	2,900	1,300	14	14	17	26	32	47	64	89	--	100	--	SPWCM
May 31	11:45 a. m.	11,100	--	1,890	2,280	--	14	--	23	--	38	51	78	--	99	--	SPWCM
June 7	11:45 a. m.	4,810	--	2,590	1,690	12	15	25	28	36	58	84	93	--	100	--	SPNM
June 13	2:15 p. m.	4,810	64	2,590	2,700	18	21	25	31	38	58	84	94	--	100	--	SPWCM
June 13	2:15 p. m.	4,500	--	2,160	2,800	--	14	--	23	--	53	86	96	--	100	--	SPWCM
June 18	10:55 a. m.	10,100	64	1,560	2,170	--	20	--	34	--	54	76	94	--	100	--	SPWCM
June 19	2:20 p. m.	11,600	65	1,160	2,100	--	23	--	36	--	54	71	88	--	99	--	SPWCM
June 27	11:05 a. m.	5,280	59	2,070	4,470	--	28	--	44	--	72	93	99	--	100	--	SPWCM
July 3	3:55 p. m.	4,360	66	2,090	2,050	19	25	29	37	44	65	93	99	--	100	--	SPWCM
July 12	2:40 p. m.	5,480	56	2,110	1,790	19	23	27	34	42	62	--	--	--	--	--	SPWCM
July 22	3:30 p. m.	7,770	--	10,200	6,300	--	47	--	66	--	81	--	--	--	--	--	SPWCM
July 25	10:05 a. m.	4,760	--	3,170	6,640	--	32	--	48	--	74	90	99	--	100	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued
 BIG HORN RIVER AT THERMOPOLIS, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
July 30, 1951	10:45 a. m.	4,140	76	3,080	7,130	--	36	--	52	--	77	93	100	--	SPWCM
July 31	4:55 p. m.	4,480	74	2,830	4,910	--	31	--	45	--	70	88	99	100	SPWCM
Aug. 7	2:50 p. m.	4,500	74	2,330	4,340	--	4	--	38	--	63	86	99	100	SPWCM
Aug. 13	12:25 p. m.	1,900	72	1,700	4,310	--	49	--	69	--	88	--	--	--	SPWCM
Aug. 23	2:30 p. m.	1,340	68	1,600	3,980	--	51	--	77	--	92	--	--	--	SPWCM
Aug. 30	2:05 p. m.	1,200	68	1,130	2,980	--	52	--	75	--	91	--	--	--	SPWCM
Aug. 30	6:00 p. m.	1,220	--	1,080	2,800	--	70	--	74	--	91	--	--	--	SPWCM
Aug. 31	10:10 a. m.	1,220	--	1,240	3,710	--	49	--	72	--	91	--	--	--	SPWCM
Sept. 4	12:35 p. m.	1,490	62	1,820	4,480	--	47	--	68	--	86	--	--	--	SPWCM
Sept. 8	1:45 p. m.	1,450	67	5,660	8,560	43	58	72	83	91	96	--	--	--	SPWCM
Sept. 13	2:45 p. m.	1,220	60	1,930	4,880	--	56	--	81	--	95	--	--	--	SPWCM
Sept. 26	11:25 a. m.	1,040	--	590	1,620	42	54	65	75	82	88	93	98	100	BWCM

YELLOWSTONE RIVER BASIN--Continued
GOOSEBERRY CREEK AT PULLIAM, WYO.

LOCATION.--At gaging station, a quarter of a mile north of Pulliam, Washakie County, and three-quarters of a mile upstream from mouth.
DRAINAGE AREA.--371 square miles.
RECORDS AVAILABLE.--Water temperatures: March to September 1951.
Sediment records: March to September 1951.
EXTREMES, March to September 1951.--Sediment concentrations: Maximum daily, 17,700 ppm Mar. 28; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 315 tons Mar. 28; minimum daily, 0 ton on many days.
REMARKS.--Flow affected by ice Mar. 19-26. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, February to June 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million		Tons per acre-foot	Calcium magnesium	Non-carbonate			
															Residue at 180° C	Sum						
Feb. 27, 1951.....	a1.0	7.2	0.10	209	168	994		542		2,730	58	1.0	2.9	0.37	4,700	4,440	6.39	1,210	766	64	5,480	8.1
Mar. 30.....	.7	10	.08	158	213	1,100		474		3,050	66	1.1	3.6	.24	4,980	4,830	6.79	1,270	881	65	5,700	7.9
May 10.....	.2	6.6	.04	322	575	3,660		480		10,000	227	2.2	1.9	.61	15,100	15,000	20.5	3,170	2,780	72	15,300	8.1
June 7.....	1.3	14	.02	203	283	1,730		457		4,760	109	1.4	1.8	.30	7,680	7,330	10.4	1,710	1,340	69	8,390	7.6

a Mean daily discharge.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued

Temperature (°F) of water, period March to July 1951

/Once-daily temperature measurement between 4 p.m. and 8 p.m. Many days of no flow/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	45	47	--			
2						--	50	55	46			
3						--	50	56	49			
4						--	58	59	--			
5						--	50	56	50			
6						--	46	44	--			
7						--	54	57	48			
8						--	52	52	--			
9						--	37	56	63			
10						--	37	--	--			
11						--	44	56	62	59		
12						--	55	55	--			
13						--	49	50	63			
14						--	41	59	--			
15						--	43	58	63			
16						--	53	56	--			
17						--	53	57	--			
18						--	52	56	--			
19						34	35	55	--			
20						31	37	--	--			
21						32	37	--	--			
22						32	52	--	--			
23						32	42	59	--			
24						33	43	--	--			
25						33	52	57	--			
26						34	55	--	--			
27						34	52	60	--			
28						35	55	--	--			
29						36	51	60	--			
30						39	48	--	--			
31						38	--	44	--			
Average						--	48	--	--			

YELLOWSTONE RIVER BASIN--Continued
GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued
Suspended sediment, March to September 1951

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----							--	--	--
2-----							--	--	--
3-----							--	--	--
4-----							--	--	--
5-----							--	--	--
6-----							--	--	--
7-----							--	--	--
8-----							--	--	--
9-----							--	--	--
10-----							--	--	--
11-----							--	--	--
12-----							--	--	--
13-----							--	--	--
14-----							--	--	--
15-----							--	--	--
16-----							--	--	--
17-----							--	--	--
18-----							--	--	--
19-----							2.0	1,220	7
20-----							2.0	5,080	28
21-----							2.0	6,240	34
22-----							3.0	5,190	42
23-----							2.5	7,220	49
24-----							2.0	4,150	22
25-----							2.5	16,200	109
26-----							4.0	16,000	173
27-----							6.1	9,590	158
28-----							6.6	17,700	315
29-----							2.0	15,400	83
30-----							3.4	8,500	78
31-----							2.5	4,150	28
Total-							40.6	--	1,126
	April			May			June		
1-----	2.5	4,820	31	1.6	305	1	9.4	6,050	154
2-----	2.5	5,300	36	1.0	84	(t)	8.5	2,200	50
3-----	2.2	2,370	14	.5	86	(t)	3.4	750	7
4-----	1.5	690	3	.4	58	(t)	1.8	310	a
5-----	1.5	388	2	.2			2.0	167	1
6-----	1.5	407	2	.3			2.0	130	a1
7-----	1.0	326	1	.4			1.0	90	(t)
8-----	.7	292	1	.4			1.5	60	(t)
9-----	1.3	428	2	.3			2.5	45	(t)
10-----	1.1	432	1	.2			.7	10	(t)
11-----	1.1	429	1	.2			.5	16	(t)
12-----	1.1	395	1	.1	22	(t)	.7	40	(t)
13-----	.6	185	(t)	.1			1.5	74	(t)
14-----	.2	144	(t)	.1			1.0	40	(t)
15-----	.2	157	(t)	.1			.5	7	(t)
16-----	.5	228	(t)	.3			.3		
17-----	1.0	257	1	.2			.1		
18-----	.6	160	(t)	.1			.1		
19-----	.4	108	(t)	.1			.1		
20-----	.5	156	(t)	.1			.1		
21-----	.6	183	(t)	.2			.1		
22-----	.6	171	(t)	.1			.1		
23-----	.5	132	(t)	.1			.1		
24-----	1.5	410	b 2	.1			.1		
25-----	1.1	287	1	.1			.1		
26-----	.5	184	(t)	.1	--	(t)	0	--	0
27-----	.5	131	(t)	.1			0	--	0
28-----	.3	18	(t)	.4			0	--	0
29-----	.7	140	(t)	.2			0	--	0
30-----	2.0	410	b 2	.5			0	--	0
31-----	--	--	--	1.5	225	1	--	--	--
Total-	30.3	--	104	10.1	--	3	36.2	--	216

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued

Suspended sediment, March to September 1951--Continued

Day	July			August			September		
	Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment	
		Mean con- centration (ppm)	Tons per day		Mean con- centration (ppm)	Tons per day		Mean con- centration (ppm)	Tons per day
1-----	0	--	0	0		0	0		0
2-----	0	--	0	0		0	0		0
3-----	0	--	0	0		0	0		0
4-----	0	--	0	0		0	0		0
5-----	0	--	0	0		0	0		0
6-----	0	--	0	3.0		e 80	0		0
7-----	0	--	0	.5		e 10	0		0
8-----	0	--	0	.1		(t)	0		0
9-----	0	--	0	0		0	0		0
10-----	.2	2,000	sa 3	0		0	0		0
11-----	1.6	3,500	15	0		0	0		0
12-----	.2	300	(t)	0		0	0		0
13-----	0	--	0	0		0	0		0
14-----	0	--	0	0		0	0		0
15-----	0	--	0	0		0	0		0
16-----	0	--	0	0		0	0		0
17-----	0	--	0	0		0	0		0
18-----	0	--	0	0		0	0		0
19-----	0	--	0	0		0	0		0
20-----	0	--	0	0		0	.2	(t)	0
21-----	0	--	0	0		0	0		0
22-----	0	--	0	0		0	0		0
23-----	0	--	0	0		0	0		0
24-----	0	--	0	0		0	0		0
25-----	0	--	0	0		0	0		0
26-----	0	--	0	0		0	0		0
27-----	0	--	0	0		0	0		0
28-----	0	--	0	0		0	0		0
29-----	0	--	0	0		0	0		0
30-----	0	--	0	.1		(t)	0		0
31-----	0	--	0	1.9	2,920	sa 80	--		--
Total-	2.0	--	18	5.6		150	0.2	(t)	--

Total discharge for period Mar. 19 to Sept. 30, 1951 (cfs-days) 127.0

Total load for period Mar. 19 to Sept. 30, 1951 (tons) 1,617

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued

Particle-size analyses of suspended sediment, March to July 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350		0.500	1.000
Mar. 30, 1951 . . .	3:09 p. m.	14	41	11,500	7,930	1	2	6	29	42	68	86	98		100	SPNM
Mar. 30.....	3:09 p. m.	14	41	4,530	19	20	26	34	46	69	86	88	98		100	SPWCM
July 11.....	10:51 a. m.	2.5	--	3,670	5,640	--	38	--	53	--	72	88	98		100	SPWCM

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.

LOCATION.--At gaging station, 1½ miles upstream from mouth and 2½ miles west of Worland, Washakie County.

DRAINAGE AREA.--500 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: March to September 1951.

EXTREMES, March to September 1951.--Sediment concentrations: Maximum daily, 100,000 ppm July 22; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 109,000 tons July 11; minimum daily, 0 ton on many days.

REMARKS.--No flow during March; record is deleted. Records of discharge for period March to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	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	133	56,700	s 22,500
2-----				0	--	0	225	63,800	40,200
3-----				0	--	0	138	67,000	s 28,400
4-----				0	--	0	26	41,300	3,010
5-----				0	--	0	8.0	37,900	849
6-----				0	--	0	14	34,000	1,330
7-----				0	--	0	2.5	30,600	206
8-----				0	--	0	.5	--	e 30
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	0	--	0
17-----				0	--	0	0	--	0
18-----				0	--	0	0	--	0
19-----				0	--	0	0	--	0
20-----				0	--	0	0	--	0
21-----				0	--	0	0	--	0
22-----				2.0	14,000	sa 390	0	--	0
23-----				3.2	30,000	sa 300	0	--	0
24-----				.1	3,500	sa 4	0	--	0
25-----				0	--	0	0	--	0
26-----				0	--	0	0	--	0
27-----				0	--	0	0	--	0
28-----				0	--	0	0	--	0
29-----				6.0	42,600	s 1,050	0	--	0
30-----				1.0	17,100	s 56	0	--	0
31-----				26	45,200	s 3,760	--	--	--
Total-	0		0	38.3	--	5,550	547.0	--	96,525

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.--Continued

Suspended sediment, April to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	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	29	40,800	s 6,590
2-----	0	--	0	0	--	0	8.5	55,200	s 1,550
3-----	0	--	0	0	--	0	.8	26,800	s 69
4-----	0	--	0	0	--	0	0	--	0
5-----	0	--	0	263	63,000	sa 64,000	0	--	0
6-----	0	--	0	34	31,000	a 2,800	0	--	0
7-----	0	--	0	320	76,500	s 97,500	0	--	0
8-----	0	--	0	16	58,700	s 3,030	0	--	0
9-----	0	--	0	2.2	34,000	s 209	0	--	0
10-----	.2	1,500	sa 7	.6	--	e 20	0	--	0
11-----	483	75,200	s 109,000	.3	--	e 7	0	--	0
12-----	153	74,600	s 35,800	0	--	0	8.3	18,000	sa 1,600
13-----	12	54,000	1,610	0	--	0	10	53,000	sa 1,800
14-----	3.2	46,100	431	0	--	0	1.9	41,900	223
15-----	0	--	0	0	--	0	.6	36,000	a 60
16-----	0	--	0	0	--	0	.1	30,000	a 8
17-----	0	--	0	0	--	0	0	--	0
18-----	0	--	0	0	--	0	0	--	0
19-----	0	--	0	0	--	0	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	20	54,200	s 8,940	0	--	0	35	57,900	s 7,090
22-----	8.0	100,000	s 2,740	0	--	0	10	47,800	s 1,430
23-----	2.2	74,500	459	18	39,000	s 4,180	1.7	35,400	s 204
24-----	.6	27,000	sa 60	3.6	59,500	s 702	.6	23,400	38
25-----	.2	11,000	a 6	.2	6,200	s 7	.4	11,000	12
26-----	5.7	31,000	sa 900	0	--	0	.1	--	e 1
27-----	1.9	22,000	sa 130	0	--	0	0	--	0
28-----	.4	12,000	a 15	0	--	0	0	--	0
29-----	.1	9,500	a 3	0	--	0	0	--	0
30-----	0	--	0	0	--	0	0	--	0
31-----	0	--	0	0	--	0	--	--	--
Total-	690.5	--	160,301	657.9	--	172,455	107.0	--	20,675

Total discharge for period Mar. 1 to Sept. 30 (cfs-days) 2,040.7

Total load for period Mar. 1 to Sept. 30 (tons) 455,506

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.--Continued

Particle-size analyses of suspended sediment, May to September 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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	0.350		0.500	1.000
May 29, 1951	5:05 p. m.	1.2	--	29,100	32,600	--	100	--	--	--	--	--	--	--	--	--	PNM
May 29	5:05 p. m.	1.2	--	29,100	8,000	90	99	99	100	--	--	--	--	--	--	--	PWCM
May 31	9:45 a. m.	18	--	41,500	5,780	--	84	--	98	--	100	--	--	--	--	--	SPWCM
May 31	4:10 p. m.	7.0	--	38,400	4,200	--	13	--	99	--	100	--	--	--	--	--	SPNM
May 31	4:10 p. m.	7.0	--	38,400	10,700	72	87	96	98	98	100	--	--	--	--	--	SPWCM
June 1	10:08 a. m.	33	60	47,100	8,310	--	78	--	96	--	99	--	--	--	--	--	SPWCM
June 1	3:00 p. m.	97	--	63,200	5,340	--	58	--	78	--	93	--	--	--	--	--	SPWCM
July 11	9:33 a. m.	680	--	80,700	7,380	39	47	57	67	75	87	95	99	100	100	100	SPWCM
July 21	5:28 p. m.	69	--	152,000	12,000	46	62	75	89	96	97	--	--	--	--	--	SPWCM
July 22	11:58 a. m.	6.5	70	98,000	5,380	--	82	--	99	--	100	--	--	--	--	--	SPWCM
Aug. 7	4:54 p. m.	106	68	77,600	5,840	47	61	74	85	93	97	98	99	100	100	100	BWCM
Aug. 7	7:59 p. m.	70	--	71,900	6,750	--	66	--	--	90	98	--	--	--	--	--	SPWCM
Aug. 8	10:14 a. m.	22	64	60,800	6,440	--	78	--	99	--	100	--	--	--	--	--	SPWCM
Aug. 23	6:20 p. m.	27	89	75,400	6,040	--	76	--	96	--	100	--	--	--	--	--	SPWCM
Sept. 21	10:00 a. m.	73	45	71,000	7,010	54	74	85	87	97	99	--	--	--	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.

LOCATION.--At gaging station at bridge on county highway, a quarter of a mile west of Rairden, 1½ miles downstream from Fivemile Creek, and 6 miles southeast of Manderson, Big Horn County.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.

Water temperatures: August 1949 to September 1951.

Sediment records: April 1949 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 82°F July 31; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 26,100 ppm May 1; minimum daily, not determined.

Sediment loads: Maximum daily, 173,000 tons July 11, 23; minimum daily, not determined.

EXTREMES, 1949-51.--Water temperatures: Maximum, 82°F July 31, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 28,000 ppm Aug. 13, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 218,000 tons Sept. 22, 1950; minimum daily, not determined.

REMARKS.--Flow affected by ice Nov. 25, 26, Dec. 4 to Feb. 25. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, June 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	Phenolic material as C ₆ H ₅ OH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
June 28, 1950.....	5,650	9.8	0.04	34	7.3	29		106	77	5.5	0.3	1.1	0.10	236	0.32		115	28	35	358	--
Dec. 26,	4,900	4.8	.02	92	35	129	3.8	232	405	26	.5	2.1	.16	834	1.13		372	182	43	1,200	0.000
Jan. 8, 1951.....	4,860	4	.04	109	33	134		268	415	30	.6	2.8	--	894	1.22		407	187	42	1,270	.001
Jan. 23	5,980	12	.02	76	29	88	3.4	212	295	23	.4	2.6	.30	650	.88		307	133	38	953	7.6
Feb. 5	5,950	15	.02	97	30	94	5.2	254	316	28	.5	2.2	.20	728	.99		364	156	36	1,060	7.8
Mar. 5	1,010	12	.04	85	29	103	3.4	219	345	25	.5	4.4	--	716	.97		332	152	40	1,040	7.7
Apr. 2	1,120	11	.04	88	30	110	3.8	211	368	24	.4	2.6	--	760	1.03		344	171	41	1,060	8.0
May 8	2,050	12	.02	76	25	88	3.8	189	287	18	.4	2.6	--	638	.87		282	137	39	920	7.8
June 8	4,030	13	.05	40	11	36	1.8	120	115	8.5	.2	1.7	--	304	.41		146	48	35	460	7.8
July 11	6,220	13	.03	42	8.0	59	4.1	160	120	7.0	.4	2.6	--	346	.47		138	7	47	523	8.1
Aug. 13	1,880	13	.03	59	16	72	3.2	143	226	15	.3	2.6	--	494	.67		213	96	42	726	8.0
Sept. 10	1,120	13	.03	84	25	113	4.3	196	363	22	.5	3.2	--	754	1.03		314	153	43	1,050	7.9

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Nitrogen, phosphorus, and related physical measurements, December 1950 to September 1951
(Analytical results in parts per million except as indicated)

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Dec. 26, 1950.....	a 900	32	75	0.04	0.002	0.5	0.53	1.1	0.005	0.17
Jan. 23, 1951.....	a 980	32	15	.03	.003	.6	.25	.9	.01	.09
Feb. 5.....	a 950	32	40	.05	.005	.5	.15	.7	.009	.05
Mar. 5.....	1,010	33	100	.03	.008	1.0	.27	1.3	.006	.06
Apr. 2.....	1,120	49	800	.02	.005	.6	.58	1.2	.02	.06
May 8.....	2,050	56	2,700	.07	.02	.5	1.5	2.1	.000	4.9
June 8.....	4,030	60	600	.00	.009	1.8	.53	2.3	.08	.89
July 11.....	6,220	56	8,000	.02	.009	1.3	1.6	2.9	.07	6.6
Aug. 13.....	1,880	69	800	.01	.01	.8	.51	1.3	.08	.77
Sept. 10.....	1,120	64	1,300	.01	.01	.6	1.7	2.3	.03	1.3

a Mean daily discharge.

Temperature (°F) of water, water year October 1950 to September 1951
(Once daily temperature measurement between 1 p. m. and 8 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	43	46	33	32	--	37	--	50	48	--	75	a 60
2	49	42	33	32	32	35	50	50	46	66	78	67
3	47	44	33	32	--	36	52	51	53	72	73	65
4	51	46	--	34	--	--	55	63	57	--	71	66
5	54	44	--	33	a 32	a 33	52	a 60	60	75	a 74	65
6	52	44	32	33	32	35	52	--	63	75	74	62
7	52	43	34	--	35	32	a 49	63	62	a 68	71	67
8	55	a 40	33	33	34	34	--	59	61	a 67	68	a 61
9	51	a 32	--	33	34	35	a 49	60	63	65	72	64
10	55	32	33	32	35	36	43	64	a 63	a 58	70	68
11	59	32	33	33	--	--	45	66	68	57	69	53
12	61	33	33	33	32	36	51	a 61	64	64	--	57
13	61	34	a 32	33	a 32	36	58	--	65	70	73	61
14	60	35	32	33	a 34	35	a 42	63	67	72	68	58
15	57	37	32	34	--	36	--	63	72	a 71	69	a 55
16	58	36	--	35	a 33	33	51	61	a 65	78	74	a 56
17	59	38	33	--	a 33	34	a 49	66	72	74	76	63
18	58	35	33	--	34	--	56	66	68	80	76	64
19	57	36	32	32	a 34	34	43	a 62	69	76	a 70	66
20	57	38	33	33	34	a 33	45	--	66	71	70	51
21	a 51	41	a 33	32	35	36	a 40	67	61	72	73	52
22	53	a 38	34	--	35	41	--	68	61	--	72	54
23	57	a 32	34	32	36	42	48	67	64	74	73	a 49
24	57	33	a 33	33	35	44	a 45	65	a 63	78	68	59
25	55	35	--	--	36	--	55	64	66	75	67	60
26	53	a 35	34	32	37	46	56	62	68	75	a 65	53
27	50	42	33	--	33	39	60	64	64	73	67	53
28	52	38	a 32	--	35	41	a 60	65	65	75	69	58
29	--	36	35	--	--	45	--	61	65	74	68	61
30	--	34	a 33	--	--	48	54	55	64	81	69	a 56
31	45	--	--	--	--	50	--	53	--	82	67	--
Average	54	38	33	--	34	38	50	61	63	72	71	59

a Reading obtained between 8 a. m. and 11 a. m.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,980	3,930	21,000	1,440	963	3,740	1,330	769	2,760
2-----	2,010	3,580	19,400	1,480	853	3,410	1,330	888	3,190
3-----	2,110	2,840	16,200	1,440	938	3,650	1,220	868	2,860
4-----	1,950	2,530	13,300	1,340	642	2,320	1,050	540	a 1,500
5-----	1,940	2,410	12,600	1,320	713	2,540	900	250	a 610
6-----	2,020	2,060	11,200	1,280	695	2,360	800	176	380
7-----	1,980	2,290	12,200	1,370	896	3,320	700	345	652
8-----	2,050	2,330	12,900	1,430	620	2,390	650	338	590
9-----	1,890	2,210	11,300	1,390	1,020	3,830	900	105	255
10-----	1,940	2,120	11,100	1,320	1,040	3,710	1,100	100	297
11-----	2,090	2,570	14,500	843	703	1,600	1,200	200	648
12-----	2,020	1,720	9,380	568	511	784	1,200	340	1,100
13-----	1,990	1,750	9,400	794	758	1,630	1,200	275	891
14-----	2,050	1,850	10,200	1,260	1,560	5,320	1,200	190	616
15-----	2,060	1,860	10,300	1,330	1,600	5,750	1,150	320	994
16-----	2,010	1,900	10,300	1,280	1,090	3,780	1,100	300	891
17-----	1,900	1,880	9,640	1,350	1,290	4,710	900	360	923
18-----	1,840	1,750	8,690	1,310	931	3,290	900	360	875
19-----	1,780	1,520	7,310	1,340	1,230	4,450	1,050	234	663
20-----	1,690	1,290	5,890	1,390	1,490	5,600	950	288	739
21-----	1,580	1,350	5,760	1,430	1,300	5,020	850	235	539
22-----	1,570	1,240	5,260	1,400	1,380	5,230	800	235	508
23-----	1,550	1,300	5,440	1,430	1,130	4,370	800	159	343
24-----	1,490	1,250	5,030	1,320	951	3,400	800	156	337
25-----	1,460	1,000	3,940	1,250	2,090	7,050	850	230	a 530
26-----	1,480	943	3,770	1,340	2,880	10,400	900	312	758
27-----	1,490	982	3,950	1,360	1,310	4,810	950	187	480
28-----	1,450	1,120	4,380	1,390	1,080	4,060	980	247	654
29-----	1,420	1,030	3,950	1,420	966	3,780	800	320	691
30-----	1,450	888	3,480	1,390	889	3,340	750	359	727
31-----	1,420	952	3,650	--	--	--	760	340	a 700
Total--	55,660	--	285,420	38,985	--	119,644	30,070	--	27,701
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	760	278	570	550	--	e 210	1,060	690	1,980
2-----	850	233	535	600	--	--	733	540	1,130
3-----	820	224	496	700	--	--	787	428	910
4-----	800	206	445	800	--	--	900	370	a 900
5-----	770	119	247	950	250	641	992	362	970
6-----	780	150	316	1,100	315	936	808	400	872
7-----	840	170	a 390	1,450	349	1,370	731	432	852
8-----	860	165	383	1,300	349	1,220	698	355	671
9-----	850	--	--	1,200	415	1,340	759	360	738
10-----	820	--	--	1,200	348	1,130	984	670	1,780
11-----	820	--	--	1,300	380	a 1,300	1,100	640	a 1,900
12-----	860	--	--	1,550	1,650	6,910	1,080	632	1,840
13-----	880	--	--	1,600	560	2,420	1,130	840	2,560
14-----	880	--	--	1,500	605	2,450	1,100	920	2,730
15-----	800	--	--	1,300	460	1,610	1,060	1,190	3,410
16-----	800	--	--	1,050	278	788	1,080	1,370	4,000
17-----	800	--	--	900	400	972	1,150	1,190	3,700
18-----	840	--	e 510	1,050	546	1,550	1,200	1,000	a 3,200
19-----	920	--	--	1,150	535	1,660	1,060	960	2,810
20-----	850	--	--	1,250	482	1,630	1,040	1,200	3,370
21-----	900	--	--	1,150	447	1,390	1,130	2,460	7,510
22-----	1,050	--	--	1,050	568	1,610	1,150	2,810	8,740
23-----	980	--	--	1,050	675	1,910	1,260	2,800	9,550
24-----	960	--	--	1,100	720	2,140	1,210	2,300	7,510
25-----	1,080	--	--	1,200	1,030	3,340	1,220	2,900	a 7,600
26-----	1,200	--	--	1,260	920	3,130	1,240	2,340	7,850
27-----	1,300	--	--	1,140	950	2,920	1,300	2,210	7,760
28-----	1,050	--	--	1,060	630	1,800	1,250	2,030	6,870
29-----	800	--	e 380	--	--	--	1,080	1,860	5,440
30-----	670	--	--	--	--	--	1,060	1,200	3,430
31-----	560	--	--	--	--	--	1,020	1,220	3,360
Total--	27,130	--	14,462	31,510	--	47,007	32,412	--	115,943

e Estimated.

a Computed from estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued.

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,000	1,300	a 3,500	1,250	26,100	s 118,000	10,400	4,620	130,000
2-----	1,120	1,350	4,080	1,330	5,900	21,200	9,500	5,890	151,000
3-----	1,100	1,230	3,660	1,290	4,380	15,300	8,300	5,640	126,000
4-----	1,040	980	2,760	815	2,390	5,260	6,910	3,790	70,700
5-----	1,020	1,000	2,760	662	1,250	2,230	5,680	3,530	54,200
6-----	1,110	1,560	4,680	650	1,100	a 1,900	4,880	4,020	53,000
7-----	1,120	1,400	4,240	759	1,200	2,460	4,340	2,900	34,000
8-----	1,120	1,300	a 3,900	1,770	8,710	41,600	4,010	2,420	26,200
9-----	1,120	1,330	4,030	1,370	4,790	17,700	3,690	2,540	26,200
10-----	1,030	1,400	3,890	1,290	3,380	11,800	3,460	2,060	19,200
11-----	984	1,130	3,000	1,290	2,660	9,260	3,120	1,960	16,700
12-----	960	1,010	2,620	1,280	2,100	7,260	3,310	2,090	18,700
13-----	944	1,050	2,680	1,500	3,600	a 15,000	3,490	2,330	21,900
14-----	829	1,100	2,460	2,060	5,960	33,200	3,940	2,910	31,000
15-----	800	1,000	a 2,200	1,820	3,900	19,200	4,760	4,130	53,100
16-----	836	800	1,800	1,480	2,600	10,400	5,720	3,220	49,600
17-----	1,020	925	2,550	1,520	2,660	10,900	6,960	3,380	63,300
18-----	968	916	2,390	1,950	4,220	22,200	8,590	4,290	99,500
19-----	829	810	1,810	1,940	4,960	26,000	9,720	4,650	122,000
20-----	857	790	1,830	2,350	7,100	a 45,000	10,100	3,040	83,000
21-----	1,020	1,010	2,780	2,850	8,050	62,000	8,640	2,700	63,000
22-----	1,150	990	a 3,100	3,320	8,740	78,300	7,150	2,030	39,200
23-----	1,250	1,410	4,760	4,390	9,120	108,000	6,360	1,790	30,700
24-----	871	1,070	2,520	3,940	7,500	79,800	5,700	2,130	32,800
25-----	871	1,220	2,870	5,180	9,080	127,000	4,620	2,280	29,700
26-----	871	800	1,880	6,450	8,210	143,000	4,370	2,500	29,500
27-----	801	800	1,730	6,520	5,480	96,500	4,320	2,400	28,000
28-----	698	710	1,340	6,680	4,830	87,100	4,090	1,840	20,400
29-----	720	900	a 1,700	7,580	5,890	121,000	3,760	1,780	18,000
30-----	752	820	1,660	9,050	5,380	131,000	3,870	2,020	21,100
31-----	--	--	--	10,200	5,000	138,000	--	--	--
Total--	28,811	--	85,180	94,536	--	1,807,570	173,980	--	1,561,700
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4,000	1,800	a 19,000	3,710	3,460	34,700	864	1,380	3,220
2-----	3,710	1,720	17,200	3,390	2,720	24,900	906	2,400	5,870
3-----	3,260	1,850	16,300	3,110	2,600	21,800	1,000	1,420	4,050
4-----	3,200	1,900	a 16,000	3,070	2,500	20,700	1,060	1,500	4,060
5-----	3,920	2,200	23,300	3,440	7,690	71,400	1,080	1,320	3,780
6-----	4,540	2,500	30,600	3,670	4,820	47,800	1,010	1,380	3,760
7-----	4,640	2,750	34,500	3,940	10,700	114,000	1,010	1,600	4,360
8-----	4,340	2,380	27,900	3,410	3,870	35,600	1,260	5,850	19,900
9-----	4,840	2,240	29,300	2,850	4,160	32,000	1,090	8,900	27,800
10-----	4,640	2,190	27,400	2,680	2,800	20,300	1,090	3,400	10,000
11-----	5,870	10,900	173,000	2,080	3,570	20,000	920	1,520	3,770
12-----	5,200	7,940	103,000	1,750	3,200	a 15,000	928	1,440	3,610
13-----	4,620	2,880	35,900	1,620	2,110	9,230	992	2,680	7,180
14-----	3,980	2,420	26,000	1,280	1,680	5,810	885	1,650	3,940
15-----	3,760	2,400	24,400	1,070	1,510	4,360	1,010	1,520	4,150
16-----	3,560	2,400	23,100	864	1,600	3,730	920	1,450	3,600
17-----	3,550	2,450	23,500	871	1,380	3,240	843	1,200	2,730
18-----	3,560	2,400	23,100	892	1,400	3,370	829	1,160	2,600
19-----	3,890	3,150	33,100	822	1,310	2,910	808	1,280	2,770
20-----	3,910	2,650	28,000	794	1,170	2,510	1,120	2,150	6,500
21-----	4,140	2,300	25,700	815	1,050	2,310	978	8,980	23,700
22-----	5,700	5,900	s 96,300	836	1,230	2,780	864	4,900	11,400
23-----	6,110	10,500	173,000	780	1,170	2,460	920	1,550	3,850
24-----	4,880	4,430	58,400	780	2,410	5,070	944	1,100	2,800
25-----	4,070	3,100	34,000	822	1,100	2,440	1,120	1,300	3,930
26-----	3,550	2,860	27,400	885	1,300	3,110	857	1,050	2,430
27-----	2,930	2,720	21,500	992	1,100	2,940	815	800	1,760
28-----	2,990	2,600	21,000	1,010	1,100	3,000	780	550	1,160
29-----	2,980	2,520	20,300	871	940	2,210	717	720	1,390
30-----	3,200	3,950	34,100	759	940	1,930	724	700	1,370
31-----	3,560	3,380	32,500	692	880	1,640	--	--	--
Total--	127,100	--	1,278,800	54,555	--	523,250	28,322	--	181,440

Total discharge for year (cfs-days) 723,071
 Total load for year (tons) 5,848,117

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Oct. 4, 1950.....	9:57 a. m.	2,050	49	2,540	4,120	--	26	--	36	--	56	74	91	100	SPWCM
Oct. 10.....	2:06 p. m.	1,940	53	1,790	2,510	--	20	--	25	--	50	76	83	100	SPWCM
Oct. 20.....	2:02 p. m.	1,710	57	1,260	1,260	--	9	--	15	--	37	62	89	100	SPWCM
Oct. 26.....	2:20 p. m.	3,900	32	528	1,730	--	17	20	25	31	44	55	74	88	SPWCM
Feb. 12, 1951.....	9:30 a. m.	a1,550	32	2,340	1,790	69	77	83	88	90	92	97	--	--	BWCM
Mar. 21.....	9:36 a. m.	1,100	34	1,880	4,650	--	31	--	47	--	86	--	--	--	SPWCM
Apr. 2.....	1:15 p. m.	1,110	49	1,290	2,830	--	51	--	69	--	80	--	--	--	SPWCM
Apr. 2.....	4:45 p. m.	1,100	50	1,560	1,060	--	47	--	71	--	78	89	97	100	SPWCM
Apr. 9.....	9:40 a. m.	1,140	49	1,260	2,860	--	44	--	61	--	83	--	--	--	SPWCM
Apr. 17.....	9:40 a. m.	1,110	46	1,050	2,520	--	39	--	60	--	81	89	97	100	SPWCM
Apr. 26.....	2:32 p. m.	968	52	763	2,260	38	45	53	63	72	81	89	100	--	BWCM
May 1.....	12:09 p. m.	1,540	49	55,700	49,800	--	0	76	86	93	97	--	--	--	SPNM
May 1.....	12:09 p. m.	1,540	--	55,700	5,730	51	62	76	82	91	97	--	--	--	SPWCM
May 1.....	12:09 p. m.	1,540	49	55,700	2,920	53	64	72	83	92	96	99	100	--	BWCM
May 8.....	4:19 p. m.	2,080	56	8,240	6,960	1	3	24	47	61	84	95	98	100	SPNM
May 8.....	4:19 p. m.	2,080	56	8,240	5,080	26	32	38	49	63	83	94	98	100	SPWCM
May 18.....	3:20 p. m.	2,090	67	4,200	8,700	--	23	--	34	--	70	92	98	100	SPWCM
May 21.....	8:30 a. m.	3,030	58	8,360	4,460	--	20	--	31	--	74	96	100	--	SPWCM
May 23.....	4:20 p. m.	4,240	--	7,640	5,510	2	5	23	33	44	74	94	98	100	SPNM
May 23.....	4:20 p. m.	4,240	--	7,640	4,100	18	24	29	35	47	72	93	98	100	SPWCM
May 28.....	2:45 p. m.	6,890	64	4,390	5,980	--	12	--	22	--	48	81	95	99	SPWCM
May 31.....	10:36 a. m.	10,200	52	4,410	2,460	10	16	22	28	37	57	82	96	100	SPNM
May 31.....	10:36 a. m.	10,200	52	4,410	3,630	18	21	23	31	38	54	80	96	100	SPWCM
June 4.....	2:46 p. m.	6,800	58	2,460	3,150	--	20	--	29	--	50	70	91	100	SPWCM
June 8.....	12:54 p. m.	4,030	--	2,440	3,340	--	21	--	32	--	56	77	95	100	SPWCM

a Mean daily discharge.

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued
BIGHORN RIVER NEAR WANDERSON, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
June 14, 1951.....	1:55 p. m.	4,030	69	3,130	1,880	8	17	31	39	51	66	--	--	--	--	--	SPNM
June 14.....	1:55 p. m.	4,030	69	3,130	3,050	23	27	37	44	52	69	85	96	--	100	--	SPWCM
June 20.....	5:10 p. m.	10,000	68	2,580	3,160	--	16	--	22	--	45	68	91	--	100	--	SPWCM
June 28.....	11:43 a. m.	4,070	61	1,940	3,180	--	22	--	37	--	55	69	90	--	100	--	SPWCM
July 6.....	11:50 a. m.	4,390	65	2,200	3,430	--	21	--	33	--	61	81	96	--	100	--	SPWCM
July 11.....	2:28 p. m.	6,200	--	15,500	14,000	1	2	48	69	76	87	94	98	--	100	--	SPNM
July 11.....	2:28 p. m.	6,200	--	15,500	4,970	43	47	62	70	78	87	--	--	--	--	--	SPWCM
July 12.....	8:35 a. m.	5,450	56	10,200	5,980	--	50	--	68	--	84	94	99	--	100	--	SPWCM
July 12.....	2:37 p. m.	5,040	64	5,250	3,560	38	46	52	60	65	75	87	97	--	100	--	SPWCM
July 12.....	2:37 p. m.	5,040	64	5,250	5,010	6	7	26	64	67	75	83	98	--	100	--	BNM
July 20.....	1:46 p. m.	3,870	72	2,670	5,280	--	37	--	55	--	71	--	--	--	--	--	SPWCM
July 23.....	9:30 a. m.	6,640	67	10,300	11,500	1	2	10	--	--	82	89	96	--	99	--	BNM
July 23.....	9:30 a. m.	6,640	67	10,300	4,100	36	46	60	70	76	83	90	97	--	99	--	BWCM
July 30.....	3:08 p. m.	3,310	77	5,550	3,120	4	5	33	69	79	85	--	--	--	--	--	SPNM
July 30.....	3:08 p. m.	3,310	77	5,550	4,640	36	48	60	71	79	85	89	93	--	97	--	BWCM
Aug. 8.....	2:46 p. m.	3,640	69	3,020	6,030	--	36	--	50	--	70	88	98	--	100	--	SPWCM
Aug. 13.....	10:45 a. m.	1,730	69	1,920	4,180	--	39	--	56	--	67	81	95	--	100	--	SPWCM
Aug. 21.....	4:01 p. m.	1,822	74	1,010	2,350	--	61	--	75	--	84	--	--	--	--	--	SPWCM
Aug. 29.....	1:50 p. m.	885	67	886	1,920	--	53	--	72	--	81	--	--	--	--	--	SPWCM
Sept. 10.....	1:06 p. m.	1,120	64	2,450	6,240	--	64	--	85	--	91	--	--	--	--	--	SPWCM
Sept. 20.....	7:46 a. m.	1,330	--	2,210	6,360	--	40	--	67	--	84	--	--	--	--	--	SPWCM
Sept. 27.....	1:12 p. m.	822	53	703	1,830	40	55	66	75	79	82	84	96	--	100	--	BWCM

YELLOWSTONE RIVER BASIN --Continued

PAINTROCK CREEK NEAR HYATTVILLE, WYO.

LOCATION --At gaging station, 0.6 mile upstream from Luman Creek and 6 miles northeast of Hyattville, Big Horn County.

TRAINING AREA --4 square miles.

RECORDS AVAILABLE --Chemical analyses: January to September 1951.

REMARKS. --Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Jan. 16, 1951	17	9.8	0.04	25	11	1.6	130			2.0	0.5	0.1	1.3	0.00	116	0.16	107	0	3	220	7.7
Feb. 26	17	8.0	.12	33	8.6	2.5	142			3.0	1.7	.1	1.1	.00	130	.16	118	2	4	260	8.0
Mar. 29	17	8.2	.02	26	12	5.1	142			5.0	1.0	.1	1.3	.00	138	.21	118	2	9	306	7.8
Apr. 30	52	8.5	.04	22	5.8	5.5	96			10	.5	.1	1.0	.01	108	.15	79	0	13	184	7.7
May 20	899	4.9	.10	6.0	1.5	2.1	27			2.0	.5	.1	.8	.02	41	.06	21	0	18	60.5	6.8
June 26	266	5.1	.02	7.0	2.3	1.2	32			2.0	.5	.1	.5	.02	36	.05	27	1	8	59.1	6.8
July 31	191	5.0	.04	11	2.7	9	45			2.0	.5	.1	.7	.01	49	.07	38	1	5	84.3	6.8
Sept. 5	47	7.2	.02	17	6.4	2.5	88			1.0	.5	.1	.6	.01	81	.11	69	0	7	143	7.7

YELLOWSTONE RIVER BASIN--Continued
MEDICINE LODGE CREEK NEAR HYATTVILLE, WYO.

LOCATION.--At gaging station, a quarter of a mile downstream from North Fork and 4½ miles northeast of Hyattville, Big Horn County.
DRAINAGE AREA--66 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses, January to September 1951.
REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 100° C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Jan. 16, 1951.....	12		13	0.04	31	14	2.3	188	1.0	1.0	0.1	1.8	0.00	152	0.21	137	0	4	267	7.9
Feb. 28.....	11		13	.08	33	14	4.1	173	3.0	1.5	1.5	1.8	.00	158	.21	140	0	5	269	8.1
Mar. 29.....	11		9.6	.03	33	15	5.5	170	13	1.5	1.5	1.5	.00	168	.23	143	4	8	306	7.6
Apr. 30.....	14		9.8	.03	31	13	7.1	160	13	1.0	1.0	1.2	.00	158	.21	132	1	11	254	8.0
May 29.....	231		5.3	.02	13	3.8	2.5	61	2.0	.5	.1	.7	.03	58	.08	48	0	10	115	7.2
June 28.....	70		7.1	.02	17	5.2	2.3	78	3.0	.5	.1	1.0	.01	76	.10	64	0	7	133	7.1
July 31.....	28		8.7	.02	26	9.0	2.1	124	3.0	.5	.1	1.0	.01	124	.17	102	0	4	202	7.4
Sept. 5.....	16		9.4	.02	35	11	1.8	160	2.0	.5	.1	1.1	.01	152	.21	131	0	3	252	7.7

YELLOWSTONE RIVER BASIN--Continued
PAINTROCK CREEK NEAR MOUTH BELOW HYATTVILLE, WYO.

LOCATION.--At bridge on road between Bonanza and Tensleep, half a mile upstream from mouth and 6½ miles downstream from Hyattville, Big Horn County. RECORDS AVAILABLE.--Chemical analyses: January to September 1951. REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Mean discharge (cfs)	Tem- perature (°F)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- nes- ium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per- cent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, mag- nesium	Non-carbon- ate			
Jan. 16, 1951.....		15	0.04		99	33	49		211	285	3.5	0.2	2.3	0.10	604	0.82	381	208	22	850	7.7
Feb. 26.....		12	.18		100	39	54		218	328	2.8	.2	2.3	.07	688	.94	410	231	21	927	7.9
Mar. 29.....		11	.05		109	35	52		218	330	3.5	.2	2.0	.09	700	.95	417	238	21	938	7.6
Apr. 30.....		12	.03		84	28	36		191	232	3.0	.2	.9	.06	524	.71	325	168	19	743	7.7
May 29.....		5.8	.02		28	7.4	5.8		97	30	.5	.1	2.0	.03	133	.18	100	20	11	220	7.7
June 28.....		7.1	.02		45	13	17		97	118	.5	.1	1.2	.05	262	.36	167	87	18	408	7.2
July 31.....		9.6	.02		71	20	31		130	207	1.0	.2	.9	.07	424	.58	258	151	20	617	7.5
Sept. 5.....		15	.02		224	68	158		286	900	7.5	.5	1.5	.07	1,620	2.20	840	605	29	1,920	7.6

a Sum of determined constituents, 1,520 parts per million.

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.

LOCATION.--At gaging station, 1 mile upstream from mouth and 1½ miles northwest of Greybull, Big Horn County.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.

Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Sediment concentrations: Maximum daily, 16,000 ppm Aug. 5; minimum daily, not determined.

Sediment loads: Maximum daily, 15,000 tons Aug. 5; minimum daily, less than 0.50 ton on several days during April

REMARKS.--Prior to Mar. 28 chemical-quality samples were taken 0.9 mile downstream. Records of discharge for period April to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million		Tons per acre-foot	Calcium	Non-carbonate				
														Residue at 180°C	Sum							
Dec. 13, 1950.....	--	20	0.08	141	57	394		404		1,010	35	2.0	10	0.40	1,950	1,870	588	257	59	2,410	7.9	
Jan. 23, 1951.....	--	24	.06	163	61	397		460		1,030	35	1.8	18	.30	2,000	1,960	656	279	57	2,550	--	
Feb. 6.....	--	19	.06	174	70	496		491		1,270	43	1.6	15	.20	2,330	2,330	722	319	60	3,050	7.8	
Feb. 11.....	--	12	.20	56	15	196		208		418	12	.7	1.2	.28	856	--	200	28	67	1,260	7.6	
Mar. 9.....	--	25	.10	189	47	424		444		1,080	49	1.6	18	.39	2,100	2,050	664	300	57	2,690	8.1	
Apr. 11.....	9	17	.04	143	74	476		347		1,280	47	1.4	10	.05	2,250	2,220	680	375	61	2,860	7.8	
May 11.....	46	19	.04	94	43	218		281		590	22	.9	7.5	.20	1,170	1,130	411	181	54	1,590	7.2	
June 12.....	54	19	.04	75	29	147		239		385	15	.7	5.5	.16	836	--	1.14	306	110	51	1,160	7.3
July 11.....	163	16	.02	66	21	138		227		325	13	.7	5.1	.13	728	--	.99	249	63	55	1,020	7.4
Aug. 15.....	60	20	.02	89	35	196		286		500	19	1.0	7.5	.20	1,050	1,010	1.43	384	129	54	1,430	7.4
Sept. 7.....	89	18	.02	72	29	152		265		375	13	.7	3.8	.15	810	--	1.10	300	83	52	1,140	7.5

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.--Continued

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	12	--	e 3	46	73	9	135	--	e 800
2-----	12	--	e 3	34	33	3	117	--	e 650
3-----	11	--	e 3	20	16	1	78	--	e 400
4-----	11	125	4	17	47	2	60	1,900	a 310
5-----	11	142	4	16	50	b 2	72	1,600	a 310
6-----	11	102	3	15	51	2	74	1,400	a 280
7-----	10	67	2	20	100	5	54	880	a 130
8-----	10	50	b 1	28	970	sb 80	41	600	68
9-----	10	46	1	66	4,600	sa 870	44	880	105
10-----	10	73	2	64	1,700	294	60	1,250	202
11-----	9	54	1	44	650	77	66	1,190	212
12-----	8	--	--	49	1,410	187	54	1,020	149
13-----	7	--	--	38	970	b 100	66	1,210	218
14-----	7	27	1	27	880	64	66	1,100	196
15-----	8	--	--	34	880	81	64	1,110	192
16-----	9	--	--	40	1,240	134	55	720	107
17-----	9	--	--	41	1,040	115	46	1,020	127
18-----	8	18	(t)	34	1,220	112	47	1,100	a 140
19-----	8	--	--	30	1,480	120	36	1,100	b 110
20-----	8	--	--	28	1,970	149	38	1,300	b 130
21-----	6	--	--	37	2,180	218	52	1,650	232
22-----	6	33	1	31	1,400	117	58	--	e 260
23-----	8	--	--	25	900	61	68	--	e 280
24-----	9	--	--	23	880	55	74	1,400	a 280
25-----	9	20	(t)	22	1,000	b 60	80	1,700	367
26-----	8	--	e 1	24	1,050	68	80	1,880	406
27-----	9	60	b 1	23	1,130	70	55	861	128
28-----	9	64	2	34	1,320	121	54	845	123
29-----	14	45	2	28	--	e 100	57	833	128
30-----	41	58	6	50	--	e 220	62	864	145
31-----	--	--	--	127	--	e 750	--	--	--
Total--	313	--	50	1,115	--	4,247	1,911	--	7,181
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	64	1,030	178	52	1,000	140	68	--	e 130
2-----	66	907	162	50	820	a 110	65	--	e 110
3-----	52	968	136	59	--	e 160	74	--	e 120
4-----	50	--	e 110	74	--	e 240	81	--	e 140
5-----	47	--	e 90	205	16,000	sb 15,000	71	--	e 120
6-----	38	--	e 60	125	15,000	5,060	71	552	106
7-----	44	--	e 55	92	--	e 1,200	78	358	73
8-----	46	--	e 60	225	15,000	sb 13,000	80	--	e 65
9-----	54	--	e 100	118	4,350	1,390	83	--	e 80
10-----	90	--	e 1,200	110	--	e 750	76	216	44
11-----	165	8,600	3,830	112	--	e 650	85	200	35
12-----	78	4,620	974	98	--	e 420	76	282	58
13-----	72	2,710	526	68	--	e 220	87	503	118
14-----	97	2,320	608	53	--	e 140	83	780	175
15-----	94	1,920	487	68	808	e 164	73	441	87
16-----	82	1,200	266	57	1,000	154	57	268	41
17-----	102	2,700	sb 3,300	47	1,900	241	52	125	18
18-----	165	14,000	sa 8,900	39	1,700	b 180	49	68	9
19-----	83	2,160	484	44	2,850	338	50	158	21
20-----	115	3,100	sa 1,500	53	455	65	49	112	15
21-----	217	6,600	sa 4,200	45	255	31	52	133	19
22-----	74	2,900	579	47	332	42	50	205	28
23-----	73	--	e 420	63	--	e 70	52	132	19
24-----	57	--	e 300	66	--	e 70	52	96	13
25-----	57	--	e 280	85	--	e 110	44	118	14
26-----	57	1,720	265	76	--	e 80	42	65	7
27-----	74	4,420	883	78	--	e 85	45	75	9
28-----	86	1,400	b 250	60	--	e 65	47	108	14
29-----	82	520	87	62	--	e 65	44	70	8
30-----	68	540	99	59	--	e 65	40	60	6
31-----	59	900	143	76	--	e 160	--	--	--
Total--	2,468	--	30,532	2,466	--	40,465	1,854	--	1,882

Total discharge for period Apr. 1 to Sept. 30, 1951 (cfs-days)..... 10,127

Total load for period Apr. 1 to Sept. 30, 1951 (tons)..... 84,157

e Estimated.

a Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.--Continued

Particle-size analyses of suspended sediment, June to August 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- centage sture (° F)	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	0.350		0.500	1.000
June 21, 1951 . . .	3:35 p.m.	68	--	2,310	3,550	--	28	--	42	--	74	88	98		100	SPWCM	
June 25	11:57 a.m.	94	62	1,830	2,550	19	25	31	34	44	61	76	95		100	SPWCM	
July 3	1:54 p.m.	66	70	1,300	2,810	17	24	30	35	40	53	63	95		99	BWCM	
July 11	3:32 p.m.	157	--	8,840	7,880	1	3	50	79	80	87	92	97		100	SPNM	
July 11	3:32 p.m.	157	--	8,840	4,280	54	65	74	78	83	87	--	--		--	SPWCM	
July 12	6:45 a.m.	80	--	4,880	3,520	--	78	--	86	--	93	--	--		--	SPWCM	
July 13	6:38 p.m.	82	72	2,740	5,390	50	61	68	74	80	85	--	--		--	SPWCM	
Aug. 6	1:10 p.m.	141	72	14,200	13,100	--	1	8	88	91	95	--	--		--	SPNM	
Aug. 6	5:10 p.m.	141	72	14,200	7,190	54	68	81	88	92	96	--	--		--	SPWCM	
Aug. 15	5:43 a.m.	60	58	487	1,100	30	35	41	47	53	65	72	97		100	BWCM	

YELLOWSTONE RIVER BASIN--Continued

SHELL CREEK NEAR SHELL, WYO.

LOCATION.--At gaging station, 1½ miles upstream from White Creek and 5 miles northeast of Shell, Big Horn County.

DRAINAGE AREA.--148 square miles.

RECORDS AVAILABLE.--Chemical analyses: January to September 1951.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-magnesium	Calcium	Percent		
Jan. 15, 1951	38	9.0	0.04	36	11	3.0	156	12	0.5	0.1	1.0	0.10	1.0	0.10	150	0.20	136	8	136	5	274	8.1
Feb. 21	34	8.3	0.20	40	10	2.3	162	11	1.0	0.1	1.3	0.16	1.6	0.16	164	0.22	142	9	142	4	283	8.0
Mar. 22	33	8.0	0.06	35	13	6.7	161	20	0.5	0.1	1.6	0.00	1.4	0.00	174	0.24	141	9	141	9	294	7.9
Apr. 12	34	7.8	0.07	38	13	5.8	168	21	1.0	0.1	1.1	0.03	1.84	0.03	184	0.25	150	12	150	12	282	7.6
May 24	806	5.4	0.02	18	5.1	3.7	78	7.0	0.6	0.1	1.0	0.12	1.2	0.12	94	0.13	66	2	66	11	135	6.9
June 20	420	4.0	0.02	15	4.0	1.6	63	5.0	0.2	0.1	2.2	0.02	0.64	0.02	64	0.09	54	2	54	6	113	6.9
July 13	231	6.2	0.02	16	5.1	2.5	71	7.0	0.5	0.1	1.3	0.01	0.76	0.01	76	0.10	61	3	61	8	125	6.8
Aug. 4	123	6.1	0.02	23	7.9	2.1	108	6.0	0.3	0.1	1.9	0.02	1.02	0.02	102	0.14	90	3	90	5	181	7.4
Sept. 7	84	6.8	0.02	26	8.0	1.8	114	7.0	0.4	0.1	1.3	0.01	1.08	0.01	108	0.15	96	5	96	4	193	6.9

SHELL CREEK NEAR MOUTH NEAR GREYBULL, WYO.

LOCATION.--At bridge, three-quarters of a mile upstream from mouth and 1½ miles northeast of Greybull, Big Horn County.

RECORDS AVAILABLE.--Chemical analyses: January to September 1951.

REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-magnesium	Calcium	Percent		
Jan. 15, 1951	11	11	0.04	101	36	66	224	333	3.5	0.4	3.3	0.20	0.95	0.20	696	0.95	402	210	402	26	932	8.0
Feb. 21	10	10	0.08	117	30	87	231	388	5.5	0.2	3.2	0.15	0.92	0.15	792	1.08	418	227	418	31	1,090	7.8
Mar. 22	14	8.3	0.06	102	37	79	217	373	4.5	0.2	4.0	0.35	0.778	0.35	778	1.06	406	238	406	30	1,080	7.5
Apr. 12	8.4	8.4	0.06	93	38	71	208	350	4.0	0.2	1.3	0.10	0.714	0.10	714	0.97	398	217	398	28	970	7.9
May 24	8.4	8.4	0.02	56	8.1	14	163	64	0.6	0.1	3.1	0.05	0.252	0.05	252	0.34	173	39	173	15	387	7.2
June 20	7.5	7.5	0.04	46	11	20	124	93	1.1	0.4	1.5	0.08	0.246	0.08	246	0.33	159	57	159	21	388	7.1
July 13	11	11	0.02	44	24	53	166	250	2.3	0.2	2.1	0.13	0.510	0.13	510	0.69	285	149	285	29	728	7.2
Aug. 4	12	12	0.02	163	21	139	239	678	8.2	0.4	4.2	0.30	1,260	0.30	1,260	1.70	616	422	616	34	1,560	7.3
Sept. 7	12	12	0.02	138	54	143	228	695	7.8	0.4	2.1	0.30	1,280	0.30	1,280	1.70	614	421	614	34	1,550	7.2

YELLOWSTONE RIVER BASIN--Continued
BIGHORN RIVER AT KANE, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951

Twice-daily temperature measurements between 9 a. m. and 11 a. m. and between 4 p. m. and 8 p. m.

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
1	42	43	45	32	34	34	34	34	--	--	--	--	41	47	50	52	49	47	60	65	74	77	--	59
2	--	44	42	--	32	--	--	--	32	--	--	--	45	--	48	--	48	50	64	65	75	--	--	65
3	--	44	45	--	41	--	32	--	--	--	--	--	44	51	49	61	45	50	64	68	72	74	--	63
4	43	47	38	44	--	--	33	--	--	--	--	--	46	54	55	64	50	50	68	70	73	74	--	65
5	47	50	42	45	--	32	--	33	--	--	--	--	52	57	--	49	57	68	72	70	73	60	--	65
6	--	40	43	34	33	32	--	--	--	--	--	--	47	50	--	--	55	62	68	73	70	73	59	66
7	--	40	43	34	32	--	--	--	--	--	--	--	44	49	--	--	59	62	70	--	70	70	57	65
8	48	48	34	--	33	32	--	33	--	--	--	--	47	47	--	--	58	61	61	65	67	68	61	--
9	--	35	33	--	35	33	--	35	--	--	32	--	47	47	--	--	59	61	--	--	63	67	60	65
10	47	53	--	--	33	--	--	35	--	--	--	--	40	--	--	--	59	60	--	58	67	69	56	67
11	51	57	--	--	32	36	--	--	--	--	--	--	40	43	--	--	62	65	56	--	65	72	57	56
12	--	--	--	--	32	--	--	--	--	--	--	--	43	55	62	60	64	65	57	62	69	73	51	56
13	--	--	--	--	32	34	--	34	--	--	--	--	46	53	57	60	64	65	62	66	67	72	52	60
14	54	56	31	35	33	33	--	--	--	--	--	--	43	42	57	61	62	69	55	71	65	67	55	59
15	55	57	--	--	33	33	--	--	--	32	--	--	45	--	55	62	65	70	66	75	63	65	50	60
16	53	58	31	41	32	32	--	35	--	--	--	--	34	49	58	64	65	69	70	75	65	72	52	50
17	53	58	33	--	34	33	35	--	--	--	--	--	43	54	59	67	67	61	71	75	67	75	54	62
18	53	57	35	--	31	32	--	--	--	--	--	--	50	56	61	--	65	65	69	77	63	75	63	63
19	51	52	--	--	32	32	--	35	--	--	--	--	42	43	59	66	--	68	74	76	--	74	55	63
20	50	54	--	--	33	--	33	--	33	--	--	--	37	41	--	61	63	73	72	64	70	53	90	90
21	--	48	58	--	--	--	--	34	--	--	--	--	--	40	60	64	60	63	68	71	65	72	48	54
22	43	42	34	--	--	--	--	--	--	--	34	42	39	--	47	--	80	81	66	71	63	70	50	55
23	47	53	31	--	--	--	--	--	32	--	36	38	44	46	--	--	80	83	--	72	--	70	50	54
24	45	52	--	--	32	--	--	--	--	35	--	45	47	--	--	--	83	82	67	75	63	69	50	56
25	47	51	34	31	34	31	--	36	--	--	40	43	--	54	--	60	61	63	72	74	61	70	50	53
26	48	53	--	--	--	33	--	--	--	--	37	43	50	55	57	63	60	65	70	75	62	67	51	54
27	48	48	--	--	--	--	--	--	--	--	34	38	52	55	58	63	53	63	70	73	62	67	46	--
28	45	50	35	35	--	33	--	--	--	--	42	42	53	60	60	61	60	62	68	70	66	67	46	--
29	48	58	33	--	--	--	--	--	--	--	32	44	57	--	62	62	72	63	72	74	67	67	58	--
30	51	--	33	--	34	--	34	--	--	--	34	45	55	53	55	55	60	65	70	76	62	68	65	60
31	45	--	33	--	33	--	33	--	--	45	--	--	--	--	51	52	--	--	73	77	63	67	--	--
Average	46	52	--	--	--	--	--	--	a 32	a 32	a 34	a 35	45	50	--	--	59	62	67	72	66	70	55	59

a includes estimated temperature 32° F on missing days.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,840	2,200	16,900	1,970	865	4,800	1,960	460	2,540
2-----	3,020	2,460	20,100	2,020	--	e 4,000	1,920	1,130	5,880
3-----	3,070	2,330	19,300	1,920	--	e 4,000	1,900	665	3,410
4-----	3,050	2,120	17,500	1,890	885	4,520	1,850	650	3,250
5-----	2,810	2,020	15,300	1,830	950	4,690	1,110	570	1,710
6-----	2,790	1,800	a 14,000	1,900	849	4,360	814	210	462
7-----	2,830	1,480	11,300	1,840	310	1,540	800	230	497
8-----	2,760	1,720	12,800	1,960	1,090	5,770	820	1,250	2,770
9-----	2,810	1,610	12,200	1,900	--	--	940	920	2,340
10-----	2,620	1,400	9,900	1,740	--	--	1,100	400	1,190
11-----	2,760	1,460	11,000	1,700	--	e 3,000	1,300	625	2,190
12-----	2,810	1,420	10,800	1,700	--	--	1,500	1,800	7,290
13-----	2,660	1,320	9,550	700	--	--	1,750	1,600	7,560
14-----	2,730	1,320	9,730	1,000	1,920	5,180	1,750	630	2,980
15-----	2,750	1,380	10,200	1,400	1,700	6,430	1,680	325	1,470
16-----	2,700	1,470	10,700	1,990	1,150	6,180	1,600	--	--
17-----	2,600	952	6,680	1,890	1,300	6,630	1,500	--	--
18-----	2,560	1,070	7,400	1,940	920	4,820	1,400	100	394
19-----	2,470	1,200	8,000	1,890	1,100	a 5,600	1,300	--	--
20-----	2,390	1,440	9,290	1,920	1,130	5,860	1,500	--	--
21-----	2,290	1,390	8,590	2,010	670	a 3,600	1,300	--	e 500
22-----	2,230	1,160	7,100	2,050	375	2,080	1,250	207	699
23-----	2,250	1,000	6,080	2,050	575	3,180	1,180	321	1,020
24-----	2,170	1,190	6,970	1,840	930	a 4,600	1,150	88	273
25-----	2,130	1,050	6,040	1,830	1,160	5,730	1,140	296	911
26-----	2,060	1,200	6,740	1,890	1,080	5,510	1,200	334	1,080
27-----	2,020	775	4,230	2,060	970	a 5,400	1,300	182	638
28-----	1,940	672	3,320	2,120	1,020	5,840	1,400	162	612
29-----	1,870	730	3,880	2,090	800	4,510	1,450	107	419
30-----	2,010	946	5,130	2,020	785	4,280	1,200	170	551
31-----	2,000	1,250	6,750	--	--	--	1,050	84	288
Total--	78,160	--	307,680	54,460	--	133,910	42,114	--	54,430
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,100	78	232	800	--	e 320	1,400	--	--
2-----	1,150	73	226	650	157	276	1,300	--	--
3-----	1,180	64	204	650	--	--	1,200	--	--
4-----	1,150	83	258	750	--	e 500	1,200	--	e 750
5-----	1,100	80	238	900	--	--	1,300	--	--
6-----	1,000	124	335	1,200	--	--	1,500	--	--
7-----	1,000	121	327	1,500	--	--	1,250	--	--
8-----	1,050	95	269	2,000	--	--	1,100	--	--
9-----	1,100	79	235	1,850	--	--	1,000	200	540
10-----	1,100	59	175	1,700	--	--	1,100	--	--
11-----	1,080	68	198	1,700	--	--	1,400	--	e 2,600
12-----	1,050	72	204	1,800	--	--	1,600	--	--
13-----	1,100	71	211	2,100	--	--	1,600	--	--
14-----	1,180	88	280	2,200	--	e 800	1,700	--	--
15-----	1,140	57	175	2,000	--	--	1,600	1,040	4,490
16-----	1,100	222	659	1,800	--	--	1,550	--	--
17-----	1,080	120	350	1,500	--	--	1,600	--	--
18-----	1,100	80	238	1,200	--	--	1,700	--	e 6,800
19-----	1,150	118	366	1,400	--	--	1,800	--	--
20-----	1,250	109	368	1,600	--	--	1,650	--	--
21-----	1,100	95	282	1,700	--	--	1,600	2,050	8,850
22-----	1,200	90	a 290	1,650	--	--	1,780	2,050	9,850
23-----	1,400	122	461	1,500	266	1,080	1,910	3,200	16,500
24-----	1,350	155	565	1,400	--	--	2,090	3,950	22,300
25-----	1,350	136	496	1,550	--	--	1,990	3,100	16,700
26-----	1,400	--	--	1,700	--	e 1,000	2,350	5,610	s 39,800
27-----	1,500	--	--	1,600	--	--	2,220	3,800	22,800
28-----	1,600	--	--	1,500	--	--	2,140	3,050	17,600
29-----	1,350	--	e 500	--	--	--	1,890	2,950	15,100
30-----	1,200	--	--	--	--	--	1,680	2,600	11,800
31-----	1,000	--	--	--	--	--	1,680	1,710	7,760
Total--	36,810	--	10,642	41,900	--	21,776	49,880	--	247,090

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
 BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,590	1,530	6,570	1,600	1,900	sb 9,500	12,800	4,130	143,000
2-----	1,520	1,510	6,200	2,190	14,300	s 79,200	14,000	5,020	190,000
3-----	1,560	1,570	6,610	1,730	13,300	62,100	12,400	6,440	216,000
4-----	1,580	1,510	6,440	1,620	4,410	19,300	10,300	5,510	153,000
5-----	1,520	1,480	6,070	1,360	2,780	10,200	8,380	4,610	104,000
6-----	1,570	1,060	4,490	1,350	1,450	5,290	7,260	3,680	72,100
7-----	1,630	1,310	5,770	1,370	1,440	5,330	6,630	3,710	66,400
8-----	1,590	1,380	5,840	1,620	2,000	8,750	6,220	3,100	52,100
9-----	1,620	1,460	6,390	2,390	4,700	30,300	5,710	3,060	47,200
10-----	1,580	1,530	6,530	2,100	3,700	21,000	5,510	2,730	40,600
11-----	1,530	1,340	5,540	2,040	2,880	15,800	5,150	2,150	29,900
12-----	1,510	1,220	4,970	1,910	2,680	13,700	4,830	2,260	29,500
13-----	1,540	1,460	6,070	2,000	2,290	12,400	5,200	2,370	33,300
14-----	1,990	1,540	6,610	2,220	2,950	17,700	6,190	2,890	47,800
15-----	1,580	959	4,090	2,640	4,880	34,800	6,580	3,310	58,800
16-----	1,500	1,280	5,180	2,590	3,300	23,100	8,080	4,750	104,000
17-----	1,500	1,640	6,640	2,560	2,350	16,200	10,700	6,050	175,000
18-----	1,650	2,020	9,000	2,650	2,760	19,700	12,100	5,500	180,000
19-----	1,580	1,290	5,500	3,370	3,860	35,100	12,700	4,210	144,000
20-----	1,420	1,080	4,140	3,880	5,360	56,200	13,000	3,030	106,000
21-----	1,520	916	3,760	4,740	6,730	86,100	12,300	2,000	66,400
22-----	1,760	1,570	7,460	4,920	5,430	72,100	10,800	2,640	77,000
23-----	1,760	1,380	6,560	5,540	6,030	90,200	9,330	2,670	87,300
24-----	1,730	1,490	6,960	6,480	7,250	127,000	8,320	2,690	60,400
25-----	1,570	1,410	5,980	7,520	7,000	142,000	7,330	2,670	52,800
26-----	1,530	1,500	6,200	7,970	6,040	130,000	6,680	2,690	48,500
27-----	1,580	1,200	5,120	8,240	5,760	128,000	6,400	2,470	42,700
28-----	1,500	1,140	4,620	8,590	5,780	134,000	6,270	2,320	39,300
29-----	1,350	1,290	4,700	10,400	6,000	168,000	5,710	2,190	33,800
30-----	1,500	1,250	5,060	11,100	5,270	158,000	5,490	2,360	35,000
31-----	--	--	--	11,700	4,620	146,000	--	--	--
Total-	46,960	--	175,070	130,390	--	1,877,070	252,370	--	2,515,900
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5,510	2,000	29,800	5,060	2,680	36,600	1,270	1,240	4,250
2-----	5,370	1,990	28,900	4,850	2,480	32,500	1,390	1,650	6,190
3-----	5,250	1,800	25,500	4,580	2,170	26,800	1,480	1,480	5,910
4-----	5,390	1,930	28,100	4,310	1,920	22,300	1,600	1,710	7,390
5-----	6,030	2,440	39,700	5,780	10,900	170,000	1,680	1,360	6,170
6-----	6,880	2,680	48,300	5,880	12,700	202,000	1,700	1,190	5,460
7-----	7,000	2,630	49,700	5,740	4,580	71,000	1,710	1,200	5,540
8-----	6,740	2,150	39,100	5,760	7,780	121,000	1,690	1,280	5,840
9-----	6,530	2,000	a 35,000	4,900	2,080	27,500	2,010	1,740	9,440
10-----	7,050	2,380	45,300	4,200	3,160	35,800	1,860	2,300	11,600
11-----	7,130	3,240	62,400	3,830	2,230	23,100	1,770	4,710	22,500
12-----	8,460	13,200	302,000	3,220	1,770	15,400	1,640	2,300	10,200
13-----	7,360	6,830	136,000	2,830	2,640	20,200	1,720	1,630	7,570
14-----	6,890	2,570	47,800	2,530	1,690	11,500	1,730	1,510	7,050
15-----	6,320	2,690	45,900	2,130	1,450	8,340	1,540	2,080	8,650
16-----	6,270	2,350	39,800	1,890	1,520	7,760	1,630	1,710	7,530
17-----	6,060	2,810	46,000	1,640	1,340	5,930	1,580	1,700	7,250
18-----	6,290	3,630	61,600	1,530	1,490	6,160	1,480	1,590	6,350
19-----	6,270	2,820	47,700	1,480	1,300	5,190	1,440	1,480	5,750
20-----	6,240	2,460	41,400	1,370	1,250	4,620	1,410	1,680	6,400
21-----	7,070	4,100	78,300	1,360	1,340	4,920	1,760	2,240	10,600
22-----	7,330	3,690	73,000	1,340	1,090	3,940	1,760	3,190	15,200
23-----	8,810	6,970	166,000	1,420	1,120	4,290	1,600	5,660	24,500
24-----	7,970	7,650	165,000	1,380	2,160	8,050	1,680	2,850	12,900
25-----	6,740	3,760	68,400	1,430	2,570	9,920	1,720	1,460	6,780
26-----	5,760	2,730	42,500	1,460	1,780	7,020	1,800	1,590	7,730
27-----	5,030	2,510	34,100	1,480	1,130	4,520	1,580	1,080	4,610
28-----	4,420	2,330	27,800	1,570	1,340	5,680	1,530	1,000	a 4,100
29-----	4,200	2,190	24,800	1,620	1,910	8,350	1,520	1,030	4,230
30-----	4,420	2,350	28,000	1,480	1,220	4,880	1,490	1,010	4,080
31-----	4,670	2,890	36,400	1,350	940	3,430	--	--	--
Total-	195,260	--	1,944,300	89,400	--	918,700	48,770	--	251,750
Total discharge for year (cfs-days)									
Total load for year (tons)									
								1,066,274	
								8,458,318	

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
BIGHORN RIVER AT KANE, WYO.--Continued.

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Oct. 2, 1950	10:30 a. m.	3,020	42	2,750	2,190	--	37	42	47	54	63	68	84		91	BWCM	
	10:53 a. m.	3,090	45	2,650	4,550	--	39	--	51	--	68	80	97		100	SPWCM	
	11:10 a. m.	2,860	51	1,340	2,360	--	20	--	27	--	49	67	95		100	SPWCM	
	10:58 a. m.	2,480	53	1,010	1,420	--	19	--	23	--	48	--	--		--	SPWCM	
	10:56 a. m.	2,060	47	788	2,370	--	--	19	24	30	39	52	90		98	BWCM	
	Mar. 26, 1951	6:10 p. m.	3,390	43	3,320	4,260	--	21	--	28	--	65	81	97		100	SPWCM
		12:34 p. m.	1,890	52	1,380	1,830	--	39	--	44	--	65	71	97		100	SPWCM
		11:46 a. m.	1,520	41	1,270	2,150	--	35	--	50	--	62	76	98		100	SPWCM
		1:25 p. m.	1,400	47	1,020	1,660	--	30	--	42	--	50	66	96		100	SPWCM
		11:28 a. m.	1,900	47	1,570	2,660	--	26	--	38	--	61	75	96		100	SPWCM
May 2	3:22 p. m.	1,950	54	11,000	10,900	1	2	10	83	92	97	--	--		--	SPNM	
	3:22 p. m.	1,950	54	11,000	6,030	47	59	70	77	86	92	92	--		--	SPWCM	
	11:52 a. m.	1,639	59	1,690	59	--	39	--	52	--	60	80	96		100	SPWCM	
	10:51 a. m.	2,010	--	2,580	6,350	--	48	--	52	--	62	--	--		--	SPNM	
	2:24 p. m.	5,090	62	5,400	3,850	3	4	26	36	52	77	90	98		100	SPNM	
	May 21	2:24 p. m.	5,090	62	5,400	4,560	22	26	31	40	54	77	69	98		100	SPWCM
		3:28 p. m.	7,940	62	6,510	4,600	3	7	23	37	52	74	87	97		100	SPNM
		3:28 p. m.	7,940	62	6,510	3,760	19	22	28	36	52	77	88	97		100	SPWCM
		May 29	10,400	--	5,750	4,550	5	11	18	28	45	79	93	98		100	SPNM
		May 29	10,400	--	5,750	4,410	15	16	23	30	45	78	92	98		100	SPWCM
June 2	10:55 a. m.	14,900	48	4,890	3,310	6	12	34	43	53	72	90	99		100	SPNM	
	June 2	14,900	48	4,890	5,090	23	30	35	43	52	71	90	99		100	SPWCM	
	June 6	2,900	60	2,900	5,970	--	25	--	25	--	63	85	98		100	SPWCM	
	June 11	5,080	66	2,080	3,520	--	21	--	30	--	56	80	95		100	SPWCM	
	2:40 p. m.	10,800	62	2,720	3,380	--	23	--	32	--	50	78	97		100	SPWCM	
June 29	3:50 p. m.	5,700	--	1,900	3,320	--	26	--	38	--	60	81	98		100	SPWCM	
	July 5	10:55 a. m.	5,180	--	1,630	5,310	--	18	--	28	--	69	83	96		100	SPWCM
	July 10	10:35 a. m.	7,130	--	1,970	3,820	--	28	--	41	--	64	85	98		100	SPWCM

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
July 12, 1951.....	10:00 a. m.	8,860	57	--	13,000	8,550	58	--	76	--	91	97	99		SPWCM
July 13.....	3:55 p. m.	7,180	66	3	3,160	3,160	5	50	61	67	80	94	99	100	SPNM
July 13.....	3:55 p. m.	7,180	66		4,140	3,750	47	54	61	68	79	93	99	100	SPWCM
July 20.....	1:40 p. m.	6,040	77	--	2,340	2,660	26	--	38	--	61	81	96	100	SPWCM
July 21.....	2:00 p. m.	7,200	73	--	6,000	3,180	52	--	70	--	85	--	--	--	SPWCM
July 23.....	2:08 p. m.	9,260	71	3	5,230	3,870	3	34	44	60	80	--	--	--	SPNM
July 23.....	2:08 p. m.	9,260	71	24	5,230	6,140	31	40	50	63	80	--	--	--	SPWCM
Aug. 3.....	3:02 p. m.	4,360	--	--	2,050	3,620	35	--	48	--	64	79	95	100	SPWCM
Aug. 6.....	6:30 a. m.	5,810	70	44	10,000	5,540	55	69	79	84	90	--	--	--	SPWCM
Aug. 15.....	1:18 p. m.	2,060	68	--	1,500	3,080	38	--	50	--	66	79	94	99	SPWCM
Aug. 22.....	1:16 p. m.	1,330	72	--	968	1,980	34	--	46	--	63	--	--	--	SPWCM
Sept. 5.....	12:22 p. m.	1,690	--	--	1,240	2,500	44	--	54	--	63	79	96	100	SPWCM
Sept. 11.....	11:32 a. m.	1,780	57	--	6,090	14,800	69	--	89	--	92	--	--	--	SPWCM
Sept. 19.....	5:14 p. m.	1,440	65	--	2,220	2,220	53	--	53	--	72	--	--	--	SPWCM
Sept. 26.....	11:02 a. m.	1,890	--	36	1,170	2,520	44	51	56	61	66	71	91	98	EWCM

YELLOWSTONE RIVER BASIN--Continued

SHOSHONE RIVER BELOW CODY, WYO.

LOCATION.--At bridge on State Highway 14, 1½ miles downstream from Sage Creek, 1½ miles upstream from Corbett Dam, and 6 miles northeast of Cody, Park County.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

REMARKS.--No gaging station in vicinity of sampling point.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent calcium carbonate	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./nestum	Non-carbonate				
Oct. 10, 1950.....		15	0.02	54	15	38		158	131	8.0	0.2	1.1		368	0.50		196	66	30	537	7.6	0.001
Nov. 1.....		15	.04	54	16	31		156	126	5.5	.3	.9		344	.47		202	74	25	508	7.6	.000
Dec. 1.....		--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	.000
Jan. 8, 1951.....		15	.04	56	13	33		171	112	4.0	.4	.8		322	.44		192	52	27	505	7.5	.000
Feb. 2.....		16	.04	80	16	39		228	148	6.0	.2	1.2		420	.57		266	79	24	651	7.7	.000
Apr. 4.....		15	.01	61	13	37		186	120	5.5	.3	1.3		362	.49		206	53	28	552	7.6	.000
May 10.....		--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	.000
May 28.....		15	.07	26	5.1	20		94	45	2.0	.2	1.3		180	.24		86	86	9	263	7.3	.000
June 13.....		15	.06	25	5.2	20		92	45	2.0	.2	1.0		160	.22		84	9	34	243	7.2	.000
July 17.....		15	.04	22	4.4	16		75	39	2.4	.2	1.2		143	.19		73	11	32	216	6.9	.000
Aug. 15.....		15	.03	37	9.1	23		108	82	3.5	.1	1.0		234	.32		130	41	28	385	7.4	.000
Sept. 17.....		15	.02	54	14	40		155	137	6.0	.2	1.2		350	.48		192	65	31	528	7.4	.000

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.

LOCATION.--Two-hundred feet upstream from bridge on U. S. Highway 310, 400 feet upstream from gaging station, 1½ miles upstream from mouth, and 3 miles west of Lovell, Big Horn County.

RECORDS AVAILABLE.--Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Sediment concentrations: Maximum daily, 16,700 ppm Apr. 26; minimum daily, 580 ppm Apr. 18.

Sediment loads: Maximum daily, 14,800 tons July 11; minimum daily, 31 tons Apr. 18, 19.

REMARKS.--Records of discharge for period April to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Car- bonate (CO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ton (B)	Dissolved solids			Hardness as CaCO ₃		Per- cent sodium	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million		Tons per acre-foot	Calcium	Non-carbonate				
															Resi- due at 180°C	Sum							
Dec. 13, 1950.....	--	14	0.02	270	190	--	839	304	--	2,830	47	1.0	19	0.71	4,600	4,360	6.26	1,460	1,210	53	5,260	7.9	
Mar. 9, 1951.....	60	11	.08	336	207	--	866	491	--	2,960	48	.8	26	.62	5,100	4,710	0.94	1,680	1,280	53	5,560	7.7	
June 12.....	172	--	--	--	--	384	--	280	--	1,410	26	--	--	--	--	--	--	--	--	--	49	2,880	7.3
Sept. 11.....	--	--	--	--	--	230	--	220	--	825	19	--	--	--	--	--	--	--	--	--	47	1,980	7.6

Periodic determinations of suspended-sediment discharge, October 1950 to April 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Oct. 3, 1950.....	195	2,060	1,080
Mar. 22, 1951.....	31	1,720	144
Apr. 4.....	22	1,250	74
Apr. 11.....	21	740	42

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.--Continued

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	129	8,300	2,890	176	6,790	3,230
2-----	--	--	--	99	4,980	1,330	179	5,910	2,860
3-----	--	--	--	90	4,100	996	181	5,150	2,520
4-----	--	--	--	86	3,580	834	162	4,240	1,850
5-----	--	--	--	103	7,500	a 2,100	146	3,340	1,320
6-----	--	--	--	108	5,000	1,460	115	2,100	652
7-----	--	--	--	110	4,290	1,270	89	1,200	288
8-----	--	--	--	108	4,490	1,310	82	1,220	270
9-----	--	--	--	134	6,660	2,410	77	1,100	229
10-----	--	--	--	129	4,760	1,660	76	780	160
11-----	--	--	--	110	3,560	1,060	66	680	121
12-----	--	--	--	100	2,420	653	61	890	147
13-----	--	--	--	90	1,890	459	65	970	170
14-----	--	--	--	82	3,250	720	103	3,080	858
15-----	--	--	--	97	3,440	901	133	3,200	1,150
16-----	17	710	33	123	5,760	1,910	128	2,540	878
17-----	20	790	43	119	4,320	1,390	125	2,650	894
18-----	20	580	31	115	3,770	1,170	128	2,550	881
19-----	19	600	31	104	2,740	769	134	2,340	847
20-----	24	1,800	sb 200	104	2,960	831	138	2,250	838
21-----	56	4,300	b 650	117	3,100	979	222	4,500	s 2,930
22-----	57	4,290	660	110	3,170	941	222	5,130	3,070
23-----	52	3,840	539	114	3,010	926	220	4,610	2,740
24-----	62	7,610	s 1,460	109	3,160	930	216	4,260	2,480
25-----	72	11,000	sa 2,200	114	2,850	877	205	3,530	1,950
26-----	118	16,700	5,320	104	2,490	699	216	3,660	2,130
27-----	134	10,600	3,840	106	3,030	867	213	3,510	2,020
28-----	128	8,820	2,980	114	3,790	1,170	207	3,070	1,720
29-----	121	7,620	2,490	112	3,650	1,100	205	2,920	1,620
30-----	157	15,000	sa 7,200	115	3,780	1,170	193	2,680	1,400
31-----	--	--	--	152	5,880	2,410	--	--	--
Total-	1,057	--	27,677	3,407	--	38,192	4,483	--	42,221
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	189	2,620	1,340	145	2,110	826	218	2,890	1,700
2-----	183	2,570	1,270	146	2,730	1,080	222	1,720	1,030
3-----	174	1,690	888	148	2,420	967	222	1,660	895
4-----	150	1,360	551	162	2,230	975	218	1,830	1,080
5-----	129	1,270	442	162	2,580	1,130	213	1,890	1,090
6-----	110	1,090	324	185	3,590	1,790	197	1,960	1,040
7-----	115	1,470	456	191	3,150	1,620	201	1,660	901
8-----	129	1,770	616	205	3,330	1,840	201	1,660	901
9-----	138	1,860	693	201	2,890	1,570	187	1,350	682
10-----	422	9,460	s 13,600	183	2,310	1,140	185	1,500	749
11-----	398	13,800	14,800	179	2,090	1,010	172	1,330	618
12-----	281	10,700	8,120	179	1,980	957	177	1,640	784
13-----	241	6,880	4,480	189	2,090	1,070	181	1,490	728
14-----	189	4,950	2,530	201	2,320	1,260	172	1,450	673
15-----	199	5,000	2,690	211	2,790	1,590	181	1,510	738
16-----	201	5,030	2,730	205	2,520	1,390	189	1,560	796
17-----	181	3,460	1,690	205	2,230	1,230	197	1,580	840
18-----	185	3,200	1,600	193	2,350	1,220	197	1,460	777
19-----	172	2,850	1,320	161	2,200	956	191	1,280	680
20-----	166	2,990	1,340	166	1,530	686	183	1,190	588
21-----	170	3,230	1,480	162	1,580	691	187	1,240	626
22-----	183	2,780	1,360	162	1,790	783	193	1,350	703
23-----	174	2,830	1,330	148	1,870	747	211	1,380	786
24-----	162	2,640	1,150	172	2,460	1,140	207	1,430	799
25-----	153	2,820	1,160	195	2,750	1,450	205	1,380	764
26-----	141	3,060	1,160	203	2,820	1,550	201	1,420	771
27-----	140	2,940	1,110	226	3,280	2,000	195	1,260	663
28-----	143	2,440	942	222	3,190	1,910	205	1,540	852
29-----	148	2,750	1,100	246	3,300	2,190	197	1,160	617
30-----	148	2,900	1,160	237	2,930	1,870	183	1,090	539
31-----	146	2,500	986	216	2,910	1,700	--	--	--
Total-	5,660	--	74,418	5,806	--	40,338	5,888	--	24,490
Total discharge for period Apr. 16 to Sept. 30 (cfs-days)									
									26,301
Total load for period Apr. 16 to Sept. 30 (tons)									
									247,336

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
SAGE CREEK NEAR LOVELL, WYO.--Continued

Particle-size analyses of suspended sediment, March to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Mar. 22, 1951...	1:50 p. m.	31	34	1,720	3,520	--	50	--	88	--	92	--	--	--	SPWCM
Apr. 4.....	3:52 p. m.	22	--	1,250	3,060	--	62	--	87	--	98	--	--	--	SPWCM
Apr. 20.....	11:00 a. m.	17	--	546	1,020	9	60	77	86	92	96	97	99	100	BWCM
Apr. 24.....	4:05 p. m.	87	--	12,300	8,840	--	39	--	63	--	90	97	97	100	SPWCM
Apr. 26.....	1:56 p. m.	120	50	14,800	12,900	--	--	2	55	67	86	95	99	100	SPNM
Apr. 26.....	1:56 p. m.	120	50	14,800	6,880	37	41	50	59	70	87	96	100	--	SPWCM
Apr. 30.....	3:05 p. m.	203	--	26,900	4,950	--	32	--	54	--	81	--	--	--	SPWCM
May 2.....	4:54 p. m.	90	50	4,200	8,750	--	--	--	59	--	82	94	99	100	SPWCM
May 16.....	10:56 a. m.	115	64	4,440	7,130	--	28	--	42	--	73	93	100	--	SPWCM
May 25.....	1:42 p. m.	120	64	3,910	5,920	24	31	37	44	54	72	92	99	100	SPWCM
June 21.....	1:50 p. m.	266	--	6,290	4,610	1	2	25	43	56	75	91	99	100	SPNM
June 21.....	1:50 p. m.	266	--	6,290	6,660	23	28	36	44	55	74	89	99	100	SPWCM
July 3.....	2:02 p. m.	185	69	1,810	2,600	--	27	--	37	--	64	86	99	100	SPWCM
July 11.....	12:08 p. m.	333	52	14,600	12,800	--	1	6	46	60	80	95	100	--	SPNM
July 11.....	12:08 p. m.	333	52	14,600	9,050	26	32	40	49	62	82	96	100	--	SPWCM
July 13.....	2:37 p. m.	248	--	6,770	5,350	--	26	--	42	--	70	91	99	100	SPWCM
July 20.....	3:12 p. m.	166	--	2,830	3,560	--	28	--	40	--	59	82	99	100	SPWCM
July 26.....	1:56 a. m.	137	--	2,740	4,860	--	33	--	49	--	77	94	100	--	SPWCM
Aug. 1.....	3:41 p. m.	148	81	4,580	4,360	--	30	--	45	--	68	86	99	100	SPWCM
Aug. 15.....	4:16 p. m.	224	69	2,950	4,300	--	25	--	36	--	64	85	99	100	SPWCM
Sept. 11.....	1:28 p. m.	172	54	1,300	1,340	--	22	--	30	--	43	65	96	100	SPWCM
Sept. 20.....	9:50 a. m.	187	53	1,150	1,240	--	25	--	30	--	47	68	96	100	SPWCM
Sept. 26.....	1:14 p. m.	207	53	1,570	1,850	--	23	--	32	--	52	68	95	100	SPWCM

YELLOWSTONE RIVER BASIN--Continued

SHOSHONE RIVER AT KANE, WYO.

LOCATION.--At bridge on county road, three-quarters of a mile upstream from mouth and 1 mile north of Kane, Big Horn County.
 RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
 REMARKS.--No gaging station in vicinity of the sampling station.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 10, 1950.....		15	0.02	80	31	123		206	383	16	0.4	4.5		784	1.07		327	158	45	1,100	7.8	0.001
Nov. 1.....		16	.02	81	31	114		219	360	12	.5	4.6		768	1.04		328	148	43	1,030	7.7	.000
Dec. 13.....		15	.06	73	25	95		196	288	11	.4	5.6		630	.86		285	124	42	831	7.7	.000
Jan. 8, 1951.....		13	.04	74	22	79		187	255	9.0	.6	4.0		564	.77		273	111	39	831	7.8	.000
Feb. 2.....		17	.04	113	29	108		260	368	13	.6	6.0		806	1.10		402	172	37	1,140	7.7	.000
Mar. 9.....		15	.04	107	31	127		270	408	14	.6	6.9		862	1.17		396	175	41	1,200	7.6	.001
Apr. 1.....		13	.01	91	25	112		269	359	13	.5	6.4		712	.97		308	135	44	1,000	7.6	.000
May 6.....		17	.02	46	13	57		139	159	8.5	.4	2.4		368	.50		159	45	44	558	7.8	.000
June 8.....		17	.03	122	40	122		122	144	5.5	.2	2.6		354	.48		149	49	43	511	7.7	.000
June 12.....		15	.04	45	13	56		140	155	5.0	.3	2.8		384	.50		165	50	42	543	7.5	.000
July 10.....		17	.02	54	16	77		144	227	6.2	.6	3.1		490	.67		200	82	46	717	7.5	.000
Aug. 15.....		16	.02	73	25	110		184	340	9.0	.2	4.6		712	.97		283	132	46	1,000	7.4	.000
Sept. 5.....		14	.02	70	25	104		182	323	9.5	.2	4.6		667	.91		276	127	45	953	7.6	.000

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.

LOCATION.--At bridge on U.S. Highways 10 and 12, 1 mile (revised) upstream from mouth, 1 mile southwest of Bighorn, Treasure County, and 3½ miles downstream from gaging station near Custer, Mont.

RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1951.

Water temperatures: April 1949 to September 1951.

Sediment records: July 1947 to September 1951.

EXTREMES, 1950-51.--Dissolved solids (January to September): Maximum, 860 ppm Feb. 1-10; minimum, 304 ppm June 23.

Hardness (January to September): Maximum, 432 ppm Feb. 1-10; minimum, 151 ppm June 23.

Specific conductance (January to September): Maximum daily, 1,270 micromhos Feb. 2; minimum daily, 384 micromhos June 23.

Water temperatures: Maximum, 75°F on several days during July and August; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 8,460 ppm July 14; minimum daily, 46 ppm Dec. 6.

Sediment loads: Maximum daily, 330,000 tons June 4; minimum daily, 173 tons Dec. 6.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum, 75°F on several days during July and August 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 20,000 ppm Sept. 23, 1949; minimum daily, not determined.

Sediment loads: Maximum daily, 539,000 tons June 4, 1948; minimum daily, 136 tons Dec. 11, 1949.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. No appreciable inflow between gaging station and sampling point except small amounts of irrigation waste water. Discharge records for gaging station near Custer for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent non-carbonate	Specific conductance (micro-mhos at 25°C)	pH	Col- or
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 2, 1950 a.....	4,830	13	0.02	81	28	99	3.5	196	0	335	14	0.2	2.8	0.10	696	0.95	8,700	318	157	40	885	7.7	5
Oct. 3 a.....	4,580	16	.02	95	24	100	3.9	222	0	338	14	.2	3.7	.20	708	.96	8,760	334	152	35	894	7.7	3
Dec. 4 a.....	3,230	17	.04	90	33	100	6.8	244	0	368	15	.2	2.5	.14	784	1.07	8,840	360	160	37	1,080	8.0	3
Jan. 5-8, 1951.....	2,200	15	.06	105	39	106	2.6	256	0	370	17	.4	4.1	.18	830	1.13	4,800	384	188	35	1,130	8.0	--
Jan. 23.....	2,300	17	.12	81	39	93	3.5	240	0	280	95	.4	3.8	.13	785	1.07	8,880	364	167	35	1,180	8.0	6
Jan. 24-25.....	2,300	14	.06	92	24	79	2.1	220	0	285	15	.4	3.5	.14	692	.93	5,960	330	150	34	1,198	8.0	3
Feb. 1-10.....	2,370	16	.06	116	35	103	4.7	282	0	363	19	.4	4.2	.19	860	1.17	5,500	432	201	34	1,170	8.0	4
Feb. 14-15.....	2,700	11	.06	87	21	86	3.6	210	0	280	15	.4	4.8	.13	672	.91	4,900	304	132	38	522	7.7	8
Feb. 16-28.....	2,715	12	.06	87	24	81	2.6	200	0	288	14	.4	4.5	.13	690	.94	5,060	314	150	36	520	8.0	8
Mar. 7-15.....	2,133	13	.10	98	30	89	5.1	236	0	320	17	.4	3.9	.17	768	1.04	4,420	366	172	34	920	7.5	4
Mar. 16-17.....	3,300	10	.10	73	21	64	3.9	174	0	240	11	.4	3.5	.20	540	1.04	4,810	268	126	34	782	7.7	17
Mar. 18.....	3,000	19	.16	--	--	103	3.4	236	8	370	16	--	4.3	.20	768	1.04	6,220	384	177	37	1,060	8.2	7
Mar. 26-28.....	5,100	9.7	.10	64	25	61	7.3	165	0	245	8.5	.4	3.6	.13	546	.74	7,230	282	126	33	747	7.6	15
Mar. 29-30.....	5,300	12	.20	80	20	73	3.6	180	0	258	12	.4	3.8	.14	622	.85	9,660	280	132	36	840	8.1	17
Mar. 31-Apr. 6.....	3,837	13	.20	86	29	92	3.2	214	0	313	15	.4	3.4	.08	738	1.00	7,650	332	157	37	984	7.8	6

a Not included in weighted average.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Chemical analyses, in parts per million, water year October 1950 to September 1951.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Apr. 7-22, 1951....	2,970	16	0.02	85	33	91	3.4	220	0	345	16	0.5	3.3	0.13	722	0.98	5,700	347	167	36	1,020	7.8	3
Apr. 23-May 24....	5,221	16	.02	61	20	69	2.5	169	0	214	17	.3	3.4	.06	502	.80	7,130	235	96	39	743	7.9	4
May 25-29.....	10,470	16	.05	46	13	44	2.3	143	0	144	7	.3	3.6	.07	366	.50	10,300	175	58	35	540	7.7	7
May 30-June 22....	12,830	18	.03	40	13	40	2.3	137	0	130	5.5	.3	3.0	.06	354	.48	12,300	169	51	34	510	7.9	7
June 23-24.....	13,000	24	.10	42	11	40	2.0	137	0	106	5.0	.2	1.9	.29	304	.41	12,300	159	39	36	445	7.7	10
June 24-30.....	11,040	19	.02	45	13	39	2.0	136	0	129	5.5	.3	2.1	.08	342	.47	10,200	164	52	34	501	7.5	5
July 1-31.....	9,457	17	.02	47	13	51	2.3	132	0	163	6.5	.3	2.8	.07	390	.53	9,960	172	64	39	567	7.8	6
Aug. 1-31.....	4,865	16	.02	66	20	81	3.1	160	0	269	10	.4	3.6	.14	578	.76	7,590	248	117	41	821	8.0	7
Sept. 1-30.....	3,161	16	.02	89	30	120	3.6	206	0	403	16	.4	3.2	.15	816	1.11	6,960	345	176	43	1,140	7.9	7
Weighted average ^b	5,862	17	0.04	60	18	63	2.7	c 161	--	210	9.2	0.3	3.2	0.10	491	0.67	7,770	224	92	38	703	--	--

^b For period of daily sampling only. Includes estimates where data are missing. Represents 77 percent of runoff for water year October 1950 to September 1951.^c Includes carbonate as bicarbonate.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 Once-daily temperature measurement between 7 a. m. and 10 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	45	46	32	--			--	50	54	63	75	64
2	42	--	a32	--			--	51	48	64	74	63
3	45	a45	a33	--			--	51	48	63	75	--
4	44	43	a32	a32			--	a58	52	61	75	56
5	46	44	--	32			--	54	54	68	74	59
6	50	43	--	--			--	55	56	70	73	60
7	48	41	--	--			--	58	58	71	73	--
8	48	a36	--	--			--	58	58	69	--	64
9	a51	33	a32	--			--	58	60	67	67	64
10	48	--	--	--			--	57	61	63	66	--
11	51	33	--	--			--	57	63	60	68	60
12	52	33	--	--			--	58	65	51	68	56
13	55	--	--	--			--	59	65	61	68	--
14	55	34	--	--			--	56	--	66	--	55
15	55	34	--	--			--	57	67	69	66	59
16	55	33	--	--			--	57	67	--	69	53
17	54	34	--	--			a49	59	67	73	69	54
18	53	32	--	--			--	63	66	74	69	56
19	53	--	--	--			46	61	65	75	--	53
20	53	33	--	--			39	61	--	75	--	57
21	50	--	--	--			36	a65	62	--	--	41
22	50	--	--	--			38	65	61	69	67	53
23	49	--	--	--			43	65	60	70	67	52
24	47	--	--	--			42	65	64	72	67	47
25	47	--	--	--			46	62	62	71	65	47
26	49	33	--	--			--	58	63	71	63	47
27	47	33	--	--			50	59	61	72	62	46
28	47	33	--	--			50	63	63	74	61	45
29	48	33	--	--			51	--	61	75	64	48
30	48	33	--	--			--	58	61	75	65	--
31	46	--	--	--			--	a54	--	75	65	--
Average	49	--	--	--			--	58	60	69	68	54

a Observations made between 1 p. m. and 6 p. m.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Suspended sediment water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4,330	1,370	16,000	3,810	549	5,350	3,530	652	6,210
2-----	4,630	1,480	18,500	3,880	522	5,190	3,370	510	a4,600
3-----	4,580	1,770	21,900	3,880	549	5,450	3,320	400	b3,600
4-----	4,770	1,810	23,300	3,880	495	4,920	3,230	423	3,890
5-----	4,860	1,960	25,700	3,680	531	5,250	1,880	--	e1,000
6-----	4,660	1,740	21,900	3,580	585	5,650	1,390	46	173
7-----	4,410	1,540	18,300	3,610	549	5,350	950	84	216
8-----	4,330	1,350	15,800	3,580	639	6,180	1,450	72	282
9-----	4,380	1,090	12,900	3,580	697	6,740	2,080	110	618
10-----	4,440	949	11,400	3,320	688	6,160	2,380	154	990
11-----	4,360	852	10,000	3,490	1,170	11,000	3,000	300	b2,400
12-----	4,260	852	9,840	3,440	684	6,350	3,200	420	b3,600
13-----	4,330	787	9,200	3,300	700	a6,200	3,400	380	b3,500
14-----	4,330	824	9,630	2,940	787	6,250	3,800	390	4,000
15-----	4,250	713	8,180	3,120	900	7,580	3,600	430	b4,200
16-----	4,250	761	8,730	3,560	1,080	10,400	3,000	840	b6,800
17-----	4,220	739	8,420	3,580	738	7,130	2,700	840	b6,100
18-----	4,170	648	7,300	3,510	396	3,750	2,700	840	b6,100
19-----	3,980	688	7,370	3,580	360	a3,500	2,800	750	a5,700
20-----	3,930	598	6,340	3,660	540	5,340	2,900	570	a4,500
21-----	3,800	574	5,890	3,800	560	a5,700	3,000	505	4,090
22-----	3,730	596	6,000	3,760	610	b6,200	3,200	630	5,440
23-----	3,660	537	5,310	3,610	490	a4,800	3,000	765	6,200
24-----	3,530	563	5,360	3,680	585	5,810	2,900	720	5,640
25-----	3,460	515	4,810	3,860	594	6,190	2,900	475	3,720
26-----	3,410	487	4,480	3,760	522	5,300	2,900	423	3,310
27-----	3,370	511	4,650	3,860	589	6,140	2,700	550	4,010
28-----	3,210	432	3,740	3,660	562	5,550	2,800	625	4,720
29-----	3,230	471	4,110	3,800	684	7,020	2,700	560	4,080
30-----	3,410	605	5,570	3,830	655	6,770	2,700	545	3,980
31-----	3,560	623	5,990	--	--	--	2,600	520	3,650
Total-	125,860	--	326,780	107,780	--	183,220	86,080	--	117,119
Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	2,300	249	1,550	1,900	65	b330	2,500	--	e1,700
2-----	2,100	204	1,160	2,000	116	626	2,500	--	e1,600
3-----	2,000	125	675	2,300	176	1,090	2,200	--	e1,500
4-----	2,200	158	938	2,400	188	1,220	2,200	--	e1,400
5-----	2,300	260	1,060	2,500	115	776	2,100	--	e1,300
6-----	2,200	271	1,610	2,400	--	e750	1,900	--	e1,200
7-----	2,100	320	b1,800	2,400	108	700	1,800	247	1,200
8-----	2,200	188	1,120	2,500	98	662	1,700	225	1,030
9-----	2,300	--	e1,000	2,600	218	1,530	1,700	230	a1,100
10-----	2,200	--	e1,100	2,700	420	3,060	1,900	280	b1,400
11-----	2,200	--	e1,200	3,000	930	7,530	2,100	240	b1,400
12-----	2,200	--	e1,300	2,900	--	e7,000	2,200	336	2,000
13-----	2,300	--	e1,400	2,800	--	e6,000	2,300	270	1,680
14-----	2,400	--	e1,800	2,700	755	5,500	2,600	298	2,090
15-----	2,500	--	e2,100	2,700	750	5,470	2,900	315	2,470
16-----	2,600	--	e2,500	2,800	480	3,630	3,400	705	6,470
17-----	2,600	--	e2,900	2,900	610	4,780	3,200	990	8,550
18-----	2,600	--	e2,600	2,900	1,000	7,830	3,000	2,600	b21,000
19-----	2,700	--	e3,200	2,800	995	7,520	2,900	--	e20,000
20-----	2,600	--	e3,000	2,800	930	b7,000	2,900	--	e20,000
21-----	2,500	--	e2,900	2,700	740	5,390	2,900	--	e20,000
22-----	2,400	--	e2,800	2,600	450	3,160	3,200	--	e30,000
23-----	2,300	448	2,780	2,700	530	3,860	3,800	--	e40,000
24-----	2,200	167	992	2,700	475	3,460	4,000	--	e42,000
25-----	2,100	219	1,240	2,700	515	3,750	4,200	--	e44,000
26-----	2,000	--	e1,100	2,600	340	2,390	4,800	3,730	48,300
27-----	1,700	--	e900	2,600	270	1,900	5,000	4,100	55,400
28-----	1,500	--	e700	2,500	264	1,780	5,500	3,800	56,400
29-----	1,200	--	e500	--	--	--	6,000	4,250	68,800
30-----	1,100	--	e220	--	--	--	5,500	5,490	81,500
31-----	1,600	--	e260	--	--	--	4,010	3,830	41,500
Total-	67,200	--	48,405	73,100	--	98,694	96,910	--	626,990

e Estimated.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN

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YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4,080	2,380	26,300	5,060	1,550	21,200	15,900	6,040	259,000
2-----	4,250	1,980	22,700	5,390	2,950	42,900	17,100	6,340	293,000
3-----	3,760	1,540	15,600	6,440	4,320	75,100	16,300	6,530	323,000
4-----	3,730	1,480	14,900	5,310	4,570	65,500	17,000	7,200	350,000
5-----	3,460	1,340	12,500	4,820	6,220	80,900	14,600	7,180	283,000
6-----	3,560	1,420	13,600	4,450	2,470	29,700	12,900	5,110	178,000
7-----	3,440	1,200	11,100	4,210	1,850	21,000	12,000	3,850	125,000
8-----	3,300	1,040	9,270	4,180	1,510	17,000	11,000	3,480	103,000
9-----	3,440	1,120	10,400	4,210	1,320	15,000	10,400	2,610	73,300
10-----	3,180	1,050	9,020	5,060	1,980	27,000	9,750	2,160	56,900
11-----	3,120	1,020	8,560	4,900	2,200	29,100	9,400	2,090	53,000
12-----	3,060	1,170	9,670	4,650	2,180	27,400	8,820	1,780	42,400
13-----	3,000	1,050	8,500	4,550	1,830	22,500	8,400	1,680	37,600
14-----	2,800	1,050	7,940	4,820	1,590	20,700	8,520	1,550	35,700
15-----	2,830	1,030	7,870	5,010	1,490	20,200	9,360	1,810	45,700
16-----	3,140	1,010	8,560	5,330	1,820	26,200	9,710	2,270	59,500
17-----	2,940	756	6,000	5,220	1,980	27,900	11,400	3,920	121,000
18-----	2,810	731	5,550	4,800	1,680	21,800	13,500	4,600	168,000
19-----	2,800	748	5,250	4,650	1,570	19,700	15,200	4,680	192,000
20-----	2,640	790	5,630	5,770	1,960	30,500	15,400	3,800	158,000
21-----	2,530	798	5,450	6,510	2,560	45,000	15,900	3,350	144,000
22-----	2,690	1,130	8,980	7,410	3,740	74,800	16,000	3,020	130,000
23-----	4,500	2,900	35,200	7,410	3,460	69,200	15,000	2,860	116,000
24-----	4,600	2,340	29,100	7,630	3,460	71,300	13,600	2,650	97,300
25-----	4,900	2,540	33,600	8,970	4,840	117,900	12,500	2,510	84,700
26-----	5,170	2,280	31,800	9,870	5,590	149,000	11,600	2,280	71,400
27-----	5,080	1,700	23,300	10,900	5,380	158,000	10,700	2,180	63,000
28-----	5,060	1,760	24,000	11,200	5,030	152,000	10,000	1,970	53,200
29-----	5,030	1,690	23,000	11,400	4,990	154,000	9,750	1,760	46,300
30-----	4,930	1,600	21,000	13,100	6,630	242,000	9,160	1,770	43,600
31-----	--	--	--	14,800	6,460	256,000	--	--	--
Total-	109,640	--	454,000	208,030	--	2,131,600	372,870	--	3,786,800
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	8,780	1,590	37,700	7,270	1,680	33,000	3,200	623	5,380
2-----	8,780	1,490	35,300	7,380	1,790	35,700	3,200	1,090	9,420
3-----	8,700	1,420	33,400	6,830	1,560	28,800	3,200	913	7,890
4-----	8,330	1,250	28,100	6,290	1,780	30,200	3,340	756	6,820
5-----	8,330	1,240	27,900	6,040	1,640	26,700	3,410	690	6,350
6-----	8,780	1,500	35,600	8,040	2,460	53,400	3,490	975	9,190
7-----	9,200	1,650	41,000	8,740	7,390	174,000	3,510	819	7,760
8-----	9,360	1,620	40,900	8,290	7,230	162,000	3,510	725	6,870
9-----	9,160	1,520	37,600	8,370	3,260	73,700	3,370	561	5,100
10-----	9,090	1,550	38,000	7,480	3,930	79,400	3,440	608	5,650
11-----	10,800	2,640	77,000	6,360	2,510	43,100	3,510	764	7,240
12-----	13,000	5,900	207,000	6,110	2,160	35,600	3,160	624	5,320
13-----	13,700	7,370	273,000	5,450	1,980	29,100	3,010	1,040	8,450
14-----	11,700	8,460	267,000	4,980	1,460	19,600	3,030	1,670	13,700
15-----	11,100	4,190	126,000	4,680	2,000	25,300	2,990	932	7,500
16-----	10,400	2,170	60,900	4,060	1,590	17,400	2,790	640	4,820
17-----	9,870	1,910	50,900	3,620	1,320	12,900	2,920	632	4,980
18-----	9,480	1,720	44,000	3,220	784	6,820	2,920	664	5,230
19-----	9,710	2,190	57,400	2,960	704	5,630	2,770	640	4,790
20-----	9,240	2,620	65,400	2,910	640	5,030	2,750	576	4,280
21-----	8,890	1,990	47,800	2,710	560	4,100	2,750	543	4,030
22-----	10,200	2,140	58,900	2,620	553	3,910	2,960	664	5,310
23-----	10,600	3,740	107,000	2,640	648	4,620	3,280	877	7,770
24-----	12,100	4,130	135,000	2,620	588	4,160	3,340	1,060	9,560
25-----	9,750	4,870	128,000	2,690	577	4,190	3,280	1,180	10,500
26-----	8,590	5,240	122,000	2,810	640	4,860	3,280	2,350	20,800
27-----	8,040	2,170	47,100	2,830	735	5,810	3,210	1,180	10,100
28-----	7,270	1,810	35,500	2,830	908	7,180	3,120	765	6,440
29-----	6,760	1,650	30,100	3,160	1,640	14,000	3,070	765	6,340
30-----	6,400	1,670	26,900	3,300	1,070	9,530	3,030	679	5,550
31-----	7,050	1,630	31,000	3,340	874	7,880	--	--	--
Total-	293,180	--	2,355,400	150,830	--	987,620	94,830	--	223,140

Total discharge for year (cfs-days)-----1,786,290

Total load for year (tons)-----11,319,988

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
BIGHORN RIVER AT BIGHORN, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Oct. 2, 1950.....	12:45 p.m.	4,690	--	1,520	3,300	--	26	--	42	--	65	82	99		100	SPWCM	
Oct. 13.....	10:35 a.m.	4,330	57	752	1,390	--	26	--	37	--	55	72	97		100	SPWCM	
Feb. 11, 1951.....	9:15 a.m.	a3,000	--	1,080	788	--	67	71	74	77	81	89	98		100	BWCM	
Mar. 26.....	8:00 a.m.	a4,800	--	3,180	2,590	--	62	--	79	--	89	--	--		--	SPWCM	
Mar. 27.....	10:00 a.m.	a5,000	--	3,540	3,050	--	66	--	87	--	98	--	--		--	SPWCM	
Mar. 28.....	6:00 p.m.	a5,500	--	5,240	3,830	--	45	--	66	--	84	--	--		--	SPWCM	
Mar. 30.....	6:00 p.m.	a5,500	--	7,320	5,400	--	31	--	51	--	86	--	--		--	SPWCM	
Apr. 6.....	4:52 p.m.	3,560	--	1,360	2,820	4	8	48	58	67	69	86	98		100	SPNM	
Apr. 6.....	4:52 p.m.	3,560	--	1,360	2,400	35	44	52	59	64	73	88	98		100	SPWCM	
Apr. 17.....	1:06 p.m.	2,850	49	646	1,390	--	41	--	51	--	65	82	97		100	SPWCM	
May 1.....	2:08 p.m.	5,110	57	1,480	4,750	19	25	30	38	48	60	76	100		--	BWCM	
May 5.....	6:00 p.m.	5,250	58	6,270	3,760	--	67	--	83	--	90	--	--		--	SPWCM	
May 5.....	5:00 p.m.	4,930	--	4,420	2,430	--	63	--	76	--	86	--	--		--	SPWCM	
May 17.....	9:46 a.m.	5,280	--	1,960	4,230	--	38	--	58	--	76	89	99		100	SPWCM	
June 6.....	4:38 p.m.	12,600	--	4,320	2,900	2	4	34	40	50	69	88	99		100	SPNM	
June 6.....	4:38 p.m.	12,600	--	4,320	2,800	24	31	37	42	51	69	87	99		100	SPWCM	
June 19.....	3:20 p.m.	15,200	67	4,840	2,980	5	11	21	31	43	74	91	99		100	SPNM	
June 19.....	3:20 p.m.	15,200	67	4,840	2,880	16	19	26	35	47	74	90	99		100	SPWCM	
June 30.....	1:30 p.m.	9,200	64	1,990	2,940	18	23	30	34	40	58	83	98		100	SPWCM	
July 17.....	3:29 p.m.	9,750	76	1,980	3,620	--	31	--	42	--	66	85	98		100	SPWCM	
July 31.....	12:38 p.m.	6,980	78	1,590	3,020	--	33	--	45	--	62	83	97		100	SPWCM	
Aug. 8.....	5:00 p.m.	8,440	--	9,860	5,940	--	72	--	90	--	95	--	--		--	SPWCM	
Aug. 15.....	4:10 p.m.	4,700	70	1,910	3,730	--	50	--	66	--	76	--	--		--	SPWCM	
Sept. 5.....	1:16 p.m.	3,360	64	723	1,640	30	37	42	46	50	56	63	87		97	BWCM	
Sept. 17.....	2:24 p.m.	2,920	58	768	2,260	33	45	52	56	59	63	69	93		100	BWCM	

a Mean daily discharge.

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.--Chemical analyses: January to September 1951.

Water temperatures: April 1949 to September 1951.

Sediment records: June 1946 to September 1951 (discontinued).

EXTREMES, 1950-51.--Dissolved solids (January to September): Maximum, 432 ppm Jan. 4-31; minimum, 148 ppm June 8-11.

Specific conductance (January to September): Maximum, 846 ppm May 1-8; minimum, 234 ppm June 8-11.

Water temperatures (January to September): Maximum daily, 1,340 microhms May 9; minimum daily, 338 microhms June 9.

Sediment concentrations: Maximum daily, 14,900 ppm Aug. 25; minimum daily, not determined.

Sediment loads: Maximum daily, 63,200 tons Sept. 2; minimum daily, not determined.

EXTREMES, 1946-51.--Water temperatures (1949-51): Maximum, 78°F July 28, 29, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 18,900 ppm Aug. 13, 1946; minimum daily, 1 ppm Aug. 14, 15, 1947.

Sediment loads: Maximum daily, 122,000 tons June 5, 1946; minimum daily, less than 1 ton on several days during 1947-49.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Miles City, Mont. Flow affected by ice Nov. 8 to Apr. 3.

Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (microhms at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
Jan. 4-31, 1951.	211	11	0.06	87	52	62	4.4	342	0	285	5.0	2.1	0.10	688	0.94	392	432	152	24	988	7.9	15
Feb. 1-26	224	17	0.06	75	43	60	4.8	288	0	235	4.5	2.3	0.35	604	82	365	362	126	26	868	7.5	15
Mar. 1-15	211	11	0.01	64	45	54	4.6	266	0	227	4.5	2.7	0.10	558	76	318	344	126	25	838	8.1	6
Mar. 16-Apr. 1	258	9.0	0.06	53	35	54	4.2	204	9	198	3.0	4.1	0.13	550	75	383	277	95	29	702	8.4	5
Apr. 2-14	408	8.4	0.25	59	37	53	4.4	212	12	208	3.5	5.2	0.10	584	79	643	299	105	27	731	8.5	7
Apr. 15-30	107	8.4	0.02	68	49	85	5.2	300	0	295	6.0	5.6	0.19	670	91	194	370	124	33	891	8.1	8
May 1-8	481	8.4	0.05	66	58	130	6.8	331	0	400	7.5	3	1.0	846	1.15	110	401	130	41	1,220	8.0	8
May 9-10	566	12	0.04	73	49	99	7.0	295	0	343	6.5	3	1.6	13	1.02	130	383	141	35	1,080	7.7	9
May 11-June 5	668	13	0.06	56	24	38	3.4	203	0	150	2.5	2.5	0.09	396	54	714	238	72	25	605	7.7	8
June 8-11	799	11	0.04	36	14	16	2.3	143	0	64	1.0	3	0.05	234	32	505	148	31	19	354	7.5	8
June 12-24	340	11	0.04	45	20	32	2.9	183	0	112	2.0	2.3	0.07	322	44	296	195	45	26	505	7.6	7
June 25-July 15	519	15	0.03	41	19	25	2.1	164	5	90	1.0	2	0.08	282	38	395	180	37	23	448	8.3	7
July 16-Aug. 6	475	15	0.03	43	21	24	2.4	178	0	95	1.5	2	0.07	292	40	374	194	48	21	466	8.1	8
Aug. 7-23	131	14	0.05	50	27	51	3.7	226	0	152	2.5	4	0.09	413	56	146	237	52	31	638	8.0	8
Aug. 24-Sept. 5	781	16	0.12	44	17	62	3.9	216	0	135	5	4	0.12	395	54	833	180	3	42	603	7.6	90
Sept. 6-30	364	12	0.05	55	32	44	3.9	222	5	165	2.5	2	0.07	428	58	421	270	80	26	661	8.3	8
Weighted average ^a	358	13	0.06	54	28	44	3.6	221	--	160	2.5	0.3	1.9	0.11	431	0.59	250	69	27	638	--	--

^a Represents 75 percent of runoff for water year October 1950 to September 1951.^b Includes carbonate as bicarbonate.

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 6 a. m. and 10 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	41	--	32		32	32	34	51	48	63	75	61
2	40	40	--		32	32	35	48	42	63	71	59
3	41	--	--		32	32	34	48	46	56	70	57
4	41	38	--		32	32	43	49	47	63	70	54
5	46	--	32		32	32	47	55	58	66	72	56
6	51	39	32		32	32	47	52	59	70	69	56
7	46	--	32		32	32	40	49	--	70	69	62
8	43	36	32		32	32	43	54	--	64	--	63
9	50	--	32		32	32	45	55	61	63	--	--
10	44	33	32		32	32	40	57	64	60	--	56
11	49	--	32		32	32	35	57	62	56	--	61
12	51	--	32		32	32	35	57	64	59	--	52
13	55	34	32		32	32	45	60	68	64	60	53
14	53	--	32		32	32	37	55	64	69	61	52
15	--	34	32		32	32	32	58	66	72	58	47
16	50	--	32		32	32	35	57	65	72	63	51
17	--	--	32		32	32	42	61	64	73	64	53
18	49	34	32		32	32	42	62	62	74	64	55
19	48	--	32		32	32	32	59	63	75	66	54
20	49	--	32		32	32	32	61	62	74	61	56
21	47	--	32		32	32	33	57	58	71	59	48
22	44	--	32		32	32	39	59	59	70	61	50
23	--	--	32		32	33	43	62	60	68	65	48
24	42	--	32		32	33	42	64	64	72	66	49
25	--	--	32		32	33	43	59	62	74	60	46
26	43	--	32		32	34	47	54	61	72	60	48
27	--	--	--		32	33	52	56	59	73	61	--
28	42	--	--		32	33	53	64	58	76	59	--
29	43	--	--		--	33	56	56	57	78	65	48
30	--	--	32		--	33	54	56	56	72	65	52
31	45	--	32		--	33	--	50	--	74	65	--
Average	46	--	32		32	32	41	56	59	69	65	54

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	556	975	1,460	385	--	e 100	360	35	34
2-----	478	450	581	395	160	171	340	--	e 20
3-----	550	270	401	400	52	56	300	--	e 15
4-----	568	220	337	406	24	26	260	--	e 10
5-----	568	200	306	406	--	e 30	220		
6-----	556	230	345	400	32	35	190		
7-----	472	185	236	395	--	e 60	170	18	9
8-----	436	107	126	390	100	105	190		
9-----	430	132	153	380	--	e 70	210	--	e 10
10-----	430	64	74	380	40	41	220	--	e 10
11-----	424	64	73	390	--	e 40	210	--	e 15
12-----	418	80	90	400	--	e 90	210	43	24
13-----	406	115	126	440	224	266	220	--	e 25
14-----	300			530	--	e 600	210	--	e 25
15-----	226			500	382	516	200		
16-----	246			480	--	e 180	190		
17-----	260	50	38	480	--	e 80	180	15	a 7
18-----	280			440	30	36	160		
19-----	380			400	--	e 20	135		
20-----	380			380	--	e 10	135	--	e 8
21-----	280			390	14	15	160	--	e 15
22-----	214	100	65	380	--	e 15	240		
23-----	174			360	--	e 15	250		
24-----	152			380	25	26	240	45	a 30
25-----	129	18	6	380	--	e 30	220		
26-----	142			370	--	e 25	200		
27-----	234	28	14	390	--	e 30	220	--	e 30
28-----	170			420	39	44	210	--	e 20
29-----	149			400	--	e 70	200	29	16
30-----	335	38	29	380	--	e 50	200	--	e 15
31-----	370			--	--	--	180	--	e 10
Total-	10,713	--	4,996	12,227	--	2,852	6,630	--	523
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	170	--	e 10	180	16	8	220	33	20
2-----	180	--	e 10	200			210	26	15
3-----	170			220			210	26	15
4-----	160			220			210	--	e 15
5-----	150			210			210	--	e 15
6-----	160			200			200	--	e 15
7-----	170	16	8	200			200	34	18
8-----	180			210			200	40	22
9-----	190			230			210	49	28
10-----	200			240	120	b 80	200	67	36
11-----	210			230	409	254	200	67	36
12-----	250			210	410	232	210	22	12
13-----	270	19	13	220	184	109	220	22	13
14-----	270			230	188	117	230	25	16
15-----	270			240	137	89	240	70	b 45
16-----	270			230	115	71	230	428	265
17-----	260			220	96	57	220	575	342
18-----	245			230	100	62	220	258	153
19-----	230			230	69	43	220	184	109
20-----	220	25	16	230	89	55	230	152	94
21-----	220			240			240	175	113
22-----	220			240			240	156	101
23-----	220			240			250	266	194
24-----	210			230			260	227	159
25-----	210	29	16	240	46	29	270	270	a 200
26-----	200	20	11	230			270	310	226
27-----	190	30	b 15	230			260	262	184
28-----	190	35	a 20	230			260	228	160
29-----	190	45	23	--	--	--	270	238	174
30-----	180	48	23	--	--	--	270	309	225
31-----	170	23	11	--	--	--	320	600	b 520
Total-	6,425	--	410	6,260	--	1,569	7,200	--	3,540

e Estimated.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	350	840	b 790	55			741	1,000	2,000
2-----	380	1,060	1,090	49			797	3,870	8,330
3-----	410	958	1,060	49			811	5,260	11,500
4-----	466	733	922	48			574	2,820	4,370
5-----	454	374	458	44	12	2	650	870	1,530
6-----	442	296	353	41			1,110	1,300	3,900
7-----	430	243	282	38			1,170	1,500	a 4,700
8-----	418	230	260	61			1,120	943	2,850
9-----	412	174	194	300	540	sa 700	895	564	1,360
10-----	406	153	168	811	1,560	3,420	643	361	627
11-----	395	183	195	860	1,290	3,000	538	198	288
12-----	395	123	131	853	1,030	2,370	508	174	238
13-----	385	166	173	839	790	1,770	478	176	227
14-----	305	202	166	832	883	1,980	355	126	121
15-----	210	95	54	818	642	1,420	325	82	72
16-----	166	57	26	636	407	699	265	966	691
17-----	142	30	12	562	285	432	250	461	311
18-----	129	21	7	544	240	353	295	209	166
19-----	126	22	7	514	247	343	265	1,710	1,220
20-----	114			350	160	151	238	693	445
21-----	108			385	175	182	178	175	84
22-----	102	15	4	550	345	512	135	100	36
23-----	98			594	340	545	424	780	893
24-----	92			601	330	535	699	960	1,810
25-----	85			608	378	621	797	644	1,390
26-----	78	16	4	594	270	433	825	444	989
27-----	72			629	440	b 750	846	456	1,040
28-----	69	23	4	671	398	721	811	734	754
29-----	63	59	10	678	476	871	650	219	364
30-----	61	25	b 4	804	617	1,340	713	258	497
31-----	--	--	--	867	840	1,970	--	--	--
Total--	7,363	--	6,398	15,285	--	25,134	18,106	--	52,803
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	720	204	397	255			881	7,200	17,100
2-----	790	945	2,020	253			1,630	13,600	s 63,200
3-----	685	1,160	2,150	246	50	34	1,430	10,500	40,500
4-----	502	1,840	2,490	246			1,020	6,840	18,600
5-----	335	780	706	246			556	3,100	4,650
6-----	295	314	250	190	30	15	418	1,270	1,430
7-----	265	163	117	146	25	10	385	517	537
8-----	238	204	131	114	30	9	365	319	314
9-----	275	122	91	61	20	3	355	255	244
10-----	310	120	100	49	14	2	350	209	198
11-----	320	120	104	42	14	2	340	173	159
12-----	340	160	147	46	200	a 25	335	157	142
13-----	350	150	142	202	7,340	4,000	335	151	137
14-----	330	159	142	170	2,580	1,180	335	118	107
15-----	508	400	b 550	186	438	220	330	123	110
16-----	643	404	701	166	325	146	340	148	136
17-----	643	295	512	190	253	130	370	143	143
18-----	678	284	520	163	137	60	365	132	137
19-----	650	226	397	146	86	34	390	134	141
20-----	650	340	b 600	135	73	27	390	133	140
21-----	706	294	560	135	68	25	406	160	175
22-----	574	209	324	135	70	26	412	160	178
23-----	556	184	276	138	47	18	406	149	163
24-----	538	200	290	780	8,300	sb 22,000	400	156	168
25-----	538	205	298	1,310	14,900	52,700	412	144	160
26-----	538	166	241	629	8,020	s 16,100	412	92	102
27-----	526	200	284	370	3,100	3,100	390	66	69
28-----	538	168	244	325	1,740	1,530	350	51	48
29-----	520	154	216	315	1,100	936	234	82	52
30-----	406	95	104	305	440	362	255	84	58
31-----	315	75	64	601	6,600	sb 12,000	--	--	--
Total--	15,262	--	15,168	8,297	--	114,830	14,617	--	149,496
Total discharge for year (cfs-days).....									128,405
Total load for year (tons).....									377,721

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
TONGUE RIVER AT MILES CITY, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Oct. 1, 1950 . . .	9:30 a. m.	601	41	1,220	1,050	57	63	73	78	81	84	89	97				BWCM
Oct. 2 . . .	5:02 p. m.	532	45	1,385	1,390	44	52	61	68	71	73	78	97			100	BWCM
June 2, 1951 . . .	6:00 p. m.	797	48	4,480	3,710	--	79	--	97	--	99	--	--	--	--	100	SPWCM
June 3 . . .	6:00 p. m.	748	57	4,830	4,120	--	80	--	94	--	97	--	--	--	--	97	SPWCM
June 4 . . .	5:30 p. m.	520	65	1,690	1,490	--	90	--	94	--	95	--	--	--	--	--	SPWCM
June 8 . . .	8:38 a. m.	1,140	--	1,020	2,910	24	32	42	52	66	78	89	98		100		BWCM
June 19 . . .	6:36 p. m.	242	71	3,780	3,820	5	9	93	--	--	100	--	--	--	--	--	SPNM
June 19 . . .	6:36 p. m.	242	71	3,780	3,760	58	81	96	98	99	99	--	97		99		SPWCM
July 18 . . .	12:04 p. m.	657	81	284	796	22	34	52	64	74	84	91	97		99		BWCM
Aug. 13 . . .	6:00 a. m.	234	60	10,300	8,910	--	63	--	90	--	100	--	--	--	--	--	SPWCM
Aug. 16 . . .	10:18 a. m.	166	71	312	822	72	84	91	96	98	98	100	--	--	--	--	BWCM
Aug. 24 . . .	7:00 p. m.	790	--	7,870	6,560	--	71	--	93	--	98	--	--	--	--	--	SPWCM
Aug. 25 . . .	6:00 a. m.	978	60	15,400	8,160	56	69	81	90	92	96	--	--	--	--	--	SPWCM
Sept. 1 . . .	6:00 a. m.	923	61	9,960	8,160	--	82	--	93	--	97	--	--	--	--	--	SPWCM
Sept. 2 . . .	7:30 a. m.	2,680	59	19,000	7,720	45	61	75	84	91	96	--	--	--	--	--	SPWCM
Sept. 6 . . .	7:35 a. m.	424	65	1,530	5,000	--	85	--	95	--	98	--	--	--	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER AT MILES CITY, MONT.

LOCATION.--At gaging station at bridge on State Highway 22 at Miles City, Custer County, three-quarters of a mile downstream from Tongue River.

RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1951.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Nov. 3, 1950	9,620	14	0.04	60	20		67	180		204	10	0.4	2.0		476	0.65		230	82	36	706	7.6
Dec. 1	9,880	12	.02	46	13		45	123		145	7.5	.6	1.8		350	.48		187	66	37	525	7.4
Jan. 4, 1951	4,550	17	.04	67	21		69	195		217	12	.4	2.6		516	.70		255	95	37	759	8.0
Feb. 2	3,920	17	.06	81	26		79	235		255	14	.5	3.0		622	.85		310	117	36	877	8.1
Mar. 15	5,430							229		279								323	135		930	7.5
Apr. 6	9,560							194		198								247	88		724	7.4
May 17	16,800							136		88								144	32		412	7.2
June 20	52,000	12	.02	33	6.4		16	115		44	2.0	.2	1.1	0.05	178	.24		109	15	25	284	7.5
July 18	29,200							136		77								139	27		390	7.3
Aug. 16	16,500							135		124								155	44		481	7.7
Sept. 18	8,730							176		214								229	85		720	7.7

YELLOWSTONE RIVER BASIN--Continued

SOUTH FORK POWDER RIVER NEAR KAYCEE, WYO.

LOCATION.--At gaging station, 600 feet upstream from bridge on U. S. Highway 87, 1½ miles upstream from Murphy Creek, 6.6 miles southeast of Kaycee, Johnson County, and about 7 miles upstream from confluence with Middle Fork Powder River.

DRAINAGE AREA.--1,150 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: April to September 1951.

Sediment records: May 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures (April to September 1951): Maximum, 90°F July 31.

Sediment concentrations: Maximum daily, 89,400 ppm Sept. 7; minimum daily, not determined.

Sediment loads: Maximum daily, 296,000 tons Sept. 7; minimum daily, less than 0.50 ton on several days in July and August.

EXTREMES, May 1950 to September 1951.--Sediment concentrations: Maximum daily, 89,400 ppm Sept. 7, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 296,000 tons Sept. 7, 1951; minimum daily, less than 0.50 ton on many days.

REMARKS.--Flow affected by ice Nov. 8-15, 19, 22-25, Dec. 3-19, 22, Jan. 1 to Mar. 12. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Temperature (°F) of water, period April to September 1951

//Once-daily temperature measurement between 8 a. m. and 10 a. m.//

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	56	44	58	70	58
2							--	44	40	60	68	65
3							--	52	50	58	68	66
4							--	56	56	65	68	58
5							--	54	56	60	70	55
6							40	50	64	58	70	--
7							38	48	64	62	68	53
8							44	54	54	a 76	70	55
9							40	46	56	a 80	64	52
10							38	66	60	--	64	60
11							40	64	60	48	62	52
12							34	60	a 70	54	68	44
13							44	46	64	59	60	45
14							38	64	65	--	60	52
15							38	56	64	--	60	46
16							40	52	72	--	62	a 66
17							54	56	66	--	72	a 65
18							42	64	66	--	74	55
19							48	54	64	a 84	64	50
20							44	60	56	--	62	48
21							34	56	a 63	--	60	44
22							44	56	60	--	65	48
23							50	60	56	a 79	58	45
24							42	64	62	a 84	58	44
25							58	66	60	--	60	46
26							46	54	66	a 80	55	45
27							50	50	50	78	58	40
28							52	64	66	a 84	62	40
29							50	60	54	80	a 68	50
30							--	60	56	72	68	53
31							--	48	--	a 90	61	--
Average							44	56	59	--	64	52

a Reading obtained between 11 a. m. and 5 p. m.

YELLOWSTONE RIVER BASIN--Continued

SOUTH FORK POWDER RIVER NEAR KAYCEE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	15	2,000	81	28	372	28	35	574	54
2-----	28	7,450	s 818	30	370	30	22	370	22
3-----	51	17,000	2,340	28	360	27	23	500	31
4-----	66	20,500	s 4,110	30	337	27	20	330	18
5-----	143	32,700	13,100	28	299	23	15	264	11
6-----	54	25,700	3,750	28	256	19	20	190	10
7-----	40	14,400	1,560	30	265	21	25	51	3
8-----	32	5,000	432	23	280	17	24	118	8
9-----	30	2,100	170	18	135	7	28	105	8
10-----	24	798	52	19	511	26	30	142	12
11-----	22	439	26	25	390	a 25	29	220	17
12-----	16	360	16	32	255	22	28	231	18
13-----	16	328	14	35	465	44	26	235	16
14-----	14	235	9	38	591	61	25	235	16
15-----	6.2	105	2	36	510	50	28	285	22
16-----	8.0	94	2	37	252	25	29	281	22
17-----	10	89	2	28	322	24	28	465	35
18-----	9.0	85	2	32	420	b 35	27	286	21
19-----	8.0	80	2	29	585	46	27	375	27
20-----	7.0	66	1	28	680	a 50	24	317	21
21-----	6.2	62	1	30	880	a 70	24	283	18
22-----	6.2	81	1	29	810	a 65	24	210	14
23-----	6.2	73	1	25	272	18	24	222	14
24-----	5.3	60	1	30	380	31	26	304	21
25-----	5.3	88	1	30	432	35	26	253	18
26-----	5.3	82	1	32	410	a 35	26	166	12
27-----	5.3	120	2	37	586	58	28	73	6
28-----	3.9	137	1	35	480	45	22	67	4
29-----	2.7	97	1	35	568	54	30	69	6
30-----	3.2	110	1	35	460	43	37	102	10
31-----	11	300	a 9	--	--	--	26	120	8
Total-	659.8	--	26,509	900	--	1,061	806	--	523
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	20	240	a 15	13	40	1	35	574	54
2-----	12	73	2	20	23	1	32	160	14
3-----	17	54	2	25	90	6	30	150	12
4-----	16	35	2	27	140	10	35	280	26
5-----	14	73	3	30	135	11	45	225	27
6-----	13	65	2	25	126	9	45	390	47
7-----	12	55	b 2	30	110	9	40	550	60
8-----	13			35	192	18	54	690	101
9-----	14			40	600	65	80	530	114
10-----	15			50	1,850	250	60	430	70
11-----	15			30	4,860	394	65	210	37
12-----	13			25	6,050	408	80	660	143
13-----	13			20	400	22	125	900	304
14-----	15	39	2	30	170	14	98	3,030	s 638
15-----	17			40	350	38	61	2,300	379
16-----	17			39	450	47	114	7,050	s 2,600
17-----	17	83	4	38	1,200	123	54	2,750	401
18-----	16			36	1,550	151	16	1,430	62
19-----	14			35	1,300	123	15	1,200	49
20-----	12			38	1,920	197	25	1,800	121
21-----	13			40	2,850	286	54	3,100	452
22-----	15	59	2	35	800	76	60	3,520	570
23-----	13			45	1,350	164	48	4,300	557
24-----	14	90	3	42	700	79	44	4,470	s 748
25-----	15	94	4	40	590	64	54	3,400	495
26-----	17	121	6	42	210	24	66	5,120	912
27-----	10			38	250	26	57	4,850	746
28-----	8			38	250	26	28	2,000	151
29-----	9	133	3	--	--	--	28	2,150	162
30-----	10			--	--	--	26	2,100	148
31-----	10			--	--	--	20	1,700	92
Total-	429	--	96	946	--	2,642	1,594	--	10,292

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

SOUTH FORK POWDER RIVER NEAR KAYCEE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	20	1,360	74	28	5,730	433	40	12,300	s 1,590
2-----	20	1,390	75	20	6,550	354	30	8,600	696
3-----	20	1,410	76	16	5,300	229	25	4,600	310
4-----	20	1,320	71	16	1,600	69	16	2,400	104
5-----	20	1,200	65	14	880	33	9.5	560	14
6-----	22	1,200	71	11	840	25	7.9	195	4
7-----	30	1,200	97	18	1,500	73	7.9	153	3
8-----	24	1,060	69	32	3,400	sa 430	7.6	100	2
9-----	30	1,200	97	30	5,730	464	7.3	82	2
10-----	42	1,300	148	18	2,150	104	6.4	68	1
11-----	37	3,800	380	12	880	28	6.4	100	2
12-----	41	8,040	s 1,050	9.0	400	10	7.3	70	1
13-----	57	14,600	s 2,430	12	250	8	8.3	680	s 19
14-----	32	5,500	475	14	200	8	9.5	6,530	187
15-----	22	1,580	94	16	318	14	9.9	23,300	623
16-----	18	1,090	53	35	12,600	1,190	7.0	800	15
17-----	11	1,060	32	16	12,300	531	6.4	155	3
18-----	14	860	32	35	27,900	2,640	7.8	2,400	sb 110
19-----	11	610	18	24	25,800	1,670	7.0	750	14
20-----	16	750	32	24	25,500	s 1,840	6.7	220	4
21-----	26	990	70	42	41,200	4,850	7.3	340	7
22-----	24	1,690	110	28	14,000	1,060	14	5,490	208
23-----	20	1,050	57	20	1,780	96	23	21,900	s 1,510
24-----	22	1,590	94	12	600	19	13	23,400	s 1,080
25-----	40	7,200	s 1,130	9.1	250	6	13	17,500	614
26-----	60	13,000	2,110	7.6	180	4	9.1	9,400	231
27-----	54	9,880	s 1,550	8.3	790	a 20	8.3	1,700	38
28-----	51	17,000	2,340	15	6,230	252	8.7	390	9
29-----	32	6,800	588	5.1	365	5	7.9	220	5
30-----	24	5,150	334	4.9	300	4	8.3	155	3
31-----	--	--	--	9.1	310	8	--	--	--
Total-	860	--	13,822	561.1	--	16,477	346.5	--	7,389
	July			August			September		
1-----	9.1	152	4	61	63,400	s 21,200	2.7	99	1
2-----	10	190	5	16	15,700	s 880	5.4	820	sa 23
3-----	18	6,630	s 532	7.9	700	15	7.0	1,100	21
4-----	15	13,400	542	7.6	170	3	10	770	21
5-----	12	978	32	7.6			10	550	15
6-----	8.7	140	3	7.6	50	1	56	21,000	sb 11,000
7-----	8.7	48	1	7.6			852	89,400	s 296,000
8-----	7.6	18	(t)	9.0	1,400	sb 60	124	34,700	s 13,800
9-----	7.0	42	1	10	3,220	s 100	43	11,000	1,280
10-----	29	10,400	s 1,640	7.6	240	5	28	1,380	104
11-----	95	31,000	s 8,560	19	17,200	s 1,000	35	3,260	s 644
12-----	29	14,300	1,120	11	16,100	478	52	12,300	1,730
13-----	16	2,700	117	9.9	370	10	25	3,200	216
14-----	13	750	26	8.3	160	4	21	320	18
15-----	12	255	8	6.4	160	3	21	232	13
16-----	7.6	110	2	5.8	80	1	17	170	8
17-----	6.4	52	1	7.0			17	158	7
18-----	7.9	20	(t)	7.0			17	130	6
19-----	7.9	32	1	7.0	62	1	171	44,800	s 47,200
20-----	7.0	50	b 1	7.0			97	45,100	s 12,900
21-----	9.1	317	s 10	7.0	130	2	43	11,000	1,280
22-----	92	72,100	s 39,300	8.0	102	2	26	1,400	98
23-----	43	58,500	s 7,580	7.0	90	2	22	360	21
24-----	17	17,600	808	5.3	40	1	21	252	14
25-----	7.6	1,400	29	4.6			19	225	12
26-----	7.0	210	4	4.6			18	191	9
27-----	6.7	152	3	4.6	36	(t)	18	160	8
28-----	6.4	40	1	4.6			18	155	8
29-----	6.7	60	1	4.6			19	122	6
30-----	7.0	35	1	3.9			20	120	6
31-----	6.7	30	1	3.9	114	1	--	--	--
Total-	536.1	--	60,335	288.4	--	23,776	1,835.1	--	388,469

Total discharge for year (cfs-days)..... 9,762.0

Total load for year (tons)..... 549,391

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

SOUTH FORK POWDER RIVER NEAR KAYCEE, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspended 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		0.350	0.500	1.000
Oct. 2, 1950	8:30 a. m.	15	--	2,640	2,100	--	68	--	81	--	89	--	--	--	SPWCM
Oct. 3	5:00 p. m.	96	--	21,300	7,370	--	51	--	71	--	89	--	--	--	SPWCM
Oct. 5	5:00 p. m.	163	--	29,900	6,080	--	72	--	88	--	99	--	--	--	SPWCM
Oct. 6	5:00 p. m.	37	--	19,400	8,250	--	75	--	94	--	98	--	--	--	SPWCM
Dec. 19	1:18 p. m.	a 27	--	619	1,400	23	29	36	42	50	61	76	98	100	BWCM
Feb. 11, 1951	5:00 p. m.	a 30	--	7,020	4,860	--	35	--	66	--	95	--	--	--	SPWCM
Mar. 15	5:00 p. m.	93	--	2,400	1,740	--	61	--	72	--	89	--	--	--	SPWCM
Mar. 16	5:00 p. m.	166	--	15,200	9,360	--	39	--	63	--	91	99	100	--	SPWCM
Mar. 17	5:00 p. m.	66	--	4,420	3,370	--	65	--	87	--	95	--	--	--	SPWCM
Mar. 18	5:00 p. m.	30	--	1,970	1,490	--	70	--	91	--	97	--	--	--	SPWCM
Mar. 24	6:00 p. m.	87	--	8,820	6,660	--	51	--	75	--	97	--	--	--	SPWCM
Apr. 10	5:30 p. m.	51	48	3,800	6,000	--	31	--	40	--	98	--	--	--	SPWCM
Apr. 11	5:00 p. m.	35	38	4,040	3,080	--	64	--	--	--	93	--	--	--	SPWCM
Apr. 12	5:00 p. m.	72	60	12,200	8,740	--	54	--	77	--	95	--	--	--	SPWCM
Apr. 13	9:00 a. m.	66	44	20,200	8,070	--	67	--	89	--	--	--	--	--	SPWCM
Apr. 14	9:30 a. m.	35	38	6,220	4,790	--	73	--	90	--	95	--	--	--	SPWCM
Apr. 24	10:35 a. m.	22	62	2,170	2,700	34	47	56	73	75	84	93	99	100	BWCM
Apr. 25	5:00 p. m.	66	65	16,800	5,460	--	50	--	73	--	90	--	--	--	SPWCM
Apr. 26	5:00 p. m.	54	55	9,870	6,830	--	63	--	82	--	93	--	--	--	SPWCM
Apr. 27	5:00 p. m.	60	56	6,640	5,130	--	69	--	86	--	97	--	--	--	SPWCM
Apr. 28	5:30 p. m.	48	60	12,200	8,730	--	77	--	91	--	96	--	--	--	SPWCM
May 1	2:15 p. m.	28	55	6,160	13,200	--	71	--	86	--	94	--	--	--	SPWCM
May 8	5:00 p. m.	63	60	7,500	5,850	--	56	--	81	--	96	--	--	--	SPWCM
May 9	11:52 a. m.	24	--	4,100	4,320	52	68	79	85	90	93	--	--	--	SPWCM
May 16	5:00 p. m.	37	55	19,000	7,400	--	71	--	90	--	97	--	--	--	SPWCM

May 17, 1951	5:00 p. m.	18	72	5,320	3,940	--	75	--	90	--	97	--	--	SPWCM
May 18	1:20 p. m.	40	68	26,100	25,500	--	1	1	88	96	97	--	--	SPWCM
May 18	1:20 p. m.	40	68	26,100	7,370	55	77	85	92	95	98	--	--	SPWCM
May 19	8:30 a. m.	28	54	27,700	11,200	--	79	--	99	98	98	--	--	SPWCM
May 20	5:00 p. m.	54	58	43,900	7,980	--	60	--	94	--	97	--	--	SPWCM
June 15	9:30 a. m.	10	64	27,600	5,350	65	82	95	98	99	100	--	--	SPWCM
June 23	8:00 a. m.	30	56	30,300	5,750	61	79	91	97	97	99	--	--	SPWCM
June 24	5:00 p. m.	15	70	26,100	3,160	--	85	--	96	--	100	--	--	SPWCM
June 25	6:00 p. m.	12	72	26,200	3,250	--	97	--	98	--	100	--	--	SPWCM
July 3	6:00 p. m.	26	72	17,400	6,720	--	83	--	98	--	100	--	--	SPWCM
July 4	8:30 a. m.	13	65	17,200	6,970	66	83	97	98	98	100	--	--	SPWCM
July 10	11:52 p. m.	88	50	31,600	6,710	49	58	69	76	81	90	--	--	SPWCM
July 10	11:52 p. m.	88	50	31,600	32,100	--	88	90	91	92	94	97	100	BNM
July 11	8:00 a. m.	130	48	30,600	7,520	--	61	--	81	--	94	--	--	SPWCM
July 13	.....	17	82	2,930	6,780	--	86	--	96	--	99	--	--	SPWCM
July 22	8:45 a. m.	415	--	84,100	7,620	--	28	--	50	--	88	99	100	SPWCM
July 23	12:02 p. m.	52	79	57,400	56,500	--	--	97	--	98	100	--	--	SPNM
July 23	12:02 p. m.	52	79	57,400	7,710	58	76	91	96	98	99	--	--	SPWCM
Aug. 1	9:00 a. m.	100	70	108,000	5,430	--	60	--	93	--	99	--	--	SPWCM
Sept. 5	1:45 p. m.	10	72	615	1,520	24	35	42	49	57	68	84	93	BWCM
Sept. 7	10:08 a. m.	1,340	53	101,000	8,540	32	43	53	63	76	88	--	--	SPWCM
Sept. 10	12:45 p. m.	27	73	636	1,390	79	80	88	93	95	96	97	98	BWCM

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

MIDDLE FORK POWDER RIVER ABOVE KAYCEE, WYO.

LOCATION.--At gaging station, 2 miles upstream from Red Fork, 2 miles downstream from Beaver Creek, and 10 miles southwest of Kaycee, Johnson County.

DRAINAGE AREA.--450 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: June 1949 to September 1951.

Sediment records: April 1949 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 80°F July 6, 24, Aug. 5-7; minimum freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 4,900 ppm Apr. 30; minimum daily, not determined.

Sediment loads: Maximum daily, 3,200 tons Apr. 30; minimum daily, not determined.

EXTREMES, 1949-51.--Water temperatures: Maximum, 80°F July 6, 24, Aug. 5-7, 1951;

minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 24,000 ppm June 9, 1949; minimum daily, not determined.

Sediment loads: Maximum daily, 18,700 tons June 9, 1949; minimum daily, less than 1 ton Aug. 26-30, 1950.

REMARKS.--Flow affected by ice Nov. 9-11, Dec. 2-15, Dec. 27 to Mar. 11, Mar. 18-20.

Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Temperature (°F) of water, water year October 1950 to September 1951

/Once-daily temperature measurement between 1 p. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	48	45	a36	--	33	37	44	52	a44	--	78	55
2	56	42	32	35	33	34	51	48	45	65	74	--
3	48	40	--	32	33	47	45	58	46	70	--	62
4	51	45	--	33	34	34	a44	--	--	76	78	a59
5	55	a47	--	a32	33	34	a44	46	65	a65	80	a60
6	50	43	--	33	--	34	48	49	--	80	80	a58
7	46	45	33	32	35	32	47	48	a55	65	80	59
8	a47	37	39	--	37	33	47	48	60	--	--	61
9	--	31	38	a32	35	--	46	48	a55	65	76	a63
10	52	32	a35	32	a42	--	46	57	a58	55	--	68
11	a47	34	34	31	40	--	--	58	a60	62	69	--
12	a54	38	a37	a31	a43	--	--	a50	58	a60	72	--
13	53	--	35	33	40	--	--	48	--	a61	--	60
14	a49	34	36	a33	46	34	--	a50	65	--	65	58
15	a48	40	--	33	40	35	--	49	a59	60	73	59
16	a50	a32	35	33	--	--	--	48	56	--	70	61
17	46	a40	37	33	35	--	--	--	60	a68	74	a56
18	a53	a42	40	34	34	--	60	57	68	75	75	63
19	a53	a31	35	33	--	34	50	a55	71	a70	71	68
20	a50	39	34	33	--	34	45	54	a55	73	74	--
21	a49	--	33	34	34	35	44	a52	55	68	71	53
22	50	37	35	a34	--	34	45	62	68	a63	73	a53
23	a44	31	a45	a35	33	--	46	62	70	75	69	--
24	46	45	45	33	33	--	40	a59	--	80	--	--
25	--	--	a37	34	33	34	45	60	--	79	70	58
26	a47	a32	--	32	a35	34	43	a55	a60	70	70	a52
27	a35	a35	--	33	34	33	--	a56	57	75	69	--
28	a50	--	--	--	33	44	a46	--	--	73	74	--
29	a43	38	32	31	--	a45	50	a60	--	71	68	--
30	a45	41	a33	32	--	45	49	--	70	--	--	--
31	47	--	35	31	--	a42	--	a52	--	a70	77	--
Average	49	38	--	33	36	--	--	53	--	69	73	--

a Reading obtained between 9 a. m. and 11 a. m.

YELLOWSTONE RIVER BASIN--Continued

MIDDLE FORK POWDER RIVER ABOVE KAYCEE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	53	58	8	48			42	40	5
2-----	55	235	35	48			36		5
3-----	53	377	54	45			37	50	5
4-----	53	156	22	46			33	30	3
5-----	52			46	35	4	30	38	3
6-----	50			45			34		
7-----	49			45			40	82	9
8-----	48			47			41		
9-----	47	55	7	30	35	3	42		
10-----	47			32			48		
11-----	47			40	65	7	45	138	17
12-----	46			46			42		
13-----	45			28	--	e 10	38	119	12
14-----	45			44			35	90	9
15-----	45			44	95	11	47		
16-----	45			44			47	94	12
17-----	45			45			47		
18-----	45			46			44	117	14
19-----	45			47	71	9	42	70	8
20-----	46			48			46	63	8
21-----	47			46			48	82	11
22-----	47	32	4	46	62	8	45	--	e 9
23-----	46			37	56	6	45		
24-----	47			61	104	17	46		
25-----	46			49	75	10	47	50	6
26-----	46			45			44		
27-----	46			44			41	--	e 4
28-----	36			43	54	6	43	35	4
29-----	46			43			41		
30-----	47			42			43	134	15
31-----	47			--	--	--	40		
Total-	1,472	--	257	1,340	--	215	1,299	--	292
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	35	--	e 10	35			35	221	21
2-----	30			37			35	295	28
3-----	33			40	58	6	37	288	25
4-----	32			41			32	270	27
5-----	32	33	3	44			40	245	26
6-----	28			37	55	a 5	41	257	28
7-----	27			40	96	10	37	230	23
8-----	31	--	e 5	41	106	12	33	215	19
9-----	34			43	92	11	40	264	28
10-----	36			48	162	21	41	230	25
11-----	38	87	8	45	186	23	43	205	24
12-----	35			40	166	18	43	205	24
13-----	34			35	179	17	44	130	15
14-----	39			40	207	22	42	90	10
15-----	46	56	6	45	189	23	42	121	14
16-----	44			43	180	a 20	45	210	26
17-----	45			40	208	22	42	165	19
18-----	43	93	11	39	177	19	35	150	14
19-----	40			38	160	a 15	37	156	16
20-----	35	70	7	41	240	a 25	43	115	13
21-----	32	100	9	43	276	32	44	100	12
22-----	40			37	190	a 20	45	99	12
23-----	38	102	11	43	220	26	42	95	a 10
24-----	41			39	185	19	44	95	a 10
25-----	47	84	11	36	168	16	43		
26-----	49	57	8	36	175	17	45	90	11
27-----	26	50	4	34	208	19	45		
28-----	20	60	a 3	33	186	17	42		
29-----	25	61	4	--	--	--	42		
30-----	35	54	5	--	--	--	43	62	7
31-----	40	52	6	--	--	--	43		
Total-	1,110	--	212	1,113	--	459	1,285	--	530

e Estimated.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

MIDDLE FORK POWDER RIVER ABOVE KAYCEE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	42			179	1,450	701	116	8	3
2-----	42			116	460	144	108	22	6
3-----	44			92	250	62	101	28	8
4-----	48			125	375	127	101	33	9
5-----	51	86	11	162	1,600	sb840	92	29	7
6-----	50			241	1,800	b1,200	87	10	2
7-----	51	78	11	174	1,150	540	80	23	5
8-----	52			213	2,120	1,220	74	21	4
9-----	52			179	1,060	512	69		
10-----	51			167	500	225	67	17	3
11-----	47			213	780	449	65		
12-----	47	73	10	269	1,810	1,310	62	25	4
13-----	49			286	1,750	1,350	66	70	a10
14-----	54			232	1,000	626	73	140	a30
15-----	49			210	715	405	63	12	2
16-----	46	60	8	216	805	469	57		
17-----	51			202	640	a350	54		
18-----	61	148	24	210	640	363	52		
19-----	65	175	31	227	353	216	50	14	2
20-----	59	90	14	230	660	410	50		
21-----	55	62	9	216	258	150	50		
22-----	49	65	9	177	305	146	59		
23-----	55	61	9	162	281	138	59	18	3
24-----	54	79	12	182	189	93	52		
25-----	53	100	14	162	150	66	49		
26-----	58	100	16	145	81	32	48	26	3
27-----	72	390	sb120	134	83	30	45		
28-----	142	2,800	sb1,200	145	100	39	45	30	a4
29-----	227	4,300	b2,600	131	60	21	43	29	3
30-----	241	4,900	b3,200	116	61	19	42	17	2
31-----	--	--	--	114	15	a5	--	--	--
Total-	2,017	--	7,418	5,667	--	12,258	1,979	--	138
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	40	15	a2	29			26	45	3
2-----	39			27			26	45	a3
3-----	37			29			28	1,000	b75
4-----	36			30	32	2	29	65	5
5-----	33	15	1	29			29	84	7
6-----	31			28			59	780	sa360
7-----	28			28			54	2,500	b360
8-----	26	15	a1	28	110	a8	29	375	29
9-----	27			33	310	b30	27	153	11
10-----	32			29	130	a10	26	85	6
11-----	44	24	2	34	500	b45	29	130	a10
12-----	43			28	190	14	34	120	a10
13-----	37			27	100	a7	32	110	10
14-----	34	25	a2	26	102	7	31	80	7
15-----	33			26	83	6	29		
16-----	33			25			29		
17-----	32	60	5	25			28	40	3
18-----	33			24			29		
19-----	32			24	49	3	29		
20-----	33	78	7	25			34	90	a8
21-----	40	117	13	25			39	65	7
22-----	58	310	a50	25			38	48	5
23-----	45	160	a20	24			40	--	e4
24-----	36	92	9	24	34	2	41	--	e4
25-----	34	46	4	24			39		
26-----	32			24			36		
27-----	32			24	23	1	37	32	3
28-----	32	36	3	24			40		
29-----	32			24			40	--	e3
30-----	31	40	a3	24	30	a2	37		
31-----	31	48	4	26	50	4	--	--	--
Total-	1,086	--	168	822	--	177	1,024	--	957

Total discharge for year (cfs-days) 20,194
 Total load for year (tons) 23,081

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
MIDDLE FORK POWDER RIVER ABOVE KAYCEE, WYO.--Continued

Particle-size analyses of suspended sediment, April to September 1951.
(Methods of analysis: P, pipette; S, sieve; N, in native water;
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Instantaneous discharge (cfs)	Water temperature per- discharge (° F)	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		0.350	0.500	1.000
Apr. 29, 1951	10:00 a. m.	205	47	2,950	2,490	--	30	--	52	--	98	--	--	--	SPWCM
Apr. 30	2:00 p. m.	238	49	4,980	4,300	--	35	--	61	--	98	--	--	--	SPWCM
May 8	3:20 p. m.	182	48	828	1,800	13	19	24	34	48	74	91	97	100	BWCM
May 8	7:32 p. m.	227	--	9,290	8,390	2	3	28	76	88	94	--	--	--	SPNM
May 8	7:32 p. m.	227	--	9,290	1,160	61	72	65	79	86	93	--	--	--	SPWCM
Sept. 3	10:30 a. m.	29	58	2,010	1,470	57	77	92	95	96	98	99	100	--	BWCM

YELLOWSTONE RIVER BASIN--Continued
MIDDLE FORK POWDER RIVER NEAR KAYCEE, WYO.

LOCATION --At gaging station cableway, at Jay Bar U Ranch, 1½ miles downstream from North Fork Powder River and 6 miles east of Kaycee, Johnson County.
DRAINAGE AREA --980 square miles, approximately.
RECORDS AVAILABLE --Chemical analyses: November 1949 to November 1950.

Water temperatures: March 1950 to September 1951.

Sediment records: March 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 80°F July 26; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 36,600 ppm Sept. 7; minimum daily, not determined.

Sediment loads: Maximum daily, 82,700 tons Sept. 7; minimum daily, less than 0.50 ton on many days during June to August.

EXTREMES, March 1950 to September 1951.--Water temperatures: Maximum, 80°F July 26, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 36,600 ppm Sept. 7, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 82,700 tons Sept. 7, 1951; minimum daily, less than 0.50 ton on many days during summer months.

REMARKS.--Flow affected by ice Nov. 9-18, Dec. 4 to Mar. 22. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, October 1950 to June 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 4, 1950	106	13	0.04	120	37	140	211		488	42	0.6	2.6		988	1.34		450	277	40	1,340	7.7
Nov. 1,	98	8.3	.04	126	44	107	229		450	52	.2	.7	0.10	974	1.32		497	309	32	1,350	7.7
June 7, 1951, 11:00 a.m.	58	8.5	.03	76	26	18	156		187	7.5	.2	.8		424	.58		295	187	12	616	7.4
June 7, 5:05 p.m.	554	8.6	.02	91	34	78	188		308	42	.3	1.1		700	.95		387	213	31	1,000	7.4

YELLOWSTONE RIVER BASIN--Continued

MIDDLE FORK POWDER RIVER NEAR KAYCEE, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 8 a. m. and 11 a. m. June to September,
 and generally between 4 p. m. and 7 p. m. October to May/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	45	--			32	--	50	50	60	70	58
2	a 42	38	--			--	--	51	42	60	68	58
3	45	36	--			--	--	--	42	59	68	59
4	51	46	--			--	--	63	47	62	70	b 74
5	a 47	48	--			--	--	62	51	63	--	59
6	48	42	--			--	--	61	55	61	68	58
7	51	--	33		32	--	--	59	56	62	68	52
8	--	--	--			--	--	51	56	63	68	62
9	53	--	40			--	--	52	56	62	68	b 60
10	--	a 34	35			--	--	53	58	58	63	55
11	55	--	--			--	--	61	b 69	52	63	--
12	a 48	--	--			--	--	a 54	b 68	b 69	70	--
13	59	--	a 32			--	--	a 47	60	61	62	b 60
14	61	--	--			--	--	a 42	58	61	61	57
15	52	--	--			32	--	54	58	68	59	50
16	56	32	--			--	--	51	65	69	61	51
17	49	a 34	--			--	--	62	65	--	62	52
18	56	a 35	--			--	--	a 56	66	62	64	58
19	55	a 39	--			--	38	a 53	62	66	68	59
20	55	36	--			--	39	51	58	b 70	60	54
21	--	--	--			39	67	55	66	66	60	49
22	51	--	--			--	54	62	--	64	60	49
23	50	--	--			--	48	69	--	60	62	48
24	--	--	--			--	40	66	--	66	--	b 60
25	51	a 33	--			--	55	65	--	--	--	b 62
26	51	--	--			--	51	64	--	b 80	--	b 58
27	48	a 32	--			--	60	--	58	70	69	--
28	48	39	a 33			42	62	61	62	68	58	b 54
29	54	a 32	--			--	53	65	56	--	61	--
30	52	--	--			--	57	69	59	68	58	--
31	46	--	--			--	--	50	--	70	62	--
Average	51	--	--			--	--	58	57	64	64	57

a Reading obtained between 8 a. m. and 11 a. m.

b Reading obtained between 4 p. m. and 7 p. m.

YELLOWSTONE RIVER BASIN--Continued

MIDDLE FORK POWDER RIVER NEAR KAYCEE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	80	180	39	98	164	43	106		
2-----	100	280	sa 85	102	106	29	96		
3-----	117	1,630	515	104	241	68	71		
4-----	119	3,030	974	98	330	87	60	--	e 10
5-----	111	1,050	315	102	129	36	50		
6-----	111	298	89	104	33	9	60		
7-----	111	148	44	104	40	b 10	80	46	10
8-----	111	120	b 35	111	53	16	90	--	e 30
9-----	111	280	a 85	60	--	e 10	100	154	42
10-----	111	130	b 40	65	294	52	110	168	50
11-----	111	64	19	80			110	--	e 40
12-----	108	93	27	90			105	--	e 35
13-----	108	110	32	100	--	e 25	100	112	30
14-----	104	239	67	110			95		
15-----	104	427	120	100			105		
16-----	104	140	39	105	96	27	105	--	e 25
17-----	104	90	25	110	110	33	100		
18-----	104	43	12	120	98	32	96		
19-----	102	49	13	117	125	39	90	80	19
20-----	102	185	51	104	132	37	98		
21-----	100	175	47	117	101	32	105		
22-----	100	105	28	102	70	b 20	100		
23-----	100	224	60	85	100	b 25	100		
24-----	100	245	66	78	118	25	105		e 20
25-----	102	234	64	143	165	64	110		
26-----	100	208	56	117	262	83	100		
27-----	98	158	42	111	200	60	90		
28-----	98	196	52	108	180	b 50	87	74	17
29-----	96	160	41	106	113	32	84		
30-----	96	125	32	106	51	15	90	--	e 15
31-----	96	46	12	--	--	--	80		
Total-	3,219	--	3,126	3,057	--	1,059	2,878	--	663
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	70		e 10	82			85	126	29
2-----	60		e 9	86			82		
3-----	56	39	6	84			80		
4-----	63			90		e 20	90		
5-----	58			100			105		
6-----	54			90			110		
7-----	50			100	110	30	95		
8-----	60			110			100	--	e 80
9-----	65			130			105		
10-----	70			150			120		
11-----	74			135			140		
12-----	70			120			110		
13-----	64			106			115		
14-----	75			110			130		
15-----	78			130			140	419	158
16-----	74			120			125		
17-----	77			112			110		
18-----	74	e 10		112		e 35	95		
19-----	70			105			100		
20-----	60			115			105		
21-----	57			120			135		
22-----	70			100			128	--	e 70
23-----	74			115			122		
24-----	78			110			113		
25-----	82			105			119		
26-----	84			105			124		
27-----	60			95			122	378	124
28-----	35			90			108	183	53
29-----	50			--	--	--	106		
30-----	60			--	--	--	106	--	e 45
31-----	70			--	--	--	96		
Total-	2,042		305	3,027		885	3,421	--	2,309

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

MIDDLE FORK POWDER RIVER NEAR KAYCEE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	96			290	2,550	2,000	128	339	117
2-----	98			200	1,200	648	131	676	239
3-----	98		e 25	140	1,680	635	113	396	121
4-----	98			133	640	230	104	192	54
5-----	100	92	25	182	1,360	668	91	176	43
6-----	102			310	3,880	s 3,760	75	132	27
7-----	93			303	2,870	2,350	60	138	22
8-----	82		21	316	3,010	s 2,780	45	108	13
9-----	93			349	3,530	3,330	34	102	9
10-----	111	88	26	274	1,840	1,360	26	85	6
11-----	106	98	28	270	2,400	1,750	38	210	sa 35
12-----	104	88	25	320	2,570	2,220	56	215	s 43
13-----	102	1,100	321	400	3,880	4,190	26	87	6
14-----	102	715	197	420	3,770	4,280	47	928	118
15-----	111	175	52	310	2,070	1,730	44	302	36
16-----	93	90	23	280	1,670	1,260	33	83	7
17-----	82			313	1,760	1,490	17	55	3
18-----	89	49	11	326	3,220	s 3,100	13	54	2
19-----	102	94	26	332	3,050	2,730	9.6	79	2
20-----	94	91	23	349	2,640	2,490	3.6	72	1
21-----	89			335	2,110	1,910	1.6	31	1
22-----	83			274	1,140	844	3.8	47	(t)
23-----	76		12	246	1,060	704	16	60	3
24-----	85			252	1,240	844	16	72	3
25-----	89	105	25	242	1,000	653	9.2	42	1
26-----	87	650	153	197	673	358	4.0		
27-----	93	190	48	153	600	b 250	1.7		
28-----	131	636	s 296	143	532	205	.8	57	(t)
29-----	215	2,940	s 1,950	158	492	210	.8		
30-----	300	3,670	2,970	138	330	123	.8		
31-----	--	--	--	117	256	81	--	--	--
Total--	3,210	--	6,442	8,072	--	49,183	1,148.9	--	914
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.7			0.3			4.0	220	2
2-----	.7			.3	76	(t)	39	5,020	s 1,770
3-----	.7			.3			47	20,100	s 2,190
4-----	.7			1.4	2,700	sa 75	24	2,220	144
5-----	.5			.3	1,340	1	20	300	16
6-----	.4	65	(t)	.3			120	7,370	s 9,550
7-----	.3			.2			728	36,600	s 82,700
8-----	.3			.3	99	(t)	113	11,900	s 3,850
9-----	.3			.3			75	2,000	405
10-----	.4			.4			65	680	119
11-----	15	1,690	s 114	2.6	510	sa 5	60	525	85
12-----	16	4,890	211	2.8	258	2	114	2,000	sb 700
13-----	4.8	476	s 8	.4			73	940	185
14-----	.4			.4			60	620	100
15-----	.3			.5			50	292	39
16-----	.4			.7	106	(t)	40	198	21
17-----	.4	82	(t)	.7			35	160	15
18-----	.4			1.0			36	135	13
19-----	.4			1.1			39	135	14
20-----	43	3,850	s 1,550	.9			40	150	16
21-----	45	17,300	s 1,770	1.4	146	1	65	1,340	235
22-----	46	11,600	s 1,680	1.7	142	1	54	553	81
23-----	40	1,750	189	.9			51	200	28
24-----	24	550	36	.6			57	120	b 20
25-----	5.1	210	b 3	.4			52	90	b 15
26-----	1.2			.4			46	72	9
27-----	.8			.3	123	(t)	46	70	9
28-----	.7			.3			57	65	10
29-----	.6	74	(t)	.3			61	68	11
30-----	.8			.3			55	60	9
31-----	.3			1.3			--	--	--
Total--	250.6	--	5,563	23.1	--	89	2,326.0	--	102,361
Total discharge for year (cfs-days)									
Total load for year (tons)									

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
MIDDLE FORK POWDER RIVER NEAR KAYCEE, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per-centage (° F)	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	0.350	0.500		1.000
Oct. 3, 1950.....	2:30 p. m.	111	43	2,580	1,720	76	85	94	97	--	--	--	--	--	--	--	BWCM
Oct. 4.....	6:28 p. m.	106	51	2,960	6,820	--	76	--	94	--	96	--	--	--	--	--	SPWCM
Oct. 26, 1951...	5:00 p. m.	83	51	1,320	1,020	65	77	89	96	97	98	100	--	--	--	--	BWCM
Apr. 28.....	5:15 p. m.	185	62	1,640	1,300	--	48	--	88	--	98	--	--	--	--	--	SPWCM
Apr. 29.....	5:15 p. m.	303	53	5,380	3,230	--	41	--	63	--	94	--	--	--	--	--	SPWCM
May 16.....	1:20 p. m.	313	50	1,470	1,800	--	22	--	34	--	64	91	100	--	--	--	SPWCM
June 14.....	2:42 p. m.	48	60	2,070	4,320	58	74	90	98	99	100	--	--	--	--	--	SPWCM
July 20.....	5:00 p. m.	8	70	12,800	10,100	--	51	--	84	--	99	--	--	--	--	--	SPWCM
July 21.....	11:30 a. m.	25	67	46,900	8,760	59	76	91	98	99	99	--	--	--	--	--	SPNM
July 21.....	12:00 m.	22	67	52,400	53,400	--	1	92	--	99	100	--	--	--	--	--	SPWCM
July 21.....	12:00 m.	22	67	52,400	7,760	59	78	91	95	96	97	--	--	--	--	--	SPWCM
July 22.....	9:00 p. m.	43	67	7,790	5,530	--	81	--	99	--	100	--	--	--	--	--	SPWCM
Aug. 4.....	9:00 p. m.	7.0	--	20,400	15,600	50	64	81	95	99	100	--	--	--	--	--	BWCM
Sept. 2.....	5:10 p. m.	4.0	45	22,800	8,260	31	40	50	63	82	95	--	--	--	--	--	SPWCM
Sept. 3.....	12:10 p. m.	28	60	38,600	6,470	--	75	--	100	--	--	--	--	--	--	--	SPWCM
Sept. 6.....	11:09 p. m.	652	55	32,600	31,500	0	1	13	62	82	91	96	99	100	--	--	SPNM
Sept. 6.....	11:09 p. m.	652	55	32,600	8,060	33	43	54	66	79	90	--	--	--	--	--	SPWCM
Sept. 7.....	3:02 p. m.	505	--	40,500	41,800	--	0	58	75	84	87	92	97	100	--	--	SPNM
Sept. 7.....	3:02 p. m.	505	--	40,500	9,220	38	51	59	62	82	88	--	--	--	--	--	SPWCM
Sept. 10.....	2:02 p. m.	65	66	612	1,200	48	64	79	86	92	95	97	99	100	--	--	BWCM

YELLOWSTONE RIVER BASIN--Continued
POWDER RIVER AT SUSSEX, WYO.

LOCATION.--At county highway bridge, 100 feet upstream from gaging station at Sussex, Johnson County, about 3 miles downstream from Salt Creek.
DRAINAGE AREA.--3,090 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: September 1949 to September 1951.
Water temperatures: March 1950 to September 1951.
Sediment records: March 1950 to September 1951.
EXTREMES, 1950-51.--Water temperatures: Maximum, 87° F July 29; minimum, freezing point probably on many days during November to March.
Sediment concentrations: Maximum daily, 63,900 ppm Sept. 7; minimum daily, not determined.
Sediment loads: Maximum daily, 484,000 tons Sept. 7; minimum daily, not determined.
EXTREMES, March 1950 to September 1951.--Water temperatures: Maximum, 88° F Aug. 10, 1950; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 63,900 ppm Sept. 7, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 484,000 tons Sept. 7, 1951; minimum daily, less than 1 ton on several days during August and September 1950.
REMARKS.--Flow affected by ice Nov. 9-19, 23-26, Dec. 3 to Feb. 28, Mar. 2-17. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million		Tons per acre-foot	Calcium	Non-carbonate				
															Residue at 180°C	Sum							
Oct. 10, 1950	137	12	0.04	153	50	159		225		610	79	0.4	2.7	0.30	1,240	1,180	1.69	588	403	37	1,630	7.7	
Oct. 20	114	13	.04	148	51	161		230		590	87	.4	1.9	.21	1,240	1,170	1.69	578	389	38	1,600	7.8	
Nov. 1	111	10	.04	163	53	186		231		675	95	.6	3.2	.10	1,350	1,300	1.84	626	437	39	1,820	7.7	
Jan. 3, 1951	a 70	11	.02	176	62	181		253		690	109	.6	4.9	.10	1,470	1,360	2.00	692	485	36	1,960	7.9	
Feb. 7	a 140	12	.10	157	47	147		268		525	95	.4	3.5	.00	1,180	1,120	1.60	594	364	35	1,570	7.8	
Mar. 1	a 150	10	.18	175	52	172		231		638	118	.4	5.2	--	1,390	1,290	1.89	652	463	36	1,840	7.8	
Apr. 5	125	11	.02	154	53	154		220		603	86	.5	4.9	.17	1,240	1,170	1.69	600	420	36	1,650	7.5	
May 8	523	13	.02	83	25	60		170		339	35	.4	2.8	.07	564	--	.77	310	171	30	1,840	7.4	
June 7	80	10	.02	131	49	142		216		520	82	.5	1.5	.16	1,110	1,040	1.51	528	351	37	1,510	7.5	
July 20	12	8.6	.04	257	103	390		204		1,330	254	1.0	1.2	.34	2,610	2,450	3.55	1,070	903	44	3,240	7.5	
Sept. 18	54	--	--	--	--	216	--	222		695	136	--	--	--	--	--	--	--	--	--	36	2,250	7.3

a Mean daily discharge.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 4 p. m. and 7 p. m. October, April to September;
 between 1 p. m. and 5 p. m. November to March/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	a43	a39	36	--	33	--	53	45	--	83	66
2	50	--	38	37	--	--	a54	54	49	71	75	70
3	a43	--	a38	a32	--	--	--	65	--	77	a76	60
4	55	--	a38	38	--	--	--	63	63	--	80	69
5	55	--	39	38	--	--	--	64	67	--	a81	70
6	50	--	--	a38	--	--	--	59	65	78	--	68
7	53	--	34	35	32	--	--	--	73	70	--	63
8	57	35	a39	35	--	39	--	55	65	--	65	62
9	58	--	35	a36	--	40	--	55	--	75	70	65
10	61	--	37	a34	38	40	--	63	--	--	a75	67
11	61	--	39	36	40	--	--	65	--	56	a65	52
12	62	--	a38	35	--	40	54	a59	--	75	--	59
13	60	--	38	36	--	--	57	54	--	79	78	61
14	68	--	a35	35	--	--	55	--	71	85	70	58
15	a56	--	a38	36	--	39	--	--	83	a73	72	65
16	--	40	40	34	--	39	53	52	80	78	76	--
17	61	40	--	a35	--	a34	a44	62	a71	81	74	66
18	58	a40	38	a36	--	--	56	64	--	84	72	--
19	59	40	--	--	--	40	--	65	--	--	--	68
20	58	--	37	--	--	40	a36	58	--	69	75	50
21	a48	--	38	--	--	44	--	60	--	68	--	57
22	a45	a38	39	--	--	a39	--	68	66	67	75	57
23	--	41	a37	36	--	39	--	a57	--	a77	a74	55
24	--	a40	35	38	--	45	--	66	--	--	a68	60
25	--	39	a35	40	--	--	43	--	74	81	72	61
26	--	a38	35	--	--	52	54	67	75	86	70	59
27	--	40	--	--	--	45	58	67	69	80	72	55
28	--	--	37	--	--	--	61	68	68	78	68	62
29	--	--	38	--	--	--	57	67	65	87	65	61
30	52	40	38	--	--	48	58	64	70	77	75	60
31	--	--	a38	--	--	a46	--	--	--	80	70	--
Average	--	--	37	--	--	--	--	61	--	73	73	62

a Observations made between 9 a. m. and 11 a. m.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	124	1,800	a 540	109	451	133	132	714	254
2-----	137	2,500	925	111			119	670	215
3-----	205	8,150	4,510	114			90	190	46
4-----	244	12,200	8,040	114			70	170	32
5-----	225	15,400	9,350	117			60	170	28
6-----	234	23,000	14,500	117			80	150	a 30
7-----	210	10,100	5,730	114			100	125	34
8-----	168	4,850	2,200	119			115	140	b 45
9-----	135	2,460	897	80	--	e 230	125	160	54
10-----	140	1,480	559	85			140	180	68
11-----	132	1,320	470	100			140	200	76
12-----	147	1,700	675	120			132	190	68
13-----	130	1,460	512	130			128	230	79
14-----	122	1,400	461	140			125	200	68
15-----	117	1,350	426	130			135	220	80
16-----	119	920	a 300	140	650	246	135	190	69
17-----	111	610	183	150	656	266	130	180	a 65
18-----	117	650	205	157	763	323	125	210	71
19-----	117	655	207	150	756	306	120	190	62
20-----	111	635	190	137	--	e 440	130	180	63
21-----	114	542	167	150	--	e 730	135	240	87
22-----	111	542	162	137	2,300	851	127	272	93
23-----	111			110	2,050	609	127	230	79
24-----	109	--	e 160	105	2,090	593	130	330	116
25-----	106			185	1,870	934	135	327	119
26-----	109	587	173	160	899	388	130	260	91
27-----	106			150	810	328	125	200	a 70
28-----	104	--	e 120	144	740	a 290	120	160	52
29-----	101			132	690	a 250	115	170	53
30-----	98	335	89	137	682	252	125	150	51
31-----	104	370	a 100	--	--	--	110	140	42
Total--	4,218	--	52,411	3,844	--	10,159	3,710	--	2,360
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	95	140	36	105			150	1,220	494
2-----	80	135	29	110			140		
3-----	70	100	19	110			130		
4-----	80	210	45	120	--	e 45	135		
5-----	73			130			155	--	e 420
6-----	70			125			160		
7-----	68	244	47	140	150	57	140		
8-----	76			160	300	a 130	150	1,100	b 450
9-----	84			185	580	a 290	200	1,120	605
10-----	90			220	950	564	190	900	462
11-----	93	224	53	230	1,030	640	210	860	a 490
12-----	87			200	550	a 300	200	850	459
13-----	80			180	380	185	240	2,000	a 1,300
14-----	95			170			225	3,600	a 2,200
15-----	100			185			210	3,340	1,890
16-----	93	220	55	200			240	4,030	2,610
17-----	98			180			140	4,130	1,560
18-----	94			170			173	2,200	a 1,000
19-----	90			170			161	2,200	b 960
20-----	80			165			190	2,900	1,490
21-----	75	--	e 40	180	--	e 320	218	2,490	1,470
22-----	100			190			227	3,400	2,080
23-----	104			170			204	2,660	1,460
24-----	110	155	46	190			186	3,160	1,590
25-----	115			170			169	3,100	a 1,400
26-----	120			180			199	3,050	1,640
27-----	80			165			186	2,400	1,200
28-----	50			160			144	2,000	a 780
29-----	65	--	e 30	--	--	--	137	1,800	a 670
30-----	80			--	--	--	133	1,670	600
31-----	90			--	--	--	140	1,680	635
Total--	2,685	--	1,337	4,660	--	7,236	5,482	--	32,015

e Estimated.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	114	1,300	a 400	308	4,980	4,140	152	586	240
2-----	121	1,330	435	213	3,520	2,020	195	2,010	1,060
3-----	133	1,300	a 470	190	2,020	1,040	182	2,200	b 1,100
4-----	125	1,940	a 320	199	1,360	731	161	2,020	878
5-----	129	871	303	208	1,280	719	152	976	401
6-----	137	980	a 340	301	2,170	1,760	118	780	249
7-----	137			412	2,700	a 3,000	92	360	89
8-----	118			330	3,000	2,670	74	389	78
9-----	121			434	4,080	4,780	59		
10-----	144	1,200	a 470	338	3,140	2,860	53		
11-----	148	1,400	a 560	323	2,210	1,930	51	--	e 190
12-----	152	1,820	747	360	2,500	2,430	87		
13-----	165	2,890	1,290	508	3,490	4,790	68		
14-----	165	3,320	1,480	523	3,960	5,590	68	536	98
15-----	148	2,600	a 1,000	381	3,100	a 3,200	74	656	131
16-----	140	1,510	571	308	2,150	1,790	62	1,740	291
17-----	110	896	286	301	3,610	2,930	45	880	107
18-----	110	756	225	338	3,430	s 3,520	33	400	a 35
19-----	121	660	a 220	412	9,120	10,100	29	250	a 20
20-----	121	740	242	434	4,560	5,340	23	120	a 7
21-----	114	1,500	a 450	353	4,900	4,670	19	87	4
22-----	110			281	5,980	4,540	18	95	5
23-----	105			246	2,670	1,770	27	--	e 120
24-----	110			251	2,060	1,400	44	--	e 630
25-----	133	2,800	1,010	241	2,200	a 1,400	38	5,400	554
26-----	152	3,700	1,520	227	1,120	686	29	4,470	350
27-----	144	3,710	1,440	186	770	387	20	3,650	197
28-----	152	3,430	1,410	156	798	336	19	1,240	64
29-----	208	4,360	2,450	161	716	311	18	700	34
30-----	308	5,450	4,530	165	688	306	18	440	21
31-----	--	--	--	137	610	a 230	--	--	--
Total--	4,195	--	24,519	9,225	--	81,376	2,028	--	7,713
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	18	290	a 15	13	3,600	sa 570	10	120	3
2-----	17	175	8	53	53,600	s 8,920	59	5,500	sa 5,700
3-----	18	135	7	20	1,980	s 152	169	14,000	sb 8,400
4-----	19	1,000	a 50	11	1,250	37	51	13,000	1,790
5-----	17	1,000	a 45	16	10,200	s 615	37	2,300	230
6-----	10	848	23	9.6	3,100	a 80	65	5,000	sa 4,000
7-----	8.8	280	7	8.4	500	11	2,540	63,900	sa 84,000
8-----	8.0	140	a 3	12	5,900	sb 560	530	50,100	sa 80,100
9-----	8.0	116	3	28	11,000	sb 1,600	228	17,000	sa 11,100
10-----	14	531	s 24	14	2,650	100	110	4,200	1,250
11-----	68	12,200	s 3,100	97	27,000	sb 7,800	88	1,100	261
12-----	114	25,300	s 8,540	40	12,100	s 1,460	220	5,890	s 5,160
13-----	48	10,000	1,300	16	2,980	s 142	142	8,190	3,140
14-----	18	2,450	s 150	12	705	23	97	2,600	681
15-----	12	420	14	11	400	12	81	800	175
16-----	8.0	200	4	11	220	7	69	550	102
17-----	11	103	3	11	110	3	60	450	73
18-----	13			10	150	4	52	300	42
19-----	11			9.6	300	a 8	126	31,800	s 17,600
20-----	48	5,200	sa 2,600	9.2			342	57,000	sb 58,000
21-----	144	12,400	s 5,750	8.4	149	3	174	18,500	8,690
22-----	148	31,000	sb 16,000	8.0			103	6,000	1,670
23-----	161	56,500	25,500	7.8			78	1,310	276
24-----	78	23,000	sa 4,800	7.8			75	739	150
25-----	42	5,600	635	7.2			73	549	108
26-----	22	1,460	87	6.8			66	386	69
27-----	18	400	19	7.0	105	2	61	261	43
28-----	18	200	10	7.0			63	264	45
29-----	40	19,400	s 3,320	7.5			72	267	52
30-----	23	5,580	s 380	7.2			69	281	52
31-----	21	4,580	s 351	7.5			--	--	--
Total--	1,203.8	--	72,754	494.0	--	22,131	5,910	--	692,962

Total discharge for year (cfs-days) 47,654.8

Total load for year (tons) 1,006,973

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
POWDER RIVER AT SUSEX, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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		0.350	0.500	1.000
Oct. 3, 1950....	9:40 a.m.	244	43	8,260	2,760	--	49	--	67	--	80	--	--	SPWCM	
Oct. 4.....	3:39 p.m.	332	44	12,300	4,040	48	63	84	91	93	96	98	99	BWCM	
Oct. 5.....	5:20 p.m.	205	55	16,000	11,100	--	64	--	86	--	96	--	--	SPWCM	
Oct. 7.....	9:30 a.m.	225	45	9,820	7,210	--	70	--	88	--	96	--	--	SPWCM	
Oct. 10.....	4:40 p.m.	137	56	1,320	3,380	--	41	--	58	--	76	91	100	SPWCM	
Mar. 15, 1951..	1:24 p.m.	210	34	3,520	2,360	2	4	18	41	53	66	--	--	SPNM	
Mar. 15.....	1:24 p.m.	210	34	3,520	2,980	26	28	32	43	53	67	84	97	SPWCM	
Mar. 16.....	1:00 p.m.	240	39	3,450	2,160	--	45	--	59	--	77	88	98	SPWCM	
Mar. 17.....	10:30 a.m.	140	34	4,280	2,720	--	68	--	88	--	95	--	--	SPWCM	
Mar. 26.....	1:00 p.m.	199	52	3,040	2,130	--	59	--	73	--	85	--	--	SPWCM	
Apr. 13.....	6:00 p.m.	169	57	4,460	2,980	36	44	53	57	61	68	77	99	BWCM	
Apr. 26.....	5:00 p.m.	152	64	4,010	2,550	--	68	--	83	--	92	--	--	SPWCM	
Apr. 27.....	6:00 p.m.	140	58	3,140	2,250	--	74	--	88	--	96	--	--	SPWCM	
Apr. 28.....	4:10 p.m.	169	63	4,750	4,510	--	0	2	79	87	91	--	--	SPNM	
Apr. 28.....	5:30 p.m.	165	61	4,680	1,780	--	69	--	84	--	95	--	--	SPWCM	
May 3.....	1:50 p.m.	173	64	2,110	4,480	--	45	--	59	--	77	90	99	SPWCM	
May 8.....	11:12 a.m.	323	54	2,870	5,180	--	26	--	34	--	61	82	98	SPWCM	
May 16.....	5:15 p.m.	308	52	1,980	3,080	--	19	--	32	--	57	82	99	SPWCM	
May 23.....	1:10 p.m.	236	--	2,350	5,140	--	38	--	50	--	72	92	99	SPWCM	
May 30.....	5:15 p.m.	161	64	693	1,220	--	22	--	33	--	63	91	99	SPWCM	
June 7.....	4:08 p.m.	80	73	283	592	--	30	--	41	--	68	88	99	SPWCM	
June 14.....	4:55 p.m.	68	71	416	878	16	23	33	40	48	58	72	100	BWCM	
June 25.....	5:00 p.m.	37	74	5,030	2,100	--	83	--	96	--	97	--	--	SPWCM	
June 27.....	1:00 p.m.	20	62	3,970	3,970	--	0	18	96	98	98	--	--	SPNM	
June 27.....	1:00 p.m.	20	62	4,090	3,450	62	92	97	98	99	99	--	--	SPWCM	

YELLOWSTONE RIVER BASIN--Continued
POWDER RIVER AT SUSSEX, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water-temperature (°F)	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	0.350		0.500	1.000
July 11, 1951 . . .	2:30 p. m.	70	56	11,600	11,900	--	--	0	90	95	98	--	--	--	--	SPNM
July 11, 1951 . . .	2:30 p. m.	70	56	11,600	7,400	57	75	86	96	97	97	--	--	--	--	SPWCM
July 11, 1951 . . .	2:30 p. m.	70	56	11,600	10,800	--	0	44	93	98	99	--	--	--	--	SPNM
July 13, 1951 . . .	3:08 p. m.	42	85	11,000	8,680	66	84	95	96	98	98	--	--	--	--	SPWCM
July 13, 1951 . . .	3:08 p. m.	42	85	11,000	8,680	--	34	--	85	--	95	--	--	--	--	SPWCM
July 21, 1951 . . .	7:30 a. m.	190	65	16,100	6,420	--	--	--	--	--	--	--	--	--	--	SPWCM
July 21, 1951 . . .	2:15 p. m.	129	68	5,890	9,130	--	61	--	91	--	97	--	--	--	--	SPWCM
July 22, 1951 . . .	3:58 p. m.	133	--	47,200	48,500	--	0	95	96	97	99	--	--	--	--	SPNM
July 23, 1951 . . .	3:58 p. m.	133	--	47,200	6,130	54	69	83	93	95	98	--	--	--	--	SPWCM
July 26, 1951 . . .	4:38 p. m.	19	86	47,966	2,950	--	82	--	91	--	96	--	--	--	--	SPWCM
July 30, 1951 . . .	1:35 p. m.	18	88	1,830	5,110	--	83	--	98	--	99	--	--	--	--	SPWCM
Aug. 9, 1951 . . .	1:38 p. m.	17	75	3,240	2,370	--	60	--	80	--	86	--	--	--	--	SPWCM
Sept. 8, 1951 . . .	12:45 a. m.	1,000	--	70,200	3,840	46	60	73	87	94	97	--	98	--	99	SPWCM
Sept. 10, 1951 . . .	4:35 p. m.	99	70	2,590	7,180	--	82	--	94	--	97	--	--	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.

LOCATION.--At county highway bridge, 200 feet downstream from gaging station, which is a quarter of a mile upstream from mouth and 12 miles south of Arvada, Sheridan County.

DRAINAGE AREA.--956 square miles.

RECORDS AVAILABLE.--Water temperatures: March 1950 to September 1951.

Sediment records: March 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 84°F July 16, 24; minimum, freezing point on many days during November to April.

Sediment concentrations: Maximum daily, 43,200 ppm Sept. 3; minimum daily, no flow on several days during July to September.

Sediment loads: Maximum daily, 24,000 tons Sept. 7; minimum daily, 0 ton on several days during July to September.

EXTREMES, March 1950 to September 1951.--Water temperatures: Maximum, 84°F July 16, 24, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 43,200 ppm Sept. 3, 1951; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 24,000 tons Sept. 7, 1951; minimum daily, 0 ton on many days.

REMARKS.--Flow affected by ice Nov. 3. Nov. 8 to Mar. 31. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Temperature (°F) of water, water year October 1950 to September 1951

/Once-daily temperature measurement between 7 a. m. and 9 a. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	40	40	31	32	31	32	32	--	--	62	73	55
2	38	35	31	32	31	32	32	48	43	--	71	--
3	35	31	31	32	32	32	32	a 61	51	63	61	51
4	34	35	--	32	31	32	33	51	51	--	--	--
5	44	36	31	31	32	32	35	--	60	--	--	a 71
6	47	35	31	31	32	32	39	52	56	--	--	--
7	44	33	32	32	32	32	38	50	56	--	--	--
8	42	--	32	31	32	32	40	53	56	--	--	57
9	48	--	32	32	32	32	39	51	54	--	--	58
10	44	32	33	32	32	32	37	51	55	--	--	54
11	48	34	32	31	32	32	36	53	56	--	--	51
12	49	33	32	31	32	32	35	53	59	63	60	47
13	52	35	31	31	32	32	42	54	60	63	65	50
14	--	35	32	31	32	32	42	51	60	65	a 55	52
15	51	34	32	32	32	32	37	54	61	73	60	--
16	51	34	32	32	32	32	35	57	66	a 84	59	45
17	51	34	32	32	32	32	42	55	67	79	--	48
18	48	38	31	33	32	32	46	57	65	68	--	55
19	47	33	31	32	32	32	40	54	56	70	--	53
20	48	--	--	32	32	32	33	60	61	--	--	54
21	47	31	32	32	32	32	--	57	--	--	--	a 53
22	44	31	31	32	32	32	34	55	58	--	--	--
23	42	--	33	32	32	32	43	60	58	--	--	--
24	41	31	31	32	32	32	41	59	63	a 84	--	48
25	42	31	32	32	32	32	39	54	--	71	--	49
26	41	31	31	32	32	32	45	52	64	71	--	48
27	42	31	31	31	32	32	48	55	58	68	--	--
28	41	31	32	31	32	32	49	62	58	72	--	41
29	43	31	--	--	--	32	53	56	60	--	--	--
30	44	32	32	--	--	32	54	67	60	70	--	--
31	44	--	32	31	--	32	--	52	--	72	a 73	--
Average	44	33	32	32	32	32	40	55	58	--	--	--

a Reading obtained between 3 p. m. and 6 p. m.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.- Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December						
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment					
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day				
1-----	11	59	2	14	32	1	21	125	7				
2-----	12			14			20	110	6				
3-----	12			11			19	90	5				
4-----	12			14			18	103	5				
5-----	14			14			10	133	4				
6-----	16			16			15	95	4				
7-----	16			16			17	189	9				
8-----	16			13			18	279	14				
9-----	16			11			19						
10-----	18			14			20						
11-----	22	34	1	17	67	3	21	110	6				
12-----	20			19			20			20			
13-----	18			20			18			18			
14-----	16			22			15			15			
15-----	16			25			17			17			
16-----	13			24			17			113	5		
17-----	12			20			17						
18-----	12			21			18						
19-----	12			15			20					20	
20-----	12			16			21					21	
21-----	14		22	81	5								
22-----	14	18	22										
23-----	15	15	7			21							
24-----	14	20	6			21							
25-----	14	30	110			9	20						
26-----	16	29	1			35	143	14	17	85	4		
27-----	16					33	165	15	17				
28-----	16					30	145	12	16				
29-----	16					25	141	10	15			--	e 3
30-----	16					22	170	10	15			68	3
31-----	16			--	--	--	14	56	2				
Total--	463			--	41	584	--	161	561			--	184
1-----	13			56	2	11	51	2	18			50	2
2-----	15	56	2	12	17								
3-----	16			12	16								
4-----	16			13	16								
5-----	15			14	17	31			1				
6-----	14			13	16								
7-----	15	86	4	13	15								
8-----	16			15	16								
9-----	17			20	19								
10-----	16			25	18								
11-----	14			23	7		18	27		1			
12-----	15			20	10		20						
13-----	16			16	3		20						
14-----	17			19	5		22				55	3	
15-----	17			25	85	6	24		45		3		
16-----	18			23		22	95		6				
17-----	17	21		17									
18-----	16	22		15									
19-----	15	21	54	3	21								
20-----	14	21			25	29	2						
21-----	15	21			30								
22-----	17	19			29								
23-----	16	20			30	81	7						
24-----	16	20			40	115	12						
25-----	17	19			70	800	a 150						
26-----	15	19			60	650	105						
27-----	11	18			45	230	28						
28-----	7	15			50	400	54						
29-----	8	--	60	680	a 110								
30-----	9	--	65	790	139								
31-----	10	64	2	--	70	295	56						
Total--	453	--	90	510	--	94	921	--	696				

e Estimated.

a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	83	1,450	325	98	2,380	630	16		
2-----	83	730	164	102	2,340	644	18		
3-----	70	1,650	312	82	1,140	252	18	40	2
4-----	68	1,370	252	62	632	106	14		
5-----	49	890	118	48	323	42	13		
6-----	41	370	41	38	202	21	12		
7-----	39	230	24	50	275	37	11		
8-----	38	210	22	66	450	80	15	51	2
9-----	37	180	18	59	330	53	15		
10-----	37	156	16	51	185	25	12		
11-----	35	112	11	54	180	26	12		
12-----	33	95	8	45	115	14	9.8		
13-----	33	85	8	34	100	9	8.4		
14-----	33	84	7	28	70	5	7.5		
15-----	33	61	5	24	48	3	6.2	34	1
16-----	33	92	8	27	36	3	5.8		
17-----	35	82	8	24	39	3	4.7		
18-----	35	80	8	20	30	2	5.3		
19-----	30	68	6	27	380	sa 55	17	12,200	s 837
20-----	32	50	4	30	790	s 73	21	990	s 67
21-----	32	50	b 4	22	230	14	15	440	b 20
22-----	37	130	13	19	285	15	9.8	440	12
23-----	45	170	21	21	212	12	7.1	198	4
24-----	47	180	23	26	160	11	5.0	148	2
25-----	46	140	17	24	94	6	5.0	110	b 1
26-----	44	136	16	18	65	3	4.1	55	1
27-----	40	122	13	15	58	2	4.1		
28-----	36	100	10	19	72	4	4.7		
29-----	36	107	10	21	78	4	4.1	60	1
30-----	47	610	sb 95	16	52	2	2.8		
31-----	--	--	--	14	38	1	--	--	--
Total--	1,287	--	1,587	1,184	--	2,157	303.4	--	977
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2.4	52	(t)	3.9			6.5	510	sa 20
2-----	2.1	60	(t)	2.4			0	--	0
3-----	1.8	60	(t)	1.1	38	(t)	94	43,200	s 17,200
4-----	1.4			.4			29	15,000	sb 2,100
5-----	.9			.2			3.0	500	4
6-----	.4		(t)	.2			.6	60	(t)
7-----	.1			.1			284	18,000	sa 24,000
8-----	0	--	0	0	--	0	202	23,000	sa 14,000
9-----	0	--	0	0	--	0	94	11,800	2,990
10-----	.4	122	(t)	0	--	0	51	13,500	1,860
11-----	1.7	--	(t)	0	--	0	28	11,700	884
12-----	1.7	--		22	3,100	sa 360	20	5,300	286
13-----	1.8	52	(t)	2.1	160	1	14	2,400	91
14-----	1.6			144	22,800	s 17,800	11	1,500	45
15-----	5.7	86	s 2	31	10,700	s 1,430	10	800	b 20
16-----	14	140	5	4.7	591	s 9	10	640	17
17-----	9.1	80	2	1.4	180	b 1	12	550	18
18-----	6.5	65	1	.3	55	(t)	13	640	22
19-----	3.3	53	(t)	0	--	0	14	455	17
20-----	2.0	--	(t)	0	--	0	13	265	9
21-----	1.8	--	(t)	0	--	0	13	220	8
22-----	1.4	56	(t)	0	--	0	14	220	b 8
23-----	1.4	--	(t)	0	--	0	16	240	b 10
24-----	5.7	72	1	0	--	0	25	585	s 43
25-----	14	100	4	0	--	0	20	300	16
26-----	15	88	4	0	--	0	20	220	12
27-----	15	85	3	0	--	0	21	260	b 15
28-----	11	68	2	0	--	0	20	125	7
29-----	8.4	60	b 1	0	--	0	19	80	b 4
30-----	7.8	55	1	0	--	0	20	110	b 6
31-----	5.6	50	1	2.8	150	sa 8	--	--	--
Total--	144.0	--	31	216.6	--	19,610	1,097.1	--	63,712

Total discharge for year (cfs-days)..... 7,724.1
 Total load for year (tons)..... 89,323

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, April to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Apr. 3, 1951 ...	4:30 p. m.	90	36	3,150	2,560	32	40	50	63	78	90	97	99		100		BWCM
Apr. 4	9:44 a. m.	81	33	1,510	3,200	--	46	--	66	--	89	--	--	--	--	--	SPWCM
May 1	8:30 a. m.	102	--	3,000	2,300	--	48	--	80	--	95	--	--	--	--	--	SPWCM
May 4	11:25 a. m.	63	58	639	1,250	47	64	74	83	90	93	94	96		97		BWCM
June 19	8:02 a. m.	20	56	24,900	5,330	--	75	--	--	98	--	100	--	--	--	--	SPWCM
Aug. 14	1:05 p. m.	483	55	51,900	5,850	--	53	--	81	--	99	--	--	--	--	--	SPWCM
Sept. 3	8:20 a. m.	176	51	79,200	8,240	47	60	75	89	97	99	--	--	--	--	--	SPWCM
Sept. 7	12:20 p. m.	79	49	41,200	6,160	--	65	--	94	--	100	--	--	--	--	--	SPWCM
Sept. 7	6:10 p. m.	280	--	24,100	9,540	--	--	--	80	--	96	--	--	--	--	--	SPWCM
Sept. 9	1:07 p. m.	64	64	8,900	8,220	0	1	4	70	91	96	--	--	--	--	--	SPNM
Sept. 9	1:07 p. m.	107	64	8,900	3,220	50	64	74	82	88	92	95	98		99		BWCM

YELLOWSTONE RIVER BASIN--Continued
POWDER RIVER AT ARVADA, WYO.

LOCATION.--At county highway bridge, 0.1 mile south of Arvada, Sheridan County, a quarter of a mile upstream from Wildhorse Creek and a half a mile downstream from gaging station.

DRAINAGE AREA.--6,050 square miles, approximately, 1949 to September 1951.

RECORDS AVAILABLE.--March 1949 to September 1951.

Water temperatures: April 1946 to September 1951.

Sediment records: April 1946 to September 1951.

EXTREMES 1950-51.--Water temperatures: Maximum, 88°F July 24, 26; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 75,600 ppm Sept. 9; minimum daily, no flow on several days during July and August.

Sediment loads: Maximum daily, 419,000 tons Sept. 8; minimum daily, 0 ton, on several days during July and August.

EXTREMES 1946-51.--Water temperatures (1949-51): Maximum, 88°F July 24, 26, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 97,200 ppm Sept. 1, 1949; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 1,200,000 tons June 18, 1948; minimum daily, 0 ton on many days each year.

REMARKS.--Flow affected by ice Nov. 8-20, 23-29, Dec. 2 to Mar. 28. There is no appreciable runoff between gaging station and sampling point except during periods of intense local rainfall. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
																					Residual at 180°C	Sum
Oct. 2, 1950	70		16	0.04	190	65	212		204	880	81	0.6	3.7	0.19	1,630	1,550	740	573	38	2,020	7.5
Oct. 31	94		22	0.04	182	65	199		233	805	85	0.6	2.0	0.25	1,550	1,480	720	529	38	1,940	7.6
Dec. 6	a 22		9.8	0.02	242	101	198		340	1,010	83	0.6	2.6	0.30	2,020	1,810	1,020	741	30	2,320	8.0
Jan. 2, 1951	a 50		10	0.04	193	67	173		275	755	83	0.4	4.0	--	1,550	1,420	736	530	33	2,010	7.8
Feb. 8	a 40		13	0.10	127	156	247		350	995	120	0.5	3.5	--	2,010	1,830	958	671	36	2,450	7.7
Mar. 1	a 191		8.3	0.10	157	43	144		196	603	62	0.4	5.0	--	1,180	1,110	568	407	34	1,540	7.8
Apr. 4	201		10	0.03	163	40	169		219	708	69	0.5	5.8	--	1,370	1,290	582	472	36	1,760	7.3
May 11	442		14	0.04	103	36	102		183	393	43	0.5	5.8	--	1,370	1,260	640	484	37	1,770	7.4
June 13	46		9.4	0.04	158	60	172		190	718	77	0.5	5.8	--	1,360	1,290	640	484	37	1,770	7.4
Sept. 21	87		--	--	--	--	209	--	184	935	87	--	--	--	--	--	--	--	36	2,160	7.2

a. Mean daily discharge.

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement made between 3 p. m. and 7 p. m.,/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	36	46	33	a 32	32	--	45	52	43	73	80	67
2	45	39	33	32	32	--	51	60	47	--	79	--
3	45	40	33	a 32	32	--	52	65	60	73	70	55
4	52	48	32	32	32	--	55	67	68	--	75	a 52
5	55	44	32	32	32	--	49	64	68	80	76	66
6	48	40	32	32	32	--	--	62	70	78	--	66
7	50	36	32	32	--	--	55	66	70	--	--	69
8	56	32	32	--	32	--	54	56	a 68	--	--	65
9	52	32	a 32	32	--	--	42	61	65	--	--	63
10	56	32	32	32	33	--	40	62	68	54	--	69
11	60	33	32	32	--	--	44	70	69	57	73	53
12	63	--	32	32	32	--	36	65	72	76	72	55
13	64	34	--	32	--	--	55	64	68	82	72	59
14	64	34	a 32	32	32	--	43	--	72	--	62	55
15	57	33	32	32	32	--	40	64	--	85	72	62
16	60	34	32	32	32	--	54	59	75	86	76	64
17	58	--	32	32	32	--	57	66	69	86	79	68
18	58	a 32	32	32	--	--	57	72	70	85	75	63
19	60	--	32	32	--	--	34	72	72	81	70	65
20	59	a 35	32	32	33	--	41	--	62	70	72	49
21	46	--	33	32	33	--	--	66	59	69	74	53
22	51	a 33	32	32	34	--	54	73	62	--	80	--
23	52	32	32	32	34	--	46	77	72	83	--	50
24	53	34	32	32	33	--	42	66	70	88	--	50
25	55	32	32	32	--	--	--	58	68	85	--	60
26	48	33	--	32	33	--	55	66	73	88	--	--
27	50	34	32	32	--	--	59	69	62	80	--	--
28	51	--	32	a 32	a 33	--	62	70	64	--	--	a 54
29	51	a 36	32	32	--	--	64	65	a 62	75	--	a 64
30	56	--	32	32	--	42	57	54	69	84	--	64
31	45	--	32	32	--	44	--	51	--	--	--	--
Average	53	36	32	32	--	--	50	64	66	78	74	60

a Reading obtained between 1 p. m. and 3 p. m.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	39	8,230	867	91	3,440	845	139	4,400	1,650
2-----	63	5,900	1,000	104	4,570	1,280	70	2,680	506
3-----	88	9,760	2,320	91	4,700	1,150	40	700	76
4-----	100	11,800	3,190	107	5,100	1,470	25	167	11
5-----	128	10,200	3,530	155	4,610	1,930	18	126	6
6-----	167	13,000	5,860	139	5,700	2,140	22	170	10
7-----	171	18,700	8,730	128	7,450	2,570	23	150	9
8-----	179	23,400	11,300	120	7,000	2,270	24	134	9
9-----	147	23,000	9,130	70	1,400	265	25	138	9
10-----	132	18,000	6,420	25	470	32	26	160	11
11-----	110	12,000	3,560	30	800	65	26	180	13
12-----	110	9,500	2,820	35	560	53	28	205	15
13-----	100	7,200	1,940	37	480	48	27	227	16
14-----	85	5,700	1,310	40	455	49	26	338	24
15-----	76	5,500	1,130	37	470	47	28	432	33
16-----	88	5,300	1,260	40	565	61	30	490	40
17-----	91	5,100	1,250	43	780	90	30	552	45
18-----	85	4,900	1,120	40	872	94	31	526	44
19-----	82	3,900	863	38	613	63	31	603	50
20-----	97	3,620	948	60	2,100	a 340	35	500	47
21-----	104	4,020	1,130	248	2,860	1,920	38	410	42
22-----	104	5,460	1,530	220	3,400	2,020	40	405	44
23-----	107	4,600	1,330	100	1,050	284	43	406	47
24-----	91	5,580	1,370	125	300	101	45	408	50
25-----	88	4,490	1,070	150	550	223	50	357	48
26-----	97	4,100	1,070	170	600	275	45	327	40
27-----	85	4,900	1,120	200	640	346	45	422	51
28-----	76	4,050	832	230	4,200	b 2,600	43	420	49
29-----	94	3,980	1,010	240	6,850	4,500	48	495	64
30-----	85	4,320	990	171	3,800	1,750	52	385	54
31-----	88	4,160	988	--	--	--	50	353	48
Total--	3,157	--	80,888	3,284	--	28,681	1,203	--	3,161
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	47	336	43	25	352	24	191	420	217
2-----	50	329	44	32			200		
3-----	55	364	54	37			150		
4-----	60	375	61	40	251	26	160		
5-----	58	352	55	42			175		
6-----	50	352	48	39			100		
7-----	55	361	54	38			90		
8-----	60	365	59	40			96	--	e 200
9-----	70	370	70	43	279	31	110		
10-----	66			45			115		
11-----	64			40			120		
12-----	68	418	77	35			120		
13-----	70			36			130		
14-----	74			40			170		
15-----	80			60	160	22	250		
16-----	85			65			230		
17-----	90	484	111	68			200		
18-----	84			70	160	30	210	--	e 600
19-----	86			120	540	175	218		
20-----	80			100	560	151	230		
21-----	86			110	700	208	290		
22-----	86	400	90	120	700	227	325	--	e 1,200
23-----	80			150	570	231	350	--	e 2,000
24-----	84			200	615	332	400	--	e 5,000
25-----	90	478	116	250	450	304	500	--	e 9,000
26-----	60	376	61	225	1,360	826	600	7,400	a 12,000
27-----	25	336	23	200	1,000	b 540	500	7,800	10,500
28-----	15	322	13	175	450	213	410	11,300	12,500
29-----	25	392	26	--	--	--	317	24,000	a 21,000
30-----	27	412	30	--	--	--	248	12,900	8,640
31-----	27	380	28	--	--	--	240	8,000	5,180
Total--	1,957	--	2,175	2,445	--	3,678	7,445	--	94,037

e Estimated.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	214	8,620	4,980	182	8,820	4,330	201	5,770	3,130
2-----	201	8,800	3,690	272	10,900	8,000	171	5,060	2,350
3-----	208	7,050	3,960	380	13,600	14,000	188	5,500	2,790
4-----	201	6,540	3,550	330	10,100	9,000	194	3,900	2,040
5-----	187	7,350	3,310	272	6,020	4,420	214	4,390	2,540
6-----	175	6,300	2,980	227	5,280	3,240	139	3,860	1,450
7-----	171	5,150	2,380	188	4,910	2,490	139	2,890	1,080
8-----	143	4,610	1,780	234	5,400	3,410	121	2,570	840
9-----	143	4,920	1,900	304	10,100	8,290	91	1,850	455
10-----	147	5,800	2,300	304	8,700	7,140	88	1,490	354
11-----	182	5,160	2,540	420	11,200	12,700	63	1,590	271
12-----	187	6,460	2,910	370	11,400	11,400	57	1,560	240
13-----	175	11,500	5,430	320	9,260	8,000	44	1,110	132
14-----	227	13,800	8,460	304	9,150	7,510	88	5,370	1,250
15-----	187	11,300	5,100	312	11,600	9,770	50	1,870	252
16-----	151	7,000	2,850	350	10,400	9,830	68	2,720	500
17-----	155	6,500	2,720	420	10,500	11,900	34	1,600	147
18-----	139	5,900	2,210	453	9,770	11,900	42	2,190	248
19-----	135	4,930	1,800	400	12,400	13,400	508	43,800	s 84,100
20-----	135	6,000	a 2,200	390	11,000	11,600	226	39,000	s 28,400
21-----	143	3,950	1,520	420	10,100	11,500	76	18,000	3,690
22-----	143	4,590	1,770	453	11,400	13,900	52	4,590	644
23-----	121	5,600	1,830	390	11,900	12,500	39	1,760	185
24-----	175	5,700	2,690	330	9,240	8,230	29	1,130	88
25-----	208	8,000	4,490	288	9,780	7,600	25	790	53
26-----	194	5,100	2,670	280	8,020	6,060	25	752	51
27-----	188	5,510	2,800	256	7,500	5,180	17	541	25
28-----	175	5,080	2,400	248	6,640	4,450	14	375	14
29-----	150	5,050	2,170	214	5,530	3,200	17	474	22
30-----	187	5,850	2,640	175	3,990	1,890	17	439	20
31-----	--	--	--	175	3,520	1,680	--	--	--
Total--	5,076	--	92,030	9,661	--	248,500	3,035	--	137,361
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	14	380	14	25	18,200	s 1,730	9.0	40,300	s 1,320
2-----	9.7	344	9	7.6	9,300	s 292	33	44,000	4,070
3-----	6.9	232	4	2.5	534	4	916	49,500	s 182,000
4-----	5.0	165	2	0	--	0	654	41,400	75,800
5-----	2.6	80	1	14	33,200	s 3,450	506	50,800	s 76,500
6-----	1.0	101	(t)	0	--	0	129	32,400	s 12,600
7-----	.2	80	(t)	0	--	0	700	43,100	s 136,000
8-----	0	--	0	0	--	0	1,930	70,200	s 419,000
9-----	0	--	0	0	--	0	1,270	75,600	s 233,000
10-----	3.5	173	2	0	--	0	377	54,300	57,300
11-----	23	671	s 46	166	41,900	s 44,900	224	40,900	25,700
12-----	38	1,020	105	856	70,300	s 252,000	184	29,500	14,700
13-----	36	942	92	107	48,800	14,600	142	19,800	7,590
14-----	42	2,400	sb 370	483	51,100	s 84,000	133	12,800	4,600
15-----	48	2,720	352	308	28,200	s 29,100	148	7,490	2,990
16-----	36	1,710	166	29	12,100	947	136	7,280	2,670
17-----	30	9,120	739	24	16,500	1,070	121	9,460	3,090
18-----	27	14,700	1,070	17	16,400	753	85	11,500	2,640
19-----	15	14,500	587	12	8,650	280	80	6,850	1,480
20-----	11	12,200	362	8.3	2,300	52	82	4,270	945
21-----	14	4,900	185	5.5	440	7	85	3,400	780
22-----	13	4,110	144	3.8	280	3	190	13,000	a 6,700
23-----	83	19,900	s 6,110	2.0	190	1	175	15,400	7,280
24-----	70	22,400	4,230	.4	334	(t)	160	22,600	9,760
25-----	106	15,800	4,520	0	--	0	139	20,500	7,700
26-----	91	12,500	3,070	0	--	0	136	13,700	5,030
27-----	55	15,600	2,320	0	--	0	136	9,060	3,330
28-----	39	25,600	2,700	0	--	0	72	6,350	1,240
29-----	30	18,900	1,530	0	--	0	67	4,260	770
30-----	16	12,500	540	0	--	0	67	3,150	570
31-----	7.6	5,000	103	0	--	0	--	--	--
Total--	873.5	--	29,373	2,071.1	--	433,189	9,086.0	--	1,307,155

Total discharge for year (cfs-days) 49,293.6
 Total load for year (tons) 2,460,428

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
POWDER RIVER AT ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per-centage (° F)	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	0.350	0.500		1.000
Oct. 2, 1950	3:26 p. m.	70	47	5,920	5,350	--	3	9	81	91	92	96	100	--	SPNM	
Oct. 2	3:26 p. m.	70	47	5,920	2,950	35	61	84	88	89	93	95	98	100	BWCM	
Oct. 6	10:51 a. m.	159	--	12,300	5,600	--	53	--	78	--	89	--	--	--	SPWCM	
Oct. 9	5:00 p. m.	139	52	24,100	3,200	--	57	--	80	--	90	--	--	--	SPWCM	
Oct. 11	1:20 p. m.	118	58	12,300	5,020	--	51	--	75	--	93	98	100	--	SPWCM	
Oct. 19	2:34 p. m.	85	59	3,960	9,050	--	58	--	77	--	94	96	100	--	SPWCM	
Oct. 25	1:28 p. m.	79	54	4,900	4,470	1	1	7	65	71	79	94	100	--	SPNM	
Oct. 25	1:28 p. m.	79	54	4,900	3,480	38	52	64	68	73	78	--	--	--	SPWCM	
Oct. 31	3:12 p. m.	85	46	3,950	8,380	--	58	--	80	--	91	98	100	--	SPWCM	
Nov. 6	9:30 a. m.	159	36	6,220	3,570	--	46	--	63	--	77	94	100	--	SPWCM	
Nov. 9	3:58 p. m.	70	32	562	1,910	59	74	88	94	95	98	100	--	--	BWCM	
Mar. 30, 1951	5:55 p. m.	272	42	10,000	3,070	--	40	--	59	--	82	--	--	--	SPWCM	
Apr. 4	11:54 a. m.	201	39	6,500	3,160	0	1	8	49	62	79	92	98	100	SPNM	
Apr. 4	11:54 a. m.	201	39	6,500	3,910	31	37	49	56	65	80	93	99	100	SPWCM	
Apr. 19	12:15 p. m.	151	36	4,240	3,120	1	3	11	47	53	69	92	100	--	SPNM	
Apr. 19	12:15 p. m.	151	36	4,240	2,200	30	36	45	53	58	72	--	--	--	SPWCM	
Apr. 27	5:50 p. m.	188	59	5,420	3,980	1	2	12	46	60	76	94	100	--	SPNM	
Apr. 27	5:50 p. m.	188	59	5,420	3,440	30	36	41	50	61	78	94	100	--	SPWCM	
May 4	3:15 p. m.	312	68	9,230	7,150	--	2	6	16	38	68	90	100	--	BWCM	
May 4	3:15 p. m.	312	68	9,230	1,520	33	44	52	62	73	85	94	99	100	BWCM	
May 11	2:00 p. m.	431	65	12,600	11,700	0	1	10	44	64	83	96	100	--	SPNM	
May 11	2:00 p. m.	431	65	12,600	6,020	27	34	42	52	64	84	96	100	--	SPWCM	
May 17	2:00 p. m.	431	67	10,000	3,560	29	36	44	54	68	84	95	99	100	BWCM	
May 21	1:05 p. m.	486	62	10,700	8,390	1	2	6	49	61	80	95	99	100	SPNM	
May 21	1:05 p. m.	486	62	10,700	6,670	28	35	41	50	61	80	94	99	100	SPWCM	
May 25	4:00 p. m.	288	63	8,800	6,840	0	2	15	55	65	78	94	99	100	SPNM	
May 25	4:00 p. m.	288	63	8,800	5,310	33	42	50	53	64	78	94	99	100	SPWCM	

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951.--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
May 29, 1951.....	12:48 p. m.	220	66	5,420	12,800	--	36	--	51	--	79	94	100	SPWCM	
June 1.....	4:40 p. m.	220	44	7,400	4,850	0	2	20	35	46	66	86	100	SPNM	
June 1.....	4:40 p. m.	220	44	7,400	3,790	21	24	29	35	46	65	85	97	SPWCM	
June 8.....	1:40 p. m.	110	68	2,980	6,800	--	37	--	51	--	79	94	100	SPWCM	
June 13.....	4:58 p. m.	55	70	890	2,240	--	36	--	55	--	81	--	--	SPWCM	
June 18.....	4:15 p. m.	899	72	51,800	10,600	--	32	--	55	--	94	--	--	SPWCM	
June 20.....	1:05 p. m.	201	62	37,300	39,800	6	7	16	89	94	98	99	100	BNM	
June 20.....	1:05 p. m.	201	62	37,300	3,880	54	69	83	90	81	95	98	99	BWCM	
June 26.....	1:25 p. m.	23	80	746	2,110	--	70	--	87	--	95	--	--	SPWCM	
July 3.....	12:18 p. m.	7.8	79	208	485	67	82	93	98	100	--	--	--	BWCM	
July 12.....	1:00 p. m.	39	76	1,210	3,290	--	55	--	74	--	88	--	--	SPWCM	
July 17.....	3:35 p. m.	31	88	13,700	14,200	0	1	69	98	98	99	100	--	SPNM	
July 17.....	3:35 p. m.	31	88	13,700	5,270	73	90	98	99	100	--	--	--	SPWCM	
July 18.....	7:40 a. m.	29	69	16,800	6,520	--	89	--	97	--	100	--	--	SPWCM	
July 19.....	6:10 p. m.	13	81	17,500	6,070	--	94	--	100	--	--	--	--	SPWCM	
July 20.....	6:00 p. m.	11	70	11,000	8,360	--	93	--	99	--	100	--	--	SPWCM	
July 21.....	7:08 p. m.	23	68	4,650	6,700	--	80	--	96	--	99	100	--	SPWCM	
July 27.....	12:55 p. m.	68	84	14,300	13,400	--	3	23	87	97	99	--	--	SPNM	
July 27.....	12:55 p. m.	68	84	14,300	6,580	63	81	93	96	96	99	--	--	SPWCM	
July 31.....	11:40 a. m.	7.2	89	4,210	2,920	--	91	--	97	--	100	--	--	SPWCM	
Aug. 11.....	6:00 p. m.	264	73	88,300	9,080	45	62	80	92	94	97	100	--	SPWCM	
Sept. 3.....	6:50 p. m.	442	55	51,200	6,940	--	60	--	90	--	95	--	--	SPWCM	
Sept. 6.....	4:06 p. m.	85	70	29,800	27,600	--	0	3	90	95	98	--	--	SPNM	
Sept. 6.....	4:06 p. m.	85	70	29,800	5,530	56	76	76	91	95	96	98	--	SPWCM	
Sept. 9.....	8:54 a. m.	1,120	48	80,600	3,800	36	47	58	68	75	83	91	97	BWCM	
Sept. 21.....	2:30 p. m.	87	55	3,370	9,680	--	65	--	83	--	90	--	--	SPWCM	
Sept. 28.....	2:16 p. m.	53	--	5,590	8,000	--	26	--	91	--	95	--	--	SPWCM	

YELLOWSTONE RIVER BASIN--Continued
CLEAR CREEK NEAR ARVADA, WYO.

LOCATION.--At gaging station, 300 feet downstream from Cabin Creek, 1½ miles upstream from mouth, and 16 miles north of Arvada, Sheridan County.

DRAINAGE AREA.--1,110 square miles, approximately 950 to September 1951.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

Water temperatures: March 1950 to September 1951.

EXTREMES, 1950-51:--Water temperatures: May 13, 40°; minimum daily, 75°; maximum daily, 75°; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 13,400 ppm Sept. 3, 1951; minimum daily, less than 0.50 ton June 14, 15.

Sediment loads: Maximum daily, 12,900 tons Sept. 3, 1951; minimum daily, less than 0.50 ton June 14, 15.

EXTREMES, March 1950 to September, 1951:--Water temperatures: Maximum daily, 75°; minimum daily, not determined.

Sediment concentrations: Maximum daily, 13,400 ppm Sept. 3, 1951; minimum daily, less than 0.50 ton on many days.

Sediment loads: Maximum daily, 12,900 tons Sept. 3, 1951; minimum daily, less than 0.50 ton on many days.

REMARKS.--Flow affected by ice Nov. 10 to Mar. 31. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonylate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million		Tons per acre-foot	Calcium	Non-carbonate				
														Residue at 180°C	Sum							
Oct. 5, 1950	169	14	0.04	105	51	73	73	214		425	5.5	0.1	2.9	0.30	850	470	295	25	1,070	8.0		
Dec. 6	260	10	.02	138	63	93	93	266		525	6.0	.6	5.8	.25	1,080	987	1,147	602	359	25	1,310	8.0
Jan. 2, 1951	295	13	.10	126	50	96	96	265		478	5.0	.2	6.3	.10	946		1,229	518	301	29	1,200	8.0
Feb. 8	268	13	.30	123	52	81	81	275		438	5.0	.2	8.0	.10	944	--	1,228	520	294	21	1,210	7.7
Feb. 26	260	9.6	.08	105	37	65	65	218		350	5.0	.1	4.1	.05	720	--	.98	413	234	24	985	7.8
Apr. 4	122	11	.02	95	48	73	73	210		395	4.5	.2	3.4	.10	762	--	1.04	434	262	27	1,050	7.5
May 17	172	9.0	.02	43	19	27	27	121		137	1.0	.2	.8	.06	302	--	1.41	165	86	24	478	7.2
June 13	14	5.0	.02	141	80	131	131	273		698	5.5	3	6.1	.14	1,290	1,200	1.75	679	455	30	1,610	7.6
July 23	572	15	.02	54	18	26	26	136		144	1.0	.2	4.0	.05	330	--	.45	209	97	22	512	7.5
Sept. 21	112	--	--	--	--	--	--	223		428	--	--	--	--	--	--	--	463	280	--	1,110	7.9

a Mean daily discharge.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 6 a.m. and 9 a.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	41	40	--		--	--	34	a54	43	61	72	60
2	38	40	--	32	--	--	--	a59	41	64	70	61
3	40	33	--		--	--	a47	a63	40	60	70	46
4	39	41	--		--	--	a49	a68	51	64	69	54
5	44	37	--		--	--	44	a60	60	66	68	58
6	48	37	a32		--	--	--	a59	60	70	67	59
7	44	36	--		--	--	38	a64	--	69	69	61
8	40	--	--		a32	--	42	a58	57	65	67	62
9	48	--	--		--	--	a43	a59	--	64	63	58
10	44	--	--		--	--	a42	53	54	59	62	56
11	48	49	--		--	--	a46	58	58	59	65	60
12	50	51	a32		--	--	a53	a65	60	55	64	49
13	53	34	--		--	--	a50	58	58	60	66	51
14	49	50	--		--	--	42	53	60	65	65	53
15	55	46	--		--	--	a42	55	64	69	58	46
16	50	32	--		--	32	a52	52	66	71	65	47
17	51	48	--		--	--	a55	56	69	72	65	54
18	50	46	--		--	--	a58	58	63	70	67	58
19	48	39	--		--	--	a40	60	56	71	65	56
20	47	--	--		--	--	a42	61	63	--	62	58
21	48	32	--		--	--	a43	59	60	a69	62	47
22	43	33	--		--	--	--	58	56	65	63	48
23	43	32	--		--	--	a43	60	56	64	65	46
24	42	--	--		--	--	--	60	61	66	62	48
25	43	--	--		--	--	a56	57	61	71	61	49
26	43	--	--		--	--	a55	54	61	60	--	51
27	41	--	--		--	--	a60	55	59	62	--	46
28	40	--	--	32	--	--	49	61	59	a67	60	44
29	44	--	--		--	32	53	53	58	75	64	51
30	a45	--	--		--	--	a59	56	59	69	65	53
31	42	--	--		--	a36	--	50	--	71	59	--
Average	45	--	--		--	--	48	58	58	66	65	53

a Observations made between 3 p.m. and 6 p.m.

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	134	38	14	117			125		
2-----	161	46	20	119			110		
3-----	161	55	24	132			100	--	e 20
4-----	155	47	20	142	35	12	70	--	e 15
5-----	166	60	27	124			50	--	e 15
6-----	158	86	37	134			60	96	16
7-----	152	72	30	136	24	9	80		
8-----	147	53	21	142		e 30	90		
9-----	136	70	26	80	136	29	110		
10-----	134	54	20	60			120	--	e 20
11-----	144	68	26	85			130		
12-----	147	90	36	110	41	12	127	77	26
13-----	150	98	40	130			124		
14-----	147	88	35	160			120		
15-----	126	92	31	154	86	36	125		
16-----	122	88	29	150	30	12	130	--	e 15
17-----	124	94	31	160	43	19	135		
18-----	122	96	32	150	67	27	130		
19-----	119	65	20	140	70	26	130		
20-----	122	68	22	150	90	36	130	33	12
21-----	124	60	20	160	87	38	125		
22-----	122	52	17	140	80	30	125		
23-----	122	36	12	100	67	18	120		
24-----	124	40	13	120	150	49	125		
25-----	124	50	16	140	120	a 45	130		
26-----	126	45	15	160	116	50	120	--	e 10
27-----	122	46	15	140	115	43	110		
28-----	112	44	13	135	69	25	115		
29-----	112	40	12	130	62	22	120		
30-----	103	40	11	130	--	e 20	110		
31-----	117	43	13	--	--	--	100		
Total-	4,135	--	698	3,930	--	696	3,496	--	452
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	90		e 6	40			65	9	2
2-----	95	28	7	45			70		
3-----	100			50			65		
4-----	105			60	--	e 1	63		
5-----	100			80			70		
6-----	80			70			60	--	e 3
7-----	82			65			56		
8-----	85			68	6	1	66		
9-----	82			69			76		
10-----	75			80			70		
11-----	70			75			75		
12-----	73			60			80		
13-----	74			55			90	--	e 9
14-----	74			65			110		
15-----	76			75			130		
16-----	85			70			135		
17-----	80		e 3	68			130	66	24
18-----	85			70	--	e 1	125		
19-----	83			68			120		
20-----	80			74			125	--	e 25
21-----	75			70			150		
22-----	85			68			140		
23-----	80			75			150		
24-----	82			72			180	--	e 80
25-----	90			70			170		
26-----	80			72			176		
27-----	60			67			180	--	e 150
28-----	50			60	9	1	250		
29-----	40			--	--	--	226	190	116
30-----	40			--	--	--	250	--	e 190
31-----	35			--	--	--	280	560	423
Total-	2,396	--	100	1,861	--	28	3,913	--	1,667

e Estimated.

a Computed from estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	293	721	s 662	224	246	149	142	80	31
2-----	248	--	e 340	236	220	140	132	90	32
3-----	155	210	88	186	124	62	172	90	42
4-----	136	87	32	147	65	26	119	40	13
5-----	134	55	20	122	56	18	71	30	6
6-----	119	30	a 10	147	170	87	46	20	2
7-----	110	37	11	218	241	142	34	20	a 2
8-----	103	29	8	239	204	132	21	25	1
9-----	94	23	6	266	225	162	12	40	a 1
10-----	92			257	217	151	6.9	85	2
11-----	101			206	95	53	4.5	110	1
12-----	92	34	7	189	76	39	7.3	150	3
13-----	80			209	95	54	12	50	2
14-----	78			300	335	271	4.5	30	(t)
15-----	94	33	7	269	290	211	2.5	72	(t)
16-----	103	28	7	197	105	56	6.0	68	1
17-----	86			156	65	28	14	540	s 30
18-----	80			142	60	23	170	1,310	s 803
19-----	84	14	3	117	85	27	370	6,790	6,780
20-----	90	23	6	155	115	48	400	1,660	1,790
21-----	105	30	9	236	196	125	328	670	593
22-----	90	20	a 5	209	131	74	296	355	284
23-----	90	15	4	136	87	25	322	650	565
24-----	80	20	a 4	90	57	14	303	600	491
25-----	96	30	8	160	133	s 63	248	200	134
26-----	90	31	8	275	271	201	212	140	80
27-----	82	36	8	169	109	50	189	100	51
28-----	80	32	7	68	35	6	183	80	40
29-----	88	41	10	30	17	1	172	60	28
30-----	129	97	s 41	344	1,000	sb 1,200	142	32	12
31-----	--	--	--	239	405	s 287	--	--	--
Total--	3,302	--	1,350	5,940	--	3,905	4,141.7	--	11,821
Day	July			August			September		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	112	22	7	129	38	13	100	1,500	405
2-----	90	21	5	98	30	8	153	3,700	sa 7,300
3-----	78	15	3	74	19	4	252	13,400	s 12,900
4-----	82	21	5	54	18	3	122	1,140	376
5-----	74	21	4	42	16	2	136	492	181
6-----	63	31	5	39	14	1	124	328	110
7-----	66			39	14	1	134	278	101
8-----	54			47	17	2	206	769	428
9-----	45	46	5	44	30	4	139	460	180
10-----	46			35	24	2	112	408	123
11-----	107	230	sb 150	31	111	9	108	174	51
12-----	440	852	1,010	33	473	s 45	114	118	36
13-----	448	530	641	42	146	17	124	103	34
14-----	436	452	632	125	5,200	sb 3,100	114	86	26
15-----	354	275	263	140	3,420	s 1,410	110	58	17
16-----	281	170	129	73	865	170	114	50	15
17-----	218	130	77	57	565	87	112	43	13
18-----	200	100	54	56	385	58	110	50	15
19-----	275	189	140	57	300	46	96	42	11
20-----	380	2,800	sa 4,900	56	242	37	112	45	14
21-----	389	5,530	5,810	52	185	26	119	38	12
22-----	512	1,980	2,740	48	145	19	150	42	17
23-----	655	1,840	3,250	55	145	22	147	50	20
24-----	572	1,280	1,980	56	145	22	155	60	25
25-----	367	440	436	59	123	20	183	90	44
26-----	281	253	192	56	110	a 15	178	95	46
27-----	206	110	61	54	105	15	172	60	28
28-----	189	75	38	51	100	14	172	52	24
29-----	147	53	21	52	80	11	164	57	25
30-----	129	37	13	55	600	sb 180	155	55	23
31-----	142	47	18	96	7,600	sb 3,500	--	--	--
Total--	7,438	--	22,504	1,905	--	8,863	4,187	--	22,600
Total discharge for year (cfs-days)									46,644.7
Total load for year (tons)									74,691

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, June to September 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
June 19, 1951	6:30 a. m.	351	56	12,200	9,250	--	41	--	92	--	99	--	--	--	--	SPWCM
June 19	11:38 a. m.	376	65	5,750	4,870	--	0	48	78	89	98	--	--	--	--	SPNM
June 19	11:38 a. m.	376	65	5,750	5,340	50	82	74	85	93	98	--	--	--	--	SPWCM
July 12	3:10 p. m.	484	65	1,680	1,680	31	42	54	66	78	87	93	97	--	99	BWCM
July 21	11:20 a. m.	370	--	4,860	3,750	--	55	--	84	--	98	--	--	--	--	SPWCM
July 23	3:08 p. m.	690	72	1,960	4,220	--	36	--	54	--	84	--	--	--	--	SPWCM
July 25	9:00 a. m.	360	71	442	1,290	39	47	58	69	74	92	94	98	--	100	BWCM
Aug. 14	6:40 p. m.	172	64	9,850	6,820	--	73	--	96	--	100	--	--	--	--	SPWCM
Aug. 15	11:30 a. m.	161	66	8,130	9,330	--	73	--	96	--	100	--	--	--	--	SPWCM
Sept. 3	5:30 a. m.	325	46	21,000	7,540	50	65	80	92	97	99	--	--	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT MOORHEAD, MONT.

LOCATION.--At gaging station at highway bridge at Moorhead, Powder River County, 7 miles upstream from Buffalo Creek.

RECORDS AVAILABLE.--Chemical analyses: February to September 1951.

Water temperatures: February to September 1951.

EXTREMES, February to September 1951.--Dissolved solids: Maximum, 1,850 ppm Sept. 4-10; minimum, 662 ppm June 24 to July 1.

Hardness: Maximum, 1,040 ppm Sept. 4-10; minimum, 348 ppm June 24 to July 1.

Specific conductance: Maximum daily, 2,600 micromhos Sept. 10; minimum daily, 502 micromhos June 1.

Water temperatures: Maximum, 90°F July 7; minimum, freezing point on many days during February and March.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, September 1949, February to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiling Residue at 180°C (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium at 25°C	Specific conductance (micro-mhos at 25°C)			
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
																						Residue at 180°C	Sum	Sum
Sept. 13, 1949	--	5.2	0.02	126	84	115		262		656	6.4	0.8	3.3	--	--	1,130	1.54	--	660	445	28	1,580	7.7	
Feb. 22-Mar. 25, 1951	197	10	0.02	133	53	132	3.1	186		570	50	0.4	3.9	0.03	1,120	1,050	1.52	596	548	395	34	1,450	8.2	
Apr. 25-May 8	346	12	.04	126	50	124	4.9	202		550	41	.4	3.7	.14	1,100	1,010	1.50	1,030	522	356	34	1,410	7.5	
May 9-27	574	13	.04	81	36	73	4.2	189		313	28	.4	3.4	.11	684		.94	1,080	350	195	31	953	7.4	
May 28-June 6	356	12	.04	91	32	81	3.6	154		365	32	.4	3.4	.09	750		1.02	721	358	232	33	1,010	7.9	
June 7-16	95.0	10	.04	144	56	148	4.6	192		645	59	.5	3.3	.14	1,300	1,170	1.77	333	588	431	35	1,620	7.8	
June 17-18	106	10	.04	171	62	148	7.0	186		775	52	.5	6.0	.13	1,460	1,310	1.99	426	682	544	32	1,750	7.6	
June 19-20	653	12	.04	131	45	120	6.2	136		533	33	.8	2.5	.11	1,040	948	1.41	1,830	312	373	29	1,310	7.3	
June 21-23	491	12	.04	114	39	61	4.2	136		426	11	.4	4.5	.07	846		1.16	1,220	446	334	23	1,040	7.3	
June 24-July 1	284	14	.02	94	28	71	3.9	175		338	12	.2	2.1	.16	662		.90	506	346	204	30	928	7.5	
July 2-9	81.6	--	--	118	56	105	5.3	--	--	540	16	--	7	--	--	--	--	--	--	--	--	30	--	--
July 11-31	391	14	.02	80	43	71	5.1	151		375	16	.2	2.7	.15	708		.96	747	375	251	29	979	7.5	
Aug. 1-30	134	12	.02	206	67	106	8.2	179		820	14	.2	6.0	.17	1,410	1,330	1.92	510	769	642	22	1,700	7.0	
Sept. 4-10	1,042	13	.04	304	68	138	9.6	244		1,050	33	.4	2.7	.17	1,850	1,730	2.52	5,200	1,040	840	22	2,150	6.9	
Sept. 11-30	272	10	.04	180	60	180	6.6	204		835	44	.4	2.8	.21	1,480	1,420	2.03	1,090	697	530	36	1,980	7.5	

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT MOORHEAD, MONT.--Continued

Temperature (°F) of water, February 1951 to September 1951
 /Once-daily temperature measurement between 4 p. m. and 6 p. m. 7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1					--	34	--	65	50	74	83	--
2					--	33	--	63	68	75	83	--
3					--	34	--	65	75	79	83	--
4					--	a33	--	64	70	80	80	60
5					--	34	--	65	a71	80	82	63
6					--	32	--	64	70	89	83	67
7					--	33	--	66	73	90	81	73
8					--	32	--	66	75	71	79	66
9					--	32	--	66	69	63	80	65
10					--	32	--	67	74	60	78	69
11					--	32	--	67	72	--	79	57
12					--	32	--	68	74	--	77	57
13					--	33	--	68	66	--	75	59
14					--	33	--	--	77	--	74	60
15					--	34	--	68	84	--	70	61
16					--	32	--	70	79	83	80	65
17					--	32	--	68	74	82	81	62
18					--	32	--	69	74	84	78	65
19					--	32	--	73	70	85	75	65
20					--	34	--	75	67	83	76	55
21					--	33	--	76	61	82	80	53
22						33	34	--	78	63	80	--
23						34	34	--	76	71	80	55
24						36	34	--	74	72	a81	55
25						33	a34	--	75	70	79	58
26						34	--	59	76	74	80	55
27						32	--	60	75	69	80	50
28						34	--	61	78	70	82	55
29						--	--	62	77	68	84	60
30						--	--	63	77	74	79	62
31						--	--	58	--	78	--	--
Average					--	33	--	70	71	79	78	60

a Observations made between 11 a. m. and 1 p. m.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.

LOCATION.--At gaging station at bridge on U. S. Highway 12, 3 miles upstream from Locate Creek, 5 miles west of former site of Locate, Custer County, and 25 miles east of Miles City.

DRAINAGE AREA.--12,900 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1951.

Water temperatures: February to September 1951.

Sediment records: March 1950 to September 1951.

EXTREMES, 1950-51.--Dissolved solids (January to September): Maximum 2,270 ppm Aug. 16; minimum, 596 ppm Aug. 25.

Hardness (January to September): Maximum, 1,170 ppm Aug. 16; minimum, 210 ppm Aug. 25.

Specific conductance (January to September): Maximum daily, 2,590 micromhos Aug. 16; minimum daily, 763 micromhos Sept. 1.

Water temperatures (February to September): Maximum, 78 F July 29; minimum, freezing point on many days during February to April.

Sediment concentrations: Maximum daily, 53,700 ppm Sept. 11; minimum daily, 39 ppm Feb. 23, 28.

Sediment loads: Maximum daily, 224,000 tons Sept. 11; minimum daily, 10 tons July 15.

EXPLANATIONS, 1950-51.--Sediment concentrations: Maximum daily, 53,700 ppm Sept. 11, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 224,000 tons Sept. 11, 1951; minimum daily, less than ton on several days during September 1950.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Neb. Flow affected by ice Nov. 8 to Mar. 28. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH	Color	
															Parts per million		Tons per acre-foot	Calcium	Non-carbonate					
															Residual at 180°C	Sum								
Oct. 3, 1950 a	111	9.2	0.10	111	49	154	5.8	233	0	605	12	0.2	2.4	0.30	1,120	1,060	336	480	289	41	1,450	7.7	20	
Nov. 6 a	169	12	.04	150	54	157	5.3	253	0	680	38	.4	3.0	.15	1,290	1,220	589	598	391	36	1,640	7.8	15	
Jan. 4-31, 1951	81.8	13	.06	200	63	180	6.7	346	0	785	52	.3	4.0	.18	1,580	1,470	349	758	474	34	1,960	7.8	15	
Feb. 1-28	119	12	.06	164	58	163	5.7	298	0	685	42	.3	3.4	.26	1,360	1,280	437	648	404	35	1,740	7.5	13	
Mar. 1-21	158	13	.05	136	62	157	4.8	201	0	680	49	.4	4.1	.15	1,320	1,220	563	596	431	36	1,680	7.9	6	
Mar. 22-28	476	9.6	.04	104	43	117	3.5	188	0	483	38	.3	3.1	.11	938	--	1,28	1,210	436	282	37	1,260	7.7	8
Mar. 29	3,680	12	.04	104	41	120	4.6	190	0	470	34	--	5.6	1.10	924	--	1,26	9,180	428	272	38	1,250	7.6	10
Mar. 30-Apr. 4	1,476	11	.03	115	42	121	3.8	182	0	495	41	.3	4.6	.12	994	--	1,35	3,960	460	311	36	1,320	7.7	8
Apr. 9-May 2	284	11	.04	145	64	172	4.6	236	0	705	48	.3	3.2	.18	1,370	1,270	1,86	1,090	624	430	37	1,740	8.0	13
May 3-June 1	494	13	.04	104	42	122	5.1	193	0	488	34	.7	4.9	.13	928	--	1,28	1,240	431	273	38	1,260	7.8	17
June 4-14	282	13	.06	93	36	125	4.6	190	0	445	28	.5	3.5	.13	868	--	1,18	661	379	223	41	1,200	8.0	22
June 15-21	122	12	.05	130	53	198	7.2	220	0	718	43	.5	1.8	.13	1,370	1,270	1,86	451	543	383	44	1,760	7.6	22
June 24-July 5	347	17	.03	118	42	106	6.8	203	0	498	19	.6	2.3	.13	990	--	1,29	890	468	302	33	1,260	7.4	23
July 6-16	82.5	--	--	133	50	176	6.9	--	--	640	28	--	4	--	--	--	--	--	--	--	41	--	--	--
July 17	295	21	.10	154	45	152	7.8	190	12	680	18	.6	5.3	.18	1,260	1,190	1,71	1,000	570	395	36	1,580	8.4	28
July 18-Aug. 15	194	18	.03	101	39	99	5.4	183	0	443	15	.6	4.8	.14	868	--	1,18	455	411	261	34	1,150	7.7	29
Aug. 16	458	17	--	292	107	185	14	502	0	1,110	76	--	8.1	.22	2,270	2,100	3.09	2,810	758	24	2,580	7.0	18	
Aug. 17-24	527	18	.07	207	63	125	7.9	212	0	815	17	.6	7.4	.15	1,470	1,370	2.00	2,080	600	26	1,760	7.0	28	

a Not included in weighted average.

Aug. 25, 1951....	2,640	13	--	61	14	115	6.0	280	0	237	2.0	--	1.2	0.20	595	--	0.81	4,250	210	0	53	825	7.5	45
Aug. 26-Sept. 12	891	14	0.03	155	42	109	7.2	187	0	605	13	0.6	2.0	.13	1,090	1.040	1.48	2,620	559	405	29	1,400	7.5	30
Sept. 13-30.....	300	13	.03	199	56	200	6.6	198	0	910	43	.6	4.2	.16	1,620	1,530	2.20	1,310	728	566	37	1,980	7.9	29
Weighted average b.....	345	13	0.04	134	47	132	5.7	c 208	--	584	30	0.5	3.8	0.14	1,110	--	1.51	1,030	528	357	35	1,440	--	--

b For period of daily sampling only. Includes estimates where data are missing. Represents 83 percent of runoff for water year October 1950 to September 1951.

c Includes carbonate as bicarbonate.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Temperature (°F) of water, February to September 1951
 /Once-daily temperature measurement between 5 a.m. and 9 a.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	32	50	44	63	74	90
2						--	34	48	37	58	69	57
3						--	34	46	43	58	70	--
4						--	36	50	49	60	70	--
5						--	36	51	56	64	72	--
6						--	40	50	58	69	68	--
7						--	36	48	60	66	70	62
8						--	36	52	55	62	62	62
9						--	45	54	60	60	62	60
10						--	40	52	60	55	60	52
11						--	44	54	--	54	60	60
12						--	36	54	66	56	62	51
13						--	42	58	66	60	68	52
14						--	38	55	64	65	64	50
15						--	36	56	64	67	58	45
16						--	36	56	62	64	64	49
17						--	40	60	61	75	62	49
18						--	40	59	61	72	62	53
19						--	33	58	62	75	63	55
20						--	34	56	59	72	60	--
21						--	34	56	55	66	60	46
22						--	34	56	58	70	64	49
23						--	45	62	59	68	64	45
24						32	42	64	61	72	62	46
25						32	47	56	61	75	58	45
26						32	46	50	58	70	56	46
27						32	48	50	55	70	66	40
28						32	54	56	54	75	56	35
29						33	52	50	53	78	64	46
30						34	56	54	58	75	65	50
31						32	--	47	--	75	62	--
Average					a 32	a 32	40	54	57	67	64	51

a Includes estimated temperature 32° F on missing days.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	100	1,300	351	200	1,750	945	130	189	66
2-----	107	995	287	210	1,700	964	120	232	75
3-----	111	1,850	495	185	1,700	489	120	295	96
4-----	107	1,500	433	173	1,600	747	100	320	86
5-----	111	1,380	414	177	1,710	817	80	349	75
6-----	124	1,390	465	169	1,680	757	80	450	97
7-----	148	1,990	795	169	1,570	718	100	458	123
8-----	164	2,390	1,060	150	1,470	595	120	306	99
9-----	181	2,530	1,240	135	220	80	130	196	69
10-----	210	3,270	1,850	120	181	59	140	137	52
11-----	241	3,990	2,600	100	230	62	150	128	52
12-----	259	5,000	3,500	80	242	52	150	118	48
13-----	225	5,100	3,100	60	214	35	140	142	54
14-----	190	6,690	3,430	60	283	46	130	161	57
15-----	164	7,650	3,380	58	270	42	130	149	52
16-----	164	8,440	3,740	70	248	47	140	162	61
17-----	156	7,020	2,960	80	281	61	130	183	64
18-----	156	4,900	2,060	80	308	67	130	212	74
19-----	169	3,910	1,780	70	349	86	125	214	72
20-----	181	3,210	1,570	80	397	86	140	157	59
21-----	195	2,680	1,410	100	364	98	150	147	60
22-----	205	2,270	1,260	110	340	101	150	146	59
23-----	195	2,000	1,050	90	351	85	150	126	51
24-----	195	1,890	995	110	310	92	150	128	52
25-----	200	1,820	982	120	278	90	140	140	53
26-----	215	1,800	1,040	130	252	88	130	132	46
27-----	215	1,820	1,060	140	272	103	140	149	56
28-----	205	2,000	1,110	150	295	120	140	155	59
29-----	195	2,000	1,050	150	259	105	130	141	49
30-----	200	2,100	1,130	140	199	75	130	124	44
31-----	200	1,890	1,020	--	--	--	120	132	43
Total--	5,488	--	47,617	3,666	--	8,050	4,015	--	2,003
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	110	175	52	70	215	41	160	52	22
2-----	100	199	54	80	250	54	150	90	36
3-----	80	200	43	80	238	51	160	70	30
4-----	70	215	41	80	212	46	170	86	39
5-----	60	291	47	60	186	30	160	78	34
6-----	60	442	72	54	181	26	150	83	34
7-----	70	305	58	55	168	25	150	63	28
8-----	80	275	59	70	156	29	150	73	30
9-----	80	269	58	100	155	42	160	75	32
10-----	80	317	68	120	155	50	160	77	33
11-----	70	296	56	110	169	50	150	82	33
12-----	80	268	58	90	170	a 40	150	90	36
13-----	90	239	58	100	170	46	160	91	39
14-----	100	215	58	110	171	51	170	80	41
15-----	100	219	59	120	191	62	180	95	46
16-----	110	217	64	130	215	75	164	110	49
17-----	120	221	72	140	232	88	150	225	91
18-----	110	221	66	150	318	129	150	116	47
19-----	100	228	62	150	89	36	150	108	44
20-----	90	231	58	160	95	41	150	109	44
21-----	90	225	55	160	78	34	180	146	71
22-----	100	227	61	150	41	17	210	241	137
23-----	90	246	60	160	39	17	270	311	227
24-----	90	240	58	170	41	19	350	351	332
25-----	80	240	52	180	73	35	400	370	400
26-----	70	242	48	170	70	a 30	500	535	722
27-----	60	215	35	160	49	21	600	800	1,300
28-----	60	191	31	150	39	16	1,000	1,200	ab 6,000
29-----	60	213	34	--	--	--	3,680	7,200	71,500
30-----	60	221	36	--	--	--	2,530	9,350	63,000
31-----	60	216	35	--	--	--	1,750	8,600	40,600
Total--	2,580	--	1,664	3,329	--	1,201	14,614	--	185,975

s Computed by subdividing day.

a Computed by estimated concentration graph.

b Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,410	7,950	30,300	330	1,800	1,600	445	7,020	8,440
2-----	1,210	7,150	23,400	271	1,520	1,110	378	12,700	30,100
3-----	1,040	5,200	14,600	265	1,460	1,040	365	12,800	29,900
4-----	915	6,380	15,800	302	1,940	1,580	508	4,430	6,080
5-----	829	5,700	12,800	526	3,590	5,100	405	2,830	3,090
6-----	625	4,000	6,750	545	4,400	6,470	397	2,390	2,560
7-----	508	3,550	4,870	454	3,750	4,600	337	1,990	1,810
8-----	454	3,250	3,980	365	3,560	3,510	283	1,590	1,210
9-----	429	2,800	3,240	323	3,240	2,830	253	1,100	751
10-----	365	3,220	3,170	302	2,910	2,370	210	788	447
11-----	316	2,510	2,140	351	3,370	3,190	185	697	348
12-----	283	2,240	1,710	535	5,500	7,940	169	930	424
13-----	277	1,990	1,490	625	5,820	9,820	169	838	382
14-----	265	1,680	1,200	605	9,150	14,900	190	4,670	s 2,790
15-----	259	1,760	1,230	615	9,770	16,200	136	1,400	514
16-----	271	1,680	1,210	657	12,100	21,500	140	1,270	480
17-----	283	1,760	1,350	615	10,600	17,600	115	370	115
18-----	277	1,800	1,350	615	9,430	15,700	107	350	101
19-----	271	1,690	1,240	605	7,450	12,200	111	350	105
20-----	316	2,090	1,780	565	6,910	10,500	107	390	113
21-----	316	1,940	1,660	535	6,590	9,520	136	820	sb 800
22-----	323	1,870	1,630	499	7,450	10,000	781	10,700	22,600
23-----	277	1,520	1,140	595	8,700	14,000	625	13,900	23,500
24-----	253	1,390	950	635	9,240	15,800	481	11,300	14,700
25-----	241	1,320	859	585	8,780	13,900	397	11,600	12,400
26-----	265	1,370	980	499	8,080	10,900	397	8,100	8,680
27-----	309	1,400	1,170	421	6,730	7,650	405	5,900	6,450
28-----	283	1,300	993	413	7,450	8,310	316	3,600	3,070
29-----	295	1,530	1,220	472	9,710	12,400	271	2,080	1,520
30-----	283	1,670	1,280	429	6,940	8,030	247	1,350	900
31-----	--	--	--	421	5,690	6,460	--	--	--
Total-	13,448	--	145,492	14,975	--	276,730	10,066	--	184,380
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	210	900	510	144	1,430	556	1,060	19,400	55,500
2-----	487	11,100	s 25,200	119	1,070	344	1,300	23,800	83,500
3-----	526	20,800	s 32,200	100	940	254	1,600	--	e 160,000
4-----	253	8,200	5,600	94	880	223	1,500	--	e 150,000
5-----	169	2,900	1,320	91	730	179	937	--	e 98,000
6-----	136	1,220	448	91	570	140	1,210	37,300	126,000
7-----	103	600	167	82	1,600	354	1,350	42,200	160,000
8-----	82	290	64	70	2,080	393	952	29,300	75,300
9-----	79	200	43	70	1,400	265	508	22,000	30,200
10-----	79	160	34	63	1,050	179	731	30,300	s 64,200
11-----	70	160	30	58	790	124	1,490	53,700	224,000
12-----	56	200	30	58	690	108	902	53,300	135,000
13-----	46	140	17	82	3,740	s 918	595	42,400	70,600
14-----	45	120	15	128	5,380	s 2,050	454	38,000	48,300
15-----	38	100	10	156	9,230	3,890	389	30,400	31,900
16-----	174	1,500	s 850	458	28,800	s 40,800	344	23,800	22,100
17-----	295	2,380	1,900	517	49,500	71,700	295	19,200	15,300
18-----	309	2,220	1,850	734	47,200	97,000	271	15,000	11,000
19-----	302	1,490	1,210	712	37,000	73,800	277	11,100	8,300
20-----	225	970	589	445	26,000	31,200	277	8,950	6,690
21-----	185	660	330	373	18,000	18,100	265	7,500	5,370
22-----	164	500	221	323	12,200	10,600	253	5,750	3,930
23-----	293	2,030	s 2,130	271	7,000	5,120	225	4,100	2,490
24-----	330	2,620	2,330	841	26,900	61,100	200	3,150	1,700
25-----	344	4,810	s 4,960	2,640	23,500	s 184,000	185	3,300	1,650
26-----	481	11,500	14,900	585	8,500	13,400	271	6,400	4,680
27-----	445	6,280	7,550	289	4,000	3,120	295	5,850	4,660
28-----	358	3,390	3,280	185	1,490	744	280	6,000	4,540
29-----	309	2,330	1,940	173	860	402	277	6,200	4,640
30-----	253	2,110	1,440	173	680	318	247	7,800	5,200
31-----	210	1,980	1,120	1,090	23,800	70,000	--	--	--
Total-	7,056	--	112,288	11,215	--	691,381	18,940	--	1,614,750

Total discharge for year (cfs-days)..... 109,392
 Total load for year (tons)..... 3,271,531

e Estimated.

s Computed by subdividing day.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
POWDER RIVER NEAR LOCATE, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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, 1950	10:32 a.m.	115	45	1,390	4,760	--	82	--	91	--	92	--	--	SPWCM	
Oct. 10	4:40 p.m.	210	--	3,970	2,280	--	82	--	95	--	98	--	--	SPWCM	
Oct. 12	5:10 p.m.	241	--	5,000	3,400	--	82	--	94	--	98	--	--	SPWCM	
Oct. 16	12:46 p.m.	169	56	8,760	4,430	70	89	98	98	98	98	--	--	SPWCM	
Nov. 3	7:35 a.m.	181	--	1,760	1,460	65	80	88	91	92	93	96	--	BWCM	
Mar. 29, 1951	8:10 a.m.	3,920	33	3,160	2,550	--	44	--	86	--	97	--	--	SPWCM	
Mar. 30	6:25 p.m.	2,410	35	14,200	3,680	--	22	--	32	--	58	71	93	SPWCM	
Mar. 31	8:45 a.m.	1,720	32	7,420	3,020	--	28	--	39	--	48	60	78	SPWCM	
Apr. 2	1:00 p.m.	1,130	36	6,500	4,770	--	43	--	59	--	84	--	100	SPWCM	
Apr. 9	12:35 p.m.	429	46	2,760	4,050	--	56	--	71	--	80	89	100	SPWCM	
Apr. 18	10:49 a.m.	277	42	1,650	4,950	--	60	--	73	--	80	--	--	SPWCM	
May 2	10:28 a.m.	265	49	1,500	3,890	--	59	--	68	--	77	81	92	SPWCM	
May 6	7:30 a.m.	555	50	4,640	3,600	--	51	--	73	--	85	--	--	SPWCM	
May 12	5:15 a.m.	499	54	4,840	3,420	--	51	--	73	--	88	--	--	SPWCM	
May 16	11:22 a.m.	635	64	11,800	6,480	1	2	10	48	54	60	65	71	SPNM	
May 16	11:22 a.m.	635	64	11,800	5,200	29	37	43	51	56	63	68	74	SPWCM	
June 2	6:00 p.m.	903	47	12,400	7,320	--	53	--	67	--	82	92	98	SPWCM	
June 3	5:00 a.m.	1,090	43	17,300	5,880	--	60	--	75	--	87	--	--	SPWCM	
June 7	3:56 p.m.	328	68	1,820	4,600	--	61	--	76	--	84	--	--	SPWCM	
June 14	12:00 m.	271	73	9,460	6,070	--	71	--	88	--	92	--	--	SPWCM	
June 22	7:00 p.m.	865	65	13,100	5,310	31	40	57	66	74	83	90	97	BWCM	
June 23	7:00 a.m.	679	59	16,600	5,060	--	54	--	69	--	81	--	--	SPWCM	
June 24	7:15 p.m.	490	70	10,200	7,400	--	69	--	88	--	94	--	--	SPWCM	
June 26	7:00 a.m.	389	58	8,980	6,840	--	75	--	90	--	93	--	--	SPWCM	
July 2	6:30 p.m.	952	59	25,000	5,630	12	17	24	33	47	68	90	99	BWCM	
July 3	7:30 a.m.	668	58	25,400	8,980	--	63	--	78	--	86	--	--	SPWCM	
July 4	6:45 a.m.	289	60	9,940	7,200	--	87	--	97	--	99	--	--	SPWCM	
July 5	11:28 a.m.	169	--	2,870	3,090	1	3	17	94	96	98	--	--	SPNM	
July 5	11:28 a.m.	169	--	2,870	3,630	83	91	94	96	96	98	--	--	SPWCM	

YELLOWSTONE RIVER BASIN--Continued
POWDER RIVER NEAR LOCATE, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951 --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 of collection	Time	Insta- tan- eous discharge (cfs)	Water tem- per- ature (° F)	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 18, 1951.....	8:40 a. m.	316	72	2,540	5,910	--	54	--	76	--	84	--	--	--	--	SPWCM
July 23.....	1:05 p. m.	429	68	3,320	2,320	--	35	--	58	--	82	--	--	--	--	SPWCM
July 25.....	7:00 p. m.	405	84	7,340	5,830	--	67	--	84	--	92	--	--	--	--	SPWCM
Aug. 13.....	11:00 a. m.	100	72	12,700	5,860	--	74	--	98	--	100	--	--	--	--	SPWCM
Aug. 14.....	6:05 p. m.	169	68	6,580	5,300	--	78	--	95	--	99	--	--	--	--	SPWCM
Aug. 16.....	3:18 p. m.	545	--	40,300	38,400	--	0	--	93	95	97	--	--	--	--	SPNM
Aug. 16.....	3:18 p. m.	545	--	40,300	3,850	61	76	87	92	94	96	100	--	--	--	BWCM
Aug. 24.....	9:05 a. m.	978	64	35,600	6,380	44	59	71	82	89	92	96	98	99	--	BWCM
Aug. 25.....	5:50 a. m.	3,780	58	29,400	5,900	50	64	74	82	88	94	97	98	99	--	BWCM
Sept. 6.....	12:45 p. m.	1,140	--	32,900	12,100	--	63	--	87	--	94	--	--	--	--	SPWCM
Sept. 18.....	9:58 a. m.	277	57	16,100	12,500	--	82	--	97	--	98	--	--	--	--	SPWCM
Sept. 29.....	11:50 a. m.	277	55	5,840	4,340	--	79	--	96	--	98	--	--	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued
YELLOWSTONE RIVER NEAR SIDNEY, MONT.

LOCATION.--At gaging station at bridge on State Highway 23, 2 miles south of Sidney, Richland County, and 30 miles upstream from mouth.

DRAINAGE AREA.--69,450 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

Water temperatures: January to September 1951.

EXTREMES, January to September 1951.--Dissolved solids: Maximum 714 ppm Feb. 1-10; minimum, 210 ppm June 17-25.

Hardness: Maximum, 360 ppm Feb. 1-10; minimum, 110 ppm June 17-25.

Specific conductance: Maximum daily, 2,780 micromhos Jan. 14; minimum daily, 288 micromhos June 21.

Water temperatures: Maximum, 80°F July 30, 31; minimum, freezing point on many days during January to April.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1269.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°)		Hardness as CaCO ₃		Per cent sodium	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 4, 1950 a	11,100	14	0.04	62	19	66	3.3	178	212	9.0	0.5	2.1	0.20	490	0.87	14,700	231	85	38	700	8.1	--
Dec. 13 a	7,500	14	0.04	79	30	83	4.7	233	280	14	0.4	3.1	1.10	636	0.86	12,900	319	128	36	881	8.2	--
Jan. 3-31, 1951	5,079	17	0.06	93	25	81	4.8	252	288	17	0.2	3.9	0.22	678	0.92	9,300	334	127	34	555	7.6	11
Feb. 1-10	2,520	18	0.06	96	29	87	4.7	272	305	16	0.2	4.1	0.22	714	0.97	4,860	360	137	34	1,010	7.4	13
Feb. 11-28	6,011	13	0.06	71	23	66	5.8	202	230	14	0.2	5.0	0.28	550	0.75	11,900	270	104	34	797	7.3	15
Mar. 1-24	6,042	15	0.02	81	28	79	4.2	224	261	15	0.5	5.0	0.19	626	0.85	10,200	316	132	35	918	7.6	7
Mar. 25-28	16,500	9.0	0.05	33	17	34	11	162	94	6.0	0.3	5.9	0.12	308	0.42	13,700	154	21	31	459	7.3	95
Mar. 29-Apr. 6	23,940	11	0.03	56	21	50	5.2	186	160	9.0	0.3	4.5	0.11	436	0.58	27,500	225	71	32	634	7.6	17
Apr. 7-30	9,491	14	0.02	61	23	64	3.0	189	205	12	0.4	2.2	0.13	486	0.67	12,700	248	93	36	727	7.8	8
May 1-21	13,220	14	0.02	47	17	48	2.6	153	146	8.5	0.3	1.9	0.12	390	0.52	13,600	188	63	35	568	7.8	8
May 22-31	27,140	14	0.01	34	9.5	26	2.1	120	73	5.5	0.3	2.2	0.09	238	0.32	17,400	124	26	31	357	7.7	16
June 1-9	37,960	17	0.03	38	8.0	30	2.5	127	86	4.5	0.4	2.9	0.08	282	0.36	26,900	128	24	33	392	7.4	8
June 10-16	22,610	16	0.03	42	8.3	34	2.1	126	101	5.5	0.3	2.5	0.03	288	0.39	17,600	139	36	34	423	7.7	8
June 17-25	40,430	14	0.03	33	6.7	20	1.8	110	61	4.0	0.3	2.7	0.05	210	0.29	22,900	110	20	28	313	7.7	9
June 26-July 2	30,110	15	0.04	33	7.7	24	1.8	107	76	4.0	0.2	2.3	0.13	230	0.31	18,700	114	26	31	340	7.7	8
July 3-31	27,020	14	0.02	33	7.9	30	2.3	108	86	4.5	0.2	2.4	0.08	244	0.33	17,800	115	26	36	367	7.8	8
Aug. 1-31	15,540	14	0.02	44	13	49	3.2	148	137	7.5	0.3	2.0	0.15	350	0.48	14,700	164	43	39	540	7.8	10
Sept. 1-30	9,898	14	0.02	65	22	72	3.9	180	241	11	0.4	3.1	0.19	533	0.72	14,200	251	103	38	787	7.5	10
Weighted average ^b	15,340	14	0.03	47	14	43	3.1	147	134	7.5	0.3	2.8	0.12	352	0.48	14,580	175	54	34	522	--	--

a Not included in weighted average.

b For period of daily sampling only. Represents 84 percent of runoff for water year October 1950 to September 1951.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.--Continued

Temperature (°F) of water, January to September 1951
 /Once-daily temperature measurement between 3 p. m. and 8 p. m. 7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				--	32	32	32	36	a 54	63	79	66
2				--	32	32	33	36	52	62	78	a 65
3				a 32	32	32	--	36	52	62	78	65
4				a 32	32	32	--	37	a 54	a 63	78	a 64
5				32	32	--	33	36	a 57	74	78	63
6				a 32	32	32	33	36	a 56	71	79	64
7				32	32	32	34	36	62	72	--	64
8				a 34	32	32	34	a 35	63	68	75	a 63
9				33	a 32	32	35	34	64	a 69	79	68
10				32	33	a 32	32	36	66	66	69	a 66
11				a 32	32	32	35	59	68	68	69	65
12				32	32	32	35	60	69	a 68	70	61
13				32	32	32	a 34	60	70	69	62	a 59
14				32	--	32	33	62	70	a 72	a 68	a 55
15				32	33	a 33	32	61	72	72	68	59
16				32	33	32	a 35	a 61	70	73	67	a 60
17				32	33	a 32	35	61	69	73	70	61
18				32	33	32	34	a 62	69	73	71	59
19				32	33	32	35	--	70	75	--	59
20				32	33	32	--	a 63	69	72	71	56
21				32	32	32	34	64	63	73	a 70	55
22				32	32	32	--	66	54	75	a 69	51
23				32	33	32	34	--	63	a 75	a 69	--
24				32	32	--	a 34	69	68	76	a 67	a 49
25				32	33	--	33	60	63	75	a 68	a 54
26				31	32	33	36	60	66	76	64	47
27				32	32	33	38	62	66	77	65	45
28				31	32	32	35	62	63	78	a 67	49
29				32	--	33	--	62	64	79	64	a 50
30				31	--	33	35	62	a 63	80	a 65	58
31				32	--	32	--	61	--	80	a 65	--
Average				32	32	32	34	53	64	72	70	59

a Observations made between 10 a. m. and 2 p. m.

YELLOWSTONE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN
Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids		Hardness as CaCO ₃	Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	Phenolic material as C ₆ H ₅ OH	
															Parts per million						Tons per acre-foot
															Residue at 180°C	Sum					
WIND RIVER NEAR DUBOIS, WYO.																					
Oct. 9, 1950.....	166	31	0.04	23	3.5	13	106	0	11	1.0	0.2	0.5	0.30		138	0.19	72	0	29	190	7.8
Nov. 6.....	111	24	.04	27	3.8	12	109	0	15	1.5	.2	.5			158	.21	83	0	23	215	7.5
Dec. 4.....	104	24	.04	29	2.8	10	114	0	11	.9	.2	.6			156	.21	84	0	21	214	7.5

WIND RIVER NEAR DUBOIS, WYO.

WIND RIVER BELOW DUBOIS, WYO.

Apr. 9, 1951	315	21	0.04	42	11	18	178	--	36	3.0	0.2	1.6	0.00	232		0.32	150	4	21	374	8.4
Apr. 19	--	22	.10	38	10	14	164	0	27	2.0	.2	1.6	.00	202		.27	136	2	19	324	8.1
July 17	2,180	25	.10	15	3.0	6.4	72	0	3.0	1.0	--	.7	.02	96		.13	50	0	22	130	7.9

OCEAN DRAIN AT OCEAN LAKE OUTLET NEAR PAVILLON, WYO.

Jan. 8, 1951		5.0	0.04	118	49	588	106	0	1,460	88	0.8	0.3	0.00	2,400	2,340	3.26	498	409	71	3,200	7.3
Jan. 24		2.9	.10	124	48	575	110	0	1,470	89	1.0	.2		2,470	2,380	3.36	500	405	71	3,250	7.7
Apr. 3		3.4	.02	117	46	545	108	0	1,400	84	1.0	.9		2,300	2,250	3.13	483	384	71	2,990	6.9
Aug. 17		5.6	.02	97	46	556	55	0	1,420	81	.8	.5		2,250	2,240	3.06	431	366	74	2,970	7.2

GOOSEBERRY CREEK NEAR GRASS CREEK, WYO.

Jan. 11, 1951	1	15	0.06	80	74	107	487	0	310	7.5	0.5	0.7	0.10	842		1.15	502	103	32	1,240	8.0
Mar. 21	5	9.7	.03	59	45	60	316	0	185	5.0	.3	.8	.04	550		.75	330	71	28	838	7.8
Apr. 25	7.8	11	.02	57	37	53	285	0	184	3.5	.4	.7	.05	490		.67	296	62	28	746	8.2
May 17		17	.05	41	22	42	209	0	102	2.0	.3	1.1	.13	334		.45	192	21	32	524	7.3
June 28		22	.17	.02	40	24	49	0	108	2.0	.3	1.1	.10	359		.49	200	11	35	573	7.7
Aug. 1	1.8	9.5	.02	55	39	72	327	0	171	4.0	.4	1.0	.08	520		.71	288	30	34	814	7.6
Aug. 14		2.9	.11	.02	52	40	69	0	173	3.5	.4	.8	.06	514		.70	286	37	34	805	7.7
Sept. 5		3.5	.02	49	48	79	336	0	200	5.0	.4	.6	.08	559		.76	320	44	35	879	7.9
Sept. 18	1.8	8.0	.02	48	49	84	338	0	209	5.5	.4	.7	.08	577		.78	322	45	36	903	8.0

YELLOWSTONE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN--Continued
Chemical analyses, in parts per million, water year October 1950 to September 1951--Continued

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃	Percent sodium	Specific conductance (micro-mhos at 25°C)	Phenolic material as C ₁₀ H ₈ O ₄	pH
														Parts per million	Tons per acre-foot	Calcium-magnesium					

GREYBULL RIVER AT MEETEETSE, WYO.

Jan. 11, 1951.....	58	16	0.10	42	17	40	144	0	133	1.5	1.5	0.2	1.1	0.00		0.45	174	56	83	495	7.9
Mar. 22.....	a 80	13	.07	39	16	41	130	0	134	2.5	2.5	.3	2.2	.00		.46	164	57	35	491	7.2
Apr. 25.....	76	12	.05	47	23	58	146	0	206	3.0	3.0	.1	1.7	.01		.61	214	94	37	640	8.3
June 4.....	283	15	.04	28	12	31	121	0	79	2.5	2.5	.1	1.2	.05		.32	120	21	36	363	7.2
July 19.....	1,210	12	.04	18	5.1	14	77	0	29	1.3	1.3	.1	1.0	.03		.16	66	3	32	184	7.0
Aug. 15.....	552	14	.04	21	7.7	17	91	0	44	.7	.7	.1	.3	.02		.21	84	9	31	237	7.2
Sept. 6.....	418	14	.04	29	12	21	118	0	63	1.7	1.7	.1	.4	.04		.30	120	23	27	340	7.4
Sept. 16.....	220	14	.04	33	13	31	131	0	92	1.0	1.0	.1	.5	.04		.34	138	31	33	398	7.6

GREYBULL RIVER NEAR BASIN, WYO.

Jan. 16, 1951.....	a 100	18	0.08	71	29	86	245	0	245	6.0	6.0	0.2	2.8	0.00		0.82	297	80	39	890	7.9
Feb. 21.....	a 90	17	.10	77	27	87	244	0	247	22.0	22.0	.2	4.0	.00		.85	303	103	38	907	7.6
Mar. 22.....	a 110	13	.01	54	23	78	205	0	211	5.0	5.0	.2	2.5	.00		.68	228	60	43	753	7.7
Apr. 28.....	92	11	.08	70	31	114	245	0	320	9.5	9.5	.2	3.3	.04		.98	300	99	45	994	8.1
June 25.....	418	16	.04	62	20	106	227	0	254	9.8	9.8	.3	2.3	.04		.82	238	52	49	882	7.5
July 12.....	822	16	.04	40	15	60	165	0	144	3.2	3.2	.2	1.5	.05		.50	180	25	45	571	7.1
Aug. 14.....	158	15	.04	45	16	78	189	0	161	16.3	16.3	.3	1.2	.06		.58	178	23	49	645	7.3
Sept. 7.....	115	16	.04	62	22	102	254	0	237	9.0	9.0	.3	1.6	.09		.79	247	39	47	859	7.4

ALKALI CREEK AT RALSTON, WYO.

Mar. 9, 1951.....	---	17	0.12	67	40	75	220	0	475	28	28	1.0	2.7	0.18		1.46	333	57	59	1,550	8.1
June 12.....	27.7					68		0	191	14	14								45	698	7.7
Sept. 5.....	45.8							0	185	15	15								49	604	7.9

a Mean daily discharge.

BITTER CREEK NEAR GARLAND, WYO.

Dec. 1, 1950	334	19	0.16	69	34	321	288	16	685	16	1.6	7.9	0.30	1,360	1,310	1.85	310	48	69	1,820	8.2
Mar. 15, 1951	18	17	.03	77	33	344	397	0	708	19	1.2	19	.27	1,400	1,390	1.90	328	35	69	1,970	7.8
June 13	159	19	.02	56	20	149	215	0	333	11	.7	8.8	.15	708	--	.96	223	47	59	1,050	7.5
Sept. 5	325	--	--	--	--	106	202	0	243	9.5	--	--	--	--	--	--	--	--	53	843	7.5

BIG HORN RIVER AT HARDIN, MONT.

Jan. 18, 1951		13	0.04	88	23	82	207	0	280	14	0.2	2.9	--	522		0.85	316	145	36	911	7.9
Feb. 13		11	.06	92	22	83	187	0	300	14	.8	4.0	--	646		.86	271	135	31	827	7.7
Mar. 21		15	.03	59	30	85	160	0	206	9.5	.3	3.0	--	442		.87	311	180	37	867	7.7
Apr. 20		15	.03	59	30	85	160	0	206	9.5	.3	3.0	--	442		.87	311	180	37	867	7.7
June 4		12	.06	48	10	50	158	0	125	5.5	.3	3.6	--	332		.48	163	33	40	518	7.7
July 9		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	.001
July 17		14	.04	50	13	49	136	0	153	7.0	4	2.4	--	366		.50	177	65	38	550	7.5
Sept. 17		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	.000

TONGUE RIVER AT TONGUE RIVER DAM NEAR DECKER, MONT.

Dec. 8, 1950	7.3	24	0.04	91	64	74	384	0	313	7.0	0.6	1.0	0.18	786		1.07	462	177	25	1,120	7.7
Feb. 14, 1951	217	12	.10	66	37	40	240	0	190	4.0	.3	4.5	.13	484		.66	318	121	21	723	7.5
Mar. 22	206	15	.02	77	41	39	262	0	210	3.5	.3	5.4	.06	540		.73	359	144	19	796	7.2
May 4	28	6.3	.02	62	41	39	228	0	203	3.5	.5	2.4	.06	488		.68	323	136	21	740	7.5
June 5	1,410	7.2	.02	27	11	11	106	0	42	2.5	.3	2.7	.03	158		.21	113	26	18	265	7.1
July 20	923	6.8	.02	37	18	15	149	0	74	.5	.2	1.1	.03	240		.33	168	46	16	381	7.3
Aug. 21	397	8.2	.02	45	25	19	179	0	102	1.0	.2	1.0	.06	306		.42	214	67	16	479	7.7
Sept. 18	420	6.9	.04	57	33	27	221	0	144	2.0	.3	2.4	.05	400		.54	278	97	18	620	7.8

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
WIND RIVER BELOW DUBOIS, WYO. ^a			
Apr. 9, 1951.....	316	194	166
May 7.....	630	526	895
May 31.....	3,040	660	5,420
June 14.....	3,050	649	5,340
July 17.....	2,180	220	1,290
OCEAN DRAIN AT OCEAN LAKE OUTLET, NEAR PAVILLION, WYO.			
Oct. 2, 1950.....	26	7	0.5
Nov. 13.....	25	6	.4
Nov. 27.....	27	3	.2
Dec. 11.....	26	1	.1
Dec. 26.....	25	2	.1
Jan. 8, 1951.....	26	4	.3
July 12.....	17	5	.2
Aug. 17.....	40	3	.3
OCEAN DRAIN AT MOUTH NEAR PAVILLION, WYO.			
June 7, 1951.....	21	932	53
July 12.....	68	2,880	529
Aug. 17.....	71	1,820	311
Aug. 31.....	66	1,320	235
SAND GULCH AT MOUTH NEAR SHOSHONI, WYO.			
July 12, 1951.....	51	520	72
Aug. 17.....	52	552	78
WYOMING CANAL SPILLWAY, 9½ MILES NORTHEAST OF PAVILLION, WYO.			
May 9, 1951.....	44	77	9.1
WIND RIVER BELOW BOYSEN DAM, WYO.			
June 7, 1951.....	4,530	2,420	29,600
LOWER HANOVER CANAL, 4 MILES SOUTH OF WORLAND, WYO.			
June 27, 1951.....	191	1,510	779
NOWATER CREEK, 4 MILES SOUTH OF WORLAND, WYO.			
June 25, 1951.....	13	454	16
July 26.....	16	2,110	91
Aug. 29.....	18	818	40
Sept. 25.....	53	2,490	359
SLICK CREEK, 3½ MILES NORTHEAST OF WORLAND, WYO.			
June 25, 1951.....	12	527	17
June 28.....	8.2	199	4.4
July 26.....	12	660	21
Aug. 29.....	12	260	8.4
Sept. 24.....	36	2,140	208
TEN MILE CREEK, 5 MILES NORTH OF WORLAND, WYO.			
July 23, 1951.....	17	9,990	459
NOWOOD CREEK AT MANDERSON, WYO.			
Oct. 13, 1950.....	278	15	11
ELK CREEK, 5 MILES SOUTH OF BASIN, WYO.			
Oct. 4, 1950.....	e 57	3,260	502
June 25, 1951.....	5.7	745	11
July 11.....	25	37,900	2,650
Aug. 29.....	3.5	765	7.2
Sept. 24.....	30	1,530	124
ANTELOPE CREEK, 2 MILES SOUTH OF BASIN, WYO.			
Oct. 4, 1950.....	e 20	1,260	68
June 25, 1951.....	6.6	716	13

e Estimated.

a Daily suspended-sediment concentration data from Apr. 9 to July 17, 1951, on file at regional office in Lincoln, Nebr.

YELLOWSTONE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
ANTELOPE CREEK, 2 MILES SOUTH OF BASIN, WYO.--Continued			
July 11, 1951.....	3.0	368	3.0
Aug. 29.....	10	893	24
Sept. 24.....	24	1,120	73
SUNSHINE CREEK, 7 MILES SOUTHWEST OF MEETEETSE, WYO.			
May 17, 1951.....	276	6,480	4,830
GREYBULL RIVER, 8 MILES WEST OF BASIN, WYO.			
Oct. 11, 1950.....	151	21	8.6
ALKALI CREEK AT RALSTON, WYO.			
Oct. 3, 1950.....	e 6	126	2.0
Apr. 14, 1951.....	1.6	88	.4
May 8.....	32	1,980	171
June 12.....	28	1,960	148
July 13.....	44	4,610	448
Aug. 3.....	63	3,750	638
Sept. 5.....	46	392	49
Sept. 17.....	36	264	26
POWELL DRAIN, 3 MILES SOUTH OF POWELL, WYO.			
Oct. 3, 1950.....	e 22	142	8.4
BITTER CREEK NEAR GARLAND, WYO.			
Oct. 3, 1950.....	287	422	327
Aug. 3, 1951.....	251	573	388
Sept. 6.....	365	295	291
SHOSHONE RIVER AT BYRON, WYO.			
Oct. 3, 1950.....	1,110	2,120	6,350
Oct. 19.....	850	65	149
HARLAN IRRIGATION DITCH, 1 MILE DOWNSTREAM FROM HARLAN DAM, WYO.			
July 24, 1951.....	3	89	0.7
Aug. 31.....	4	46	.5
NORTH FORK POWDER RIVER, 6 MILES NORTHWEST OF MAYOWORTH, WYO.			
Mar. 15, 1951.....	20	2	0.1
Apr. 3.....	19	2	.1
May 3.....	27	6	.4
June 15.....	44	82	9.7
July 13.....	34	6	.6
Aug. 17.....	15	3	.1
J-U RANCH IRRIGATION DITCH, 6 MILES EAST OF KAYCEE, WYO.			
July 26, 1951.....	1.5	44	0.2
SAHARA IRRIGATION DITCH, 6 MILES EAST OF KAYCEE, WYO.			
June 14, 1951.....	71	3,300	633
July 20.....	45	68	8.3
Aug. 31.....	49	88	12
SALT CREEK, 2 MILES WEST OF SUSSEX, WYO.			
July 11, 1951.....	2.2	6,970	41
July 30.....	8.0	5,370	116
Aug. 2.....	60	12,900	2,090
NORTH FORK CRAZY WOMAN CREEK BELOW SPRING DRAW, NEAR BUFFALO, WYO.			
Apr. 5, 1951.....	5.4	1	(t)
May 7.....	26	8	0.6
June 15.....	41	7	.8
July 2.....	31	10	.8
Aug. 14.....	12	6	.2

e Estimated. t Less than 0.05 ton.

YELLOWSTONE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)

CLEAR CREEK NEAR BUFFALO, WYO.

Apr. 3, 1951.....	2.8	1	(t)
May 7.....	46	6	.7
June 15.....	129	6	2.1
July 13.....	182	10	4.9

PINEY CREEK AT KEARNEY, WYO.

Apr. 8, 1951.....	29	2	0.2
May 7.....	121	11	3.6
June 15.....	70	6	1.1
July 13.....	172	4	1.9
Aug. 16.....	26	6	.4

t Less than 0.05 ton.

MISSOURI RIVER MAIN STEM

MISSOURI RIVER NEAR WILLISTON, N. DAK.

LOCATION.—At gaging station at Lewis and Clark Highway bridge, 5 miles southwest of Williston, Williams County, and 25 miles downstream from Yellowstone River.

Drainage area.—164,500 square miles, approximately.

RECORDS AVAILABLE.—Chemical analyses, December 1950 to September 1951.

Water temperature.—Maximum, 1951, 78° F. (August 1).

Water temperature.—Minimum, 1951, 30° F. (January 1).

Water temperature.—Maximum, 1950 to September 1951, 78° F. (August 1).

Water temperature.—Minimum, 1950 to September 1951, 30° F. (January 1).

Dissolved solids.—Maximum, 544 ppm Dec. 5; minimum, 272 ppm June 1-30.

Hardness.—Maximum, 272 ppm Dec. 5; minimum, 127 ppm June 1-30.

Specific conductance.—Maximum daily, 320 micromhos June 24.

Specific conductance.—Minimum daily, 864 micromhos Jan. 20; minimum daily, 320 micromhos June 24.

REMARKS.—Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Daily samples for chemical analysis composited by discharge. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Dec. 5, 1950, sta. 120	12,600	17	0.02	87	26	70	3.6	216	0	227	11	0.6	1.9	0.10	544	0.74	17,720	272	95	35	798	8.2
Dec. 5, sta. 220	12,600	14	.02	64	25	66	4.1	210	0	218	12	.7	1.9	.10	510	.69	—	263	91	35	770	8.1
Dec. 5, sta. 500	12,600	17	.04	63	24	67	3.8	197	6	209	11	.7	1.4	.10	508	.69	—	256	85	36	747	8.2
Dec. 6-31	13,590	17	.01	65	24	61	3.2	208	0	208	11	.6	1.8	.18	522	.71	19,150	259	88	34	721	7.7
Jan. 1-31, 1951	12,830	14	.01	66	24	62	3.4	209	0	208	11	.6	1.7	.17	526	.72	18,220	263	92	34	718	7.8
Jan. 3, sta. 140 b.	14,900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	716	—
Jan. 3, sta. 200 b.	14,900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	710	—
Jan. 3, sta. 300 b.	14,900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	701	—
Jan. 3, sta. 950 b.	14,900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	702	—
Feb. 1-28	13,310	14	.01	62	23	58	3.6	203	0	197	10	.5	1.8	.15	502	.68	18,040	249	83	33	691	7.8
Mar. 1-21	10,640	15	.02	64	26	66	3.2	200	0	227	12	.5	2.6	.16	522	.71	15,000	268	104	35	777	8.1
Mar. 2, sta. 120 b.	12,100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	699	—
Mar. 2, sta. 200 b.	12,100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	699	—
Mar. 2, sta. 550 b.	12,100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	703	—
Mar. 22-27	19,870	13	.03	59	18	53	3.8	182	0	188	10	.4	4.3	.11	436	.59	23,390	220	87	34	642	8.2
Mar. 28-31	36,500	10	.03	40	14	38	4.1	134	0	112	4.0	.3	3.2	.09	304	.41	29,960	156	46	34	471	7.9
Apr. 1-7	32,280	10	.02	42	16	44	3.7	134	0	149	8.0	.3	2.6	.08	380	.49	31,390	178	68	34	528	8.2
Apr. 8	35,600	11	.02	43	14	49	4.5	148	0	149	8.0	.5	3.8	.08	380	.50	34,650	164	43	39	530	8.0
Apr. 8-30	23,360	12	.02	46	19	54	4.0	110	0	195	8.0	.4	1.9	.13	426	.56	32,650	186	56	37	606	8.0
Apr. 26, sta. 710 b.	22,400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	852	—
Apr. 26, sta. 880 b.	22,400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	852	—
Apr. 26, sta. 950 b.	22,400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	880	—
Apr. 26, sta. 978 b.	22,400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	881	—

a. Mean for cross section.

b. Not included in weighted average.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER NEAR WILLISTON, N. DAK.--Continued

Chemical analyses, in parts per million, December 1950 to September 1951.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
May 1-31, 1951...	31,880	15	0.02	46	15	53	3.3	158	0	142	7.5	0.4	2.3	0.09	370	0.50	31,650	176	46	39	559	7.8	7
June 7, sta. 560...	41,080	15	.02	33	11	33	2.1	120	0	97	5.0	.3	1.9	.05	272	.37	30,150	127	29	36	399	8.0	8
June 7, sta. 860 b.	40,800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	--	--
June 7, sta. 860 b.	40,800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	443	--	--
June 7, sta. 890 b.	40,800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	438	--	--
June 7, sta. 1000 b.	40,800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	441	--	--
July 1-31, 1951...	33,370	15	.03	38	10	37	2.2	130	0	99	5.5	.4	1.5	.12	275	.37	24,780	136	29	37	425	7.7	7
Aug. 1-31, 1951...	36,060	13	.03	47	16	47	3.2	159	0	142	8.0	.6	1.5	.12	358	.49	34,860	184	54	35	554	7.6	7
Sept. 1-30, 1951...	34,790	13	.02	57	17	55	3.3	176	0	171	9.0	.6	1.4	.13	418	.57	39,260	213	69	36	640	7.8	7
Sept. 3, sta. 580 b.	37,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	630	--	--
Sept. 3, sta. 870 b.	37,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	626	--	--
Sept. 3, sta. 890 b.	37,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	622	--	--
Sept. 3, sta. 1015 b.	37,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	628	--	--
Weighted average c.....	26,480	14	0.02	48	16	48	3.1	159	--	146	7.7	0.5	1.9	0.11	376	0.51	26,880	186	56	35	557	--	--

b Not included in weighted average.

c Represents 83 percent of runoff for water year October 1950 to September 1951.

d Includes carbonate as bicarbonate.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER NEAR WILLISTON, N. DAK.--Continued

Temperature (*F) of water, May to September 1951

/Once-daily measurement/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	55	62	78	61
2								--	--	--	76	63
3								--	54	--	76	63
4								--	--	--	73	63
5								--	57	--	70	61
6								57	--	--	76	61
7								--	62	72	73	62
8								58	--	--	71	62
9								--	--	68	70	62
10								--	--	--	68	61
11								--	65	68	67	63
12								61	--	--	68	58
13								--	68	69	65	58
14								62	--	--	66	56
15								--	71	70	64	56
16								62	--	--	67	55
17								--	71	72	67	57
18								64	--	--	68	58
19								--	70	74	68	60
20								64	--	--	67	58
21								--	65	73	64	54
22								64	--	--	65	54
23								--	67	75	66	53
24								63	--	--	67	50
25								--	62	74	67	48
26								61	--	74	65	48
27								--	62	75	64	49
28								62	--	77	62	47
29								--	61	76	62	47
30								60	--	76	60	50
31								--	--	76	62	--
Average								--	--	--	68	57

LITTLE MISSOURI RIVER BASIN

LITTLE MISSOURI RIVER AT ALZADA, MONT.

LOCATION --At bridge on U.S. Highway 212, 1 mile northwest of Alzada, Carter County, 2 miles upstream from Thompson Creek, and 4 miles upstream from gaging station near Alzada.

DRAINAGE AREA --780 square miles, approximately (above gaging station):

RECORDS AVAILABLE --Water temperatures: June 1949 to September 1951.

Sediment records: March 1949 to September 1951.

EXTREMES, 1950-51 --Water temperatures: Maximum, not determined; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 8,550 ppm June 20; minimum daily, no flow on many days during April to August.

Sediment loads: Maximum daily, 5,130 tons June 20; minimum daily, 0 tons on many days during April to August.

EXTREMES, 1949-51 --Water temperatures: Maximum, 82°F Aug. 5, 1949; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 20,100 ppm May 21, 1949; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 17,600 tons May 10, 1950; minimum daily, 0 tons on many days each year.

REMARKS --Records of discharge for gaging station near Alzada for water year October 1950 to September 1951 given in Water-Supply Paper 1209. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, October 1950 to July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃	Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million		Tons per acre-foot					
															Residue at 180°C	Sum						
Oct. 18, 1950	a 0.1	7.0	0.04	63	21	88	122	315	2.0	0.4	1.3	0.30	580	1,480	1,410	0.79	242	142	44	821	7.2	
Jan. 4, 1951	.2	8.1	.06	159	55	225	351	778	8.0	.8	1.3	.30	1,480	1,410	1,110	2.01	622	334	44	1,760	7.3	
Apr. 6	.6	4.1	.20	113	47	177	184	672	6.0	.4	.5	.26	1,180	1,110	1,110	1.60	476	325	45	1,550	7.5	
July 11	.3	--	--	--	246	--	382	460	5.5	--	--	--	--	--	--	--	--	--	--	87	1,490	7.5

a Mean daily discharge.

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT ALZADA, MONT.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 7 and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	40	--	--	33	33	33	34	--	40	--	74	--
2	38	a 40	--	34	32	34	33	50	40	--	70	--
3	40	38	--	34	32	34	35	55	40	--	70	--
4	37	40	--	33	32	33	45	--	40	--	71	--
5	44	43	--	a 34	33	34	39	--	55	--	70	--
6	48	38	--	34	32	a 32	40	--	60	--	68	a 65
7	45	40	--	37	a 32	32	39	--	60	--	68	a 65
8	47	35	35	34	32	32	33	--	60	--	--	60
9	50	a 36	--	35	a 32	a 32	34	--	58	--	--	60
10	45	35	35	34	33	a 34	40	50	61	--	--	60
11	50	35	35	a 34	33	33	34	50	65	a 60	--	60
12	50	35	a 35	35	a 33	--	33	53	62	60	--	--
13	50	40	35	34	33	33	40	55	65	--	--	50
14	50	38	33	34	33	33	38	54	63	70	--	50
15	53	38	35	33	a 35	33	35	57	68	72	--	48
16	48	a 38	a 35	33	34	33	40	60	68	71	--	--
17	50	--	35	34	34	a 34	40	60	62	75	--	--
18	50	a 38	35	35	35	a 32	--	60	60	78	--	50
19	40	--	34	a 34	33	33	--	60	59	78	--	50
20	50	a 32	35	a 34	34	32	--	60	58	--	--	a 52
21	45	--	35	a 33	a 34	33	--	60	60	--	--	48
22	45	35	35	34	33	34	45	62	60	70	--	46
23	42	--	33	33	32	32	40	68	59	65	--	50
24	40	32	35	34	33	34	45	62	60	72	--	45
25	45	--	35	32	35	34	46	58	60	73	--	45
26	--	--	34	33	34	37	50	55	60	73	--	50
27	45	--	34	a 32	34	35	48	60	a 60	71	--	40
28	40	--	34	32	34	32	55	60	60	75	--	38
29	44	--	a 35	33	--	34	62	60	a 60	75	--	50
30	48	--	35	33	--	32	--	55	--	72	--	50
31	47	--	35	a 32	--	32	--	a 50	--	75	--	--
Average	46	--	--	34	33	33	41	57	58	--	--	--

a Reading obtained between 1 and 5 p. m.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT ALZADA, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1.0	40	a 0.1	0.2	20	(t)	0.3	34	(t)
2-----	1.1			.2			.3		
3-----	1.1			.2			.3		
4-----	45	130	b 16	.2	16	(t)	.3	70	0.1
5-----	52	72	6.2	.2			.2		
6-----	6.1	69	1.0	.2			.1		
7-----	4.2			.2	93	0.1	.1	46	1
8-----	6.6			.2			.3		
9-----	3.2	41	.2	.2			.5		
10-----	2.3			.2	72	(t)	.6	74	.1
11-----	.9			.2			.6		
12-----	.6	28	(t)	.2			.7	47	(t)
13-----	.4			.2	58	.1	.7		
14-----	.3			.2			.7		
15-----	.2	24	(t)	.2			.4	92	.2
16-----	.2			.2	38	(t)	.4		
17-----	.1			.2			.4	26	.1
18-----	.1	50	0.1	.6			.3		
19-----	.1			.4	78	(t)	.5	69	.2
20-----	.1			.3			.5		
21-----	.1	24	(t)	.2			.5	92	.2
22-----	.1			.1	72	(t)	.5		
23-----	.1			.1			.4	47	(t)
24-----	.1	24	(t)	.1			.4		
25-----	.1			.2	58	.1	.4		
26-----	.1			.3			.3	92	.2
27-----	.1	50	0.1	.4			.3		
28-----	.1			.5	78	(t)	.3	69	.2
29-----	.1			.5			.3		
30-----	.1	24	(t)	.5			.3	92	.2
31-----	.1			--	--	--	.3		
Total-	106.7	--	26.4	7.6	--	1.0	12.3	--	2.2
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.3	50	(t)	0.4	87	0.1	0.3	85	0.1
2-----	.3			.4			.3		
3-----	.3			.4	80	(t)	.4	61	.1
4-----	.3	66	0.1	.4			.3		
5-----	.3			.4			.4	69	.2
6-----	.3			.3	78	(t)	.4		
7-----	.3	39	(t)	.2			.7	92	.2
8-----	.3			.2			.9		
9-----	.3			.2	38	(t)	.9	26	.1
10-----	.3	50	0.1	.2			1.0		
11-----	.3			.2			.8	92	.2
12-----	.3			.2	78	(t)	.8		
13-----	.3	66	0.1	.2			.8	69	.2
14-----	.3			.2			.8		
15-----	.3			.2	38	(t)	.9	26	.1
16-----	.3	39	(t)	.2			.9		
17-----	.3			.2			.9	92	.2
18-----	.3			.2	78	(t)	.8		
19-----	.3	50	0.1	.2			.5		
20-----	.3			.2			.4	69	.2
21-----	.2			.2	38	(t)	.6		
22-----	.2	39	(t)	.3			.7	92	.2
23-----	.2			.3			.7		
24-----	.2			.3	78	(t)	.7	26	.1
25-----	.2	50	0.1	.3			.8		
26-----	.2			.3			.8	92	.2
27-----	.2			.3	78	(t)	.7		
28-----	.2	66	0.1	.3			.6		
29-----	.3			--	--	--	.7	69	.2
30-----	.4			--	--	--	.9		
31-----	.4	24	(t)	--	--	--	.9		
Total-	8.7	--	1.6	7.5	--	1.4	21.1	--	4.4

t Less than 0.05 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT ALZADA, MONT.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.8			0	--	0	1.4		
2-----	.8			.1			9.3	50	0.7
3-----	.7			.1	33	(t)	29	--	e 18
4-----	.7	26	(t)	0	--	0	60	110	sb 22
5-----	.6			0	--	0	12	66	2.1
6-----	.6			0	--	0	3.6	91	.9
7-----	.5			0	--	0	1.2	83	.3
8-----	.5			0	--	0	.9	80	b .2
9-----	.4			0	--	0	1.6	80	.3
10-----	.4	41	(t)	.1			1.0	71	.2
11-----	.3			.1			1.0	80	.2
12-----	.5			7.8	65	.6	.5	85	.1
13-----	.9	32	0.1	5.3			.2	112	.1
14-----	2.0			4.4			6.1	211	s 4.7
15-----	.3			15	45	1.4	79	264	s 62
16-----	.1	58	(t)	15			50	100	s 15
17-----	.1			9.6			223	3,340	s 3,520
18-----	0	--	0	7.6	31	.7	271	4,430	s 3,540
19-----	0	--	0	8.2			287	3,280	s 2,650
20-----	0	--	0	6.9			221	8,550	s 5,130
21-----	0	--	0	6.9	38	.6	215	5,050	s 3,300
22-----	.1			5.3			129	1,120	390
23-----	.2			3.8			78	850	179
24-----	.2			2.7			43	710	82
25-----	.2	38	(t)	1.3	38	.1	17	500	23
26-----	.2			.8			9.3	480	12
27-----	.1			.4			5.8	380	6.0
28-----	.2			.3			3.8	370	3.8
29-----	.1			.3	80	.1	2.8	280	2.1
30-----	0	--	0	.3			2.5	240	a 1.6
31-----	--	--	--	.4			--	--	--
Total-	11.5	--	1.0	102.7	--	11.9	1,765.0	--	18,967.0
	July			August			September		
1-----	4.2	--	e 3.4	0.3			60	3,120	s 422
2-----	6.3	--	e 4.4	.3			54	1,510	s 207
3-----	16	--	e 24	.3			74	2,080	s 438
4-----	43	--	e 130	.2	47	(t)	49	1,800	s 221
5-----	20	--	e 32	.2			54	4,070	593
6-----	5.8	--	e 3.8	.1			100	3,910	s 1,070
7-----	1.2	--	e .6	.1			94	2,720	s 726
8-----	.3	--		0	--	0	27	1,250	s 97
9-----	.2	--	e .1	0	--	0	13	635	22
10-----	.2			0	--	0	5.1	510	7.0
11-----	5.7	260	sb 13	0	--	0	4.2	445	5.0
12-----	97	1,500	sb 600	0	--	0	4.2	399	4.5
13-----	171	1,900	s 905	0	--	0	3.2	398	3.4
14-----	54	705	s 123	0	--	0	3.0	304	2.5
15-----	16	110	s 5.5	.1	47	(t)	2.8	255	1.9
16-----	5.8	130	2.0	37	1,230	s 615	3.2	254	2.2
17-----	2.1	78	s .5	230	7,740	4,810	1.6	228	1.0
18-----	.5	73	.1	77	5,820	s 1,300	1.1	189	.6
19-----	.1	87	(t)	19	2,560	s 140	.9	210	.5
20-----	0	--	0	9.6	1,160	30			
21-----	0	--	0	6.9	750	14	.3		
22-----	.3	78	s .2	8.5	550	13	.3	142	.1
23-----	.2			10	410	11	.2		
24-----	.2			17	300	14	.3		
25-----	.3	64	(t)	20	200	11	.3		
26-----	.3			19	210	11	.3		
27-----	.3			17	190	8.7	.3		
28-----	.4			21	150	8.5	.3	75	.1
29-----	.4	52	(t)	21	80	4.5	.4		
30-----	.3			22	160	9.5	.3		
31-----	.3			50	2,580	s 289	--	--	--
Total-	452.4	--	1,848.2	586.6	--	7,289.4	557.6	--	3,825.7
Total discharge for year (cfs-days).....									3,639.7
Total load for year (tons).....									31,980.2

e Estimated.

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT ALZADA, MONT.--Continued

Particle-size analyses of suspended sediment, June to August 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- centage discharge (° F)	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	0.350	0.500		1.000
June 18, 1951 . . .	5:45 p. m.	202	62	3,470	3,270	--	94	--	100	--	--					PDCM
June 22,	1:00 p. m.	135	63	1,190	2,690	71	82	90	95	99	100					BDGM
Aug. 16,	11:45 p. m.	222	--	7,840	4,090	77	87	95	98	99	100					SPWCM
Aug. 16,	11:45 p. m.	222	--	7,840	3,920	8	18	90	99	99	100					PN

LITTLE MISSOURI RIVER BASIN--Continued
LITTLE MISSOURI RIVER AT MARWARTH, N. DAK.

LOCATION.--At gaging station at bridge on U. S. Highway 12 in Marwarth, Slope County, 1½ miles downstream from Little Beaver Creek.
DRAINAGE AREA.--4,570 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December, 1949 to September 1951.
REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos/cm at 25°C)	pH
														Parts per million	Residue at 180°C	Tons per acre-foot	Calcium, mg./meq.	Non-carbonate			
Oct. 9, 1950	52	12	0.04	31	9.8	289		381		405	5.5	0.2	4.7		952	--	118	0	1,390	8.0	
Nov. 6	34	7.0	.14	38	20	326		454		483	8.5	.4	.9		1,130	1,110	1.54	0	1,640	8.0	
Dec. 4	4.2	13	.06	37	39	520		637		805	15	.4	.8		1,810	1,740	2.46	0	2,510	8.0	
Jan. 2, 1951	5.3	10	.08	64	47	644		858		985	17	.5	.9		2,230	2,190	3.03	0	3,070	7.9	
Apr. 6	192	--	--	--	--	141		233		222	5.0	--	--		--	--	--	--	71	832	7.5
Apr. 30	40	--	--	--	--	344		488		533	9.5	--	--		--	--	--	--	77	1,770	7.8
May 21	89	--	--	--	--	238		294		405	4.5	--	--		--	--	--	--	77	1,290	7.7
June 16	46	--	--	--	--	262		336		528	8.0	--	--		--	--	--	--	68	1,550	7.7
July 11	113	--	--	--	--	126		197		403	4.0	--	--		--	--	--	--	47	1,140	7.6
July 29	2,860	23	.06	37	13	142		78		365	5.2	.6	1.0		642	--	145	81	914	6.8	
Aug. 13	8.7	--	--	--	--	336		401		540	7.5	--	--		--	--	--	--	81	1,680	7.9
Sept. 4	1,680	--	--	--	--	120		65		350	4.0	--	--		--	--	--	--	62	873	6.5

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT MARMARTH, N. DAK.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Oct. 9, 1950	52	2,580	362
Nov. 6	32	451	39
Dec. 4	4	20	.2
Jan. 2, 1951	5	65	.9
Feb. 23	4	96	1.0
Mar. 23	1,200	1,240	4,020
Mar. 24	1,100	1,180	3,500
Mar. 26	1,100	2,080	6,180
Mar. 28	570	1,510	2,320
Apr. 6	190	808	415
Apr. 16	72	238	46
Apr. 30	40	836	90
May 21	88	2,540	604
June 16	46	241	30
July 11	109	3,720	1,090
July 29	2,870	21,600	167,000
July 30	510	13,100	18,000
Aug. 13	9.0	95	2.3
Aug. 30	143	558	215
Sept. 4	1,680	17,200	78,000
Sept. 17	94	1,140	289

LITTLE MISSOURI RIVER BASIN--Continued

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, and 1 mile upstream from Andrews Creek.

DRAINAGE AREA.--6,190 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: March 1947.

Water temperatures: March 1947 to September 1949.

Sediment records: March 1946 to September 1951 (discontinued).

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 26,600 ppm July 5; minimum daily, no flow on many days during winter months.

Sediment loads: Maximum daily, 150,000 tons Sept. 5; minimum daily, 0 tons Jan. 25 to Feb. 2, Feb. 5-9.

EXTREMES, 1946-51.--Dissolved solids (1947-49): Maximum, 2,160 ppm Jan. 1 to Feb. 4, 1948; minimum, 182 ppm Mar. 19-20, 1948.

Sediment loads: Maximum daily, 3,300 tons Mar. 18, 1948.

Specific conductance (1947-49): Maximum, 568 ppm Feb. 1 to Mar. 3, 1948; minimum, 43 ppm Mar. 18, 1948.

Freezing point: Maximum daily, 4.770 micromhos Jan. 1-2, 1949; minimum daily, 244 micromhos Mar. 20, 1948.

Water temperatures (1947-49): Maximum, 92.8° Aug. 2, 9, 1947; minimum, freezing point on many days during winter months.

Sediment loads: Maximum daily, 35,400 tons June 16, 1948; minimum daily, no flow on many days during winter months.

Sediment loads: Maximum daily, 6,600 tons Apr. 16, 1950; minimum daily, 0 tons Dec. 23, 1949 to Mar. 2, 1950. Jan. 25 to Feb. 2, Feb. 5-9, 1951.

REMARKS.--Flow affected by ice Nov. 10 to Apr. 2. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate magnesium					
																		Residue at 180°C				Sum
Oct. 6, 1950.....	112	13	0.04	31	9.8	250	282	395	4.0	0.2	7.5	0.2	0.24	860	1.17	118	0	82	1,250	7.9		
Nov. 2.....	27	14	.06	64	30	342	407	653	8.0	.4	.8	.4		1,340	1.310	282	0	73	1,840	7.9		
Dec. 12.....	2	18	.06	86	45	411	413	905	8.0	.4	1.0	.4		1,730	1,680	235	61	69	2,300	7.9		
Jan. 9, 1951.....	1.1	14	.06	120	46	442	502	985	7.5	.4	1.4	.4		1,890	1,860	2.57	489	77	66	2,480	7.6	
Feb. 26.....	126	8.2	.08	34	9.2	95	167	176	3.5	.4	2.9	.4		452	--	.61	123	0	63	644	7.2	
Mar. 23.....	1,206	5.4	.40	26	5.1	31	106	57	3.5	.4	2.1	.4		226	--	.31	86	0	44	307	7.0	
Apr. 27.....	148	--	--	--	--	306	402	585	8.0	--	--	--		--	--	--	--	--	70	1,760	7.7	
May 29.....	32	--	--	--	--	366	422	700	8.0	--	--	--		--	--	--	--	--	73	2,010	7.7	
June 11.....	121	--	--	--	--	235	286	443	4.5	--	--	--		--	--	--	--	--	78	1,390	7.7	
June 26.....	77	--	--	--	--	255	310	473	5.0	--	--	--		--	--	--	--	--	74	1,440	7.8	
July 9.....	125	--	--	--	--	234	259	448	4.0	--	--	--		--	--	--	--	--	74	1,320	7.6	
Aug. 1.....	180	--	--	--	--	180	174	428	4.5	--	--	--		--	--	--	--	--	66	1,150	7.4	
Sept. 5.....	2,380	--	--	--	--	141	224	279	1.5	--	--	--		--	--	--	--	--	64	927	7.4	
Sept. 17.....	234	--	--	--	--	110	145	395	4.5	--	--	--		--	--	--	--	--	45	1,020	7.6	

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT MEDORA, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	33	280	25	26	198	14	6		
2-----	51			26	190	13	6		
3-----	63	2,500	472	22	125	7	6		
4-----	74			26			8		
5-----	92			25			5	19	(t)
6-----	107	4,750	1,370	25	300	a20	3		
7-----	109	6,500	1,910	27			2		
8-----	123	6,340	2,110	24			2		
9-----	103	5,820	1,620	25	145	9	10		
10-----	101	5,790	1,580	22	188	13	12		
11-----	78	4,770	1,000	18	82	5			e1
12-----	64			18			6		
13-----	58	5,940	946	16	66	3	2		
14-----	55			12			2		
15-----	47			14			1		
16-----	41	3,360	372	10			1		
17-----	41	2,180	241	12			2		
18-----	41	1,300	144	14			2	28	(t)
19-----	37	1,000	100	14	63	2	2		
20-----	36			10			1		
21-----	34			8			1		
22-----	36	444	42	6			1		
23-----	34			2	60	(t)	2		
24-----	34			3	82	1	3		
25-----	34			10	80	2	2		
26-----	32			12			4	85	1
27-----	32			8			10		
28-----	30	298	24	5	23	(t)	4		
29-----	29			5			3		
30-----	28			5			4	17	(t)
31-----	27			--	--	--	3		
Total--	1,704	--	16,211	450	--	175	118	--	10
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4			0	--	0	50	98	13
2-----	3			0	--	0	35	40	4
3-----	3	20	(t)	1	23	(t)	30	18	1
4-----	2			1			25	8	1
5-----	2			0			25	18	1
6-----	2			0	--	0	20		
7-----				0	--	0	15		e1
8-----				0	--	0	10		
9-----				0	--	0	8		
10-----				5	--	e5	8		(t)
11-----				100	--	e30	6		
12-----				270	352	257	2	28	(t)
13-----				120	112	36	2	10	(t)
14-----				100	80	22	2	8	(t)
15-----				90	86	21	2	80	(t)
16-----	1	50	(t)	150	80	32	5		
17-----				150	70	28	10		
18-----				180	88	43	10	95	a3
19-----				280	78	59	20		
20-----				280	95	72	50	80	b11
21-----				250	120	81	100	250	68
22-----				300	122	99	2,200	950	5,640
23-----				180			1,800	440	2,140
24-----				140	136	53	2,200	600	3,560
25-----	0	--	0	140			2,600	1,450	10,200
26-----	0	--	0	120			2,800	3,220	24,300
27-----	0	--	0	90	140	b34	2,300	3,880	24,100
28-----	0	--	0	70	120	b22	1,500	3,200	13,000
29-----	0	--	0	--	--	--	1,200	3,600	11,700
30-----	0	--	0	--	--	--	1,000	3,300	8,910
31-----	0	--	0	--	--	--	700	3,400	6,430
Total--	34	--	3	3,017	--	1,053	18,735	--	110,096

e Estimated.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT MEDORA, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	600	3,450	5,590	92	1,000	248	47	420	s 57
2-----	580	3,600	5,640	103	1,080	300	107	4,800	s 1,710
3-----	524	3,050	4,320	103	580	161	223	10,300	6,200
4-----	524	3,200	4,530	90	520	126	419	11,800	s 15,500
5-----	474	2,950	3,780	78			750	17,800	36,000
6-----	445	2,300	2,760	74			445	14,000	16,800
7-----	382	2,080	2,150	80			301	12,000	9,750
8-----	315	1,550	1,320	88	191	39	231	10,500	6,550
9-----	237	1,140	729	74			202	8,380	4,570
10-----	197	790	420	61			161	7,500	3,260
11-----	163	580	255	56	400	60	131	5,000	1,770
12-----	135	460	168	50	1,140	154	136	3,950	1,470
13-----	123	434	144	44	1,250	149	123	1,940	644
14-----	107	350	101	40	680	74	109	740	218
15-----	58	252	39	36	160	16	98	450	119
16-----	94			36	150	15	101	600	164
17-----	92			45	150	18	123	700	232
18-----	90	251	60	81	560	122	86	460	107
19-----	85			65			74	550	110
20-----	83			58			83	1,200	269
21-----	96			51	708	107	74	900	180
22-----	60			50			119		
23-----	98	189	46	85	1,200	275	133		
24-----	92			98	4,000	1,060	123	3,570	1,050
25-----	86			78	3,800	b 800	90		
26-----	81	102	22	65	3,200	b 550	81		
27-----	127	5,820	s 2,880	55	2,100	b 320	182		
28-----	168	10,100	s 4,790	45	900	b 110	202	4,480	2,260
29-----	111	1,930	578	32	380	33	194		
30-----	94	1,050	266	29	200	16	170		
31-----	--	--	--	34	300	28	--	--	--
Total--	6,341	--	41,012	1,976	--	5,297	5,320	--	119,970
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	142	4,120	1,580	870	22,500	52,900	99	3,500	936
2-----	146	2,980	1,170	368	15,200	15,100	144	4,400	1,710
3-----	290	13,800	s 11,200	220	10,800	6,420	168	9,800	4,450
4-----	605	17,400	s 35,200	168	9,600	4,350	1,240	20,800	69,600
5-----	722	26,600	51,900	123	7,400	2,460	2,170	25,600	150,000
6-----	440	21,600	25,700	99	4,400	1,180	1,350	21,300	77,800
7-----	270	14,300	10,400	68	2,300	422	714	17,500	33,700
8-----	161	10,100	4,390	58	418	65	468	13,700	17,300
9-----	131	9,200	3,250	52	241	34	450	12,200	14,800
10-----	248	12,000	8,040	45	118	14	430	7,000	8,130
11-----	284	9,000	6,900	43	98	11	335	6,200	5,610
12-----	226	6,200	3,780	38	83	9	258	4,300	3,000
13-----	170	4,700	2,160	38	68	7	210	3,000	1,700
14-----	127	3,170	1,090	31	76	6	294	5,600	s 7,700
15-----	111	1,920	575	33	78	7	580	10,400	16,300
16-----	85	1,120	257	31	95	8	351	11,600	11,000
17-----	87	680	123	44	90	11	242	8,100	5,290
18-----	56	420	64	45	80	b 10	194	4,380	2,290
19-----	47	300	38	46	73	9	157	2,300	975
20-----	43	230	27	41	74	8	131	1,300	460
21-----	57	560	86	182	6,400	s 3,600	111	1,000	300
22-----	105	950	269	187	12,000	6,060	98	770	204
23-----	101	1,150	314	125	6,100	2,060	88	570	135
24-----	73	1,000	197	115	4,400	1,370	85	400	b 90
25-----	56	550	83	109	2,800	824	105	480	136
26-----	52	900	126	123	1,000	332	113	860	262
27-----	60	1,600	259	343	7,680	s 7,040	117	820	259
28-----	85	1,000	230	277	19,500	14,600	111	1,100	330
29-----	74	670	134	242	13,800	9,020	96	5,700	1,480
30-----	46	360	45	144	9,000	3,500	101	6,910	1,880
31-----	1,810	26,100	s 140,000	107	7,200	2,080	--	--	--
Total--	6,890	--	309,587	4,415	--	133,517	11,010	--	437,627

Total discharge for year (cfs-days) 60,010
 Total load for year (tons) 1,174,558

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT MEDORA, N. DAK.--Continued

Particle-size analyses of suspended sediment, March to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	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		0.350	0.500	1.000
Mar. 23, 1951	3:30 p. m.	1,200	545	2,550	37	44	50	54	60	66	73	84		96		BWCM
Mar. 25	5:15 p. m.	2,980	2,010	2,890	--	40	--	56	--	72	80	96		100		SPWCM
Mar. 27	4:00 p. m.	2,250	3,700	1,930	41	49	59	69	77	82	--	--		--		SPWCM
Mar. 27	4:00 p. m.	2,250	3,700	1,980	8	23	56	66	76	82	--	--		--		SPWCM
Mar. 29	11:45 a. m.	1,200	3,590	5,960	--	48	--	59	--	69	78	97		100		SPWCM
Apr. 2	4:45 p. m.	557	3,250	6,910	--	58	--	79	--	92	95	99		100		SPWCM
Apr. 6	1:00 p. m.	468	2,300	2,420	55	65	73	82	85	90	--	--		--		SPWCM
Apr. 6	1:00 p. m.	468	2,300	2,270	3	6	68	87	88	91	--	--		--		SPWCM
Apr. 10	3:25 p. m.	202	2,745	3,230	--	78	--	89	--	91	--	--		--		SPWCM
Apr. 18	12:20 p. m.	94	191	801	67	81	84	87	88	89	89	95		97		BWCM
Apr. 27	2:30 p. m.	148	3,940	8,940	--	47	--	80	--	92	98	100		--		SPWCM
May 14	3:15 p. m.	39	462	1,160	--	95	--	100	--	--	--	--		--		PWCM
June 11	4:10 p. m.	121	4,770	6,070	91	96	98	--	--	98	--	--		--		PWCM
June 26	10:50 a. m.	78	5,000	11,000	--	96	--	99	--	100	--	--		--		PWCM
July 3	8:00 p. m.	258	19,500	11,200	--	84	--	98	--	99	--	--		--		SPWCM
July 4	7:00 a. m.	223	8,380	9,950	--	87	--	99	--	--	--	--		--		PWCM
July 4	6:30 p. m.	1,370	29,100	8,390	58	70	81	89	90	93	95	99		100		SPWCM
July 5	6:20 p. m.	531	23,700	13,500	--	81	--	91	--	96	--	--		--		SPWCM
July 6	6:45 p. m.	391	19,000	11,300	--	86	--	96	--	98	--	--		--		SPWCM
July 9	4:00 p. m.	125	9,390	10,600	83	94	98	98	99	100	--	--		--		SPWCM
July 9	4:00 p. m.	125	9,390	11,200	97	99	99	99	99	100	--	--		--		PWCM
July 10	6:45 p. m.	298	12,400	7,870	--	89	--	93	--	94	94	98		100		SPWCM
July 31	2:45 p. m.	1,070	28,800	8,820	64	77	88	93	96	98	--	--		--		SPWCM
July 31	2:45 p. m.	1,070	28,800	8,820	2	73	73	94	96	98	--	--		--		SPWCM
Aug. 1	11:50 a. m.	840	22,000	12,100	--	87	--	98	--	99	--	--		--		SPWCM

KNIFE RIVER BASIN
MISCELLANEOUS ANALYSES OF STREAMS IN KNIFE RIVER BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Borates (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million		Tons per acre-foot	Calcium	Non-carbonate			
															Residue at 180°C	Sum						

KNIFE RIVER AT HAZEN																						
Oct. 2, 1950.....	47	17	0.10	70	29	224		561	300	4.5	0.4	1.4	---	---	942	---	1.28	284	0	62	1,370	7.9
Oct. 31.....	44	16	.04	67	34	240		578	333	5.0	.3	.9	---	---	980	---	1.33	306	0	63	1,420	8.1
Jan. 15, 1951.....	29	18	.06	82	36	291		692	390	5.5	.2	3.9	---	---	1,200	1,170	1.63	352	0	64	1,700	7.8
Feb. 6.....	25	19	.04	88	37	274		677	383	5.5	.6	3.4	0.43	0.43	1,150	1,140	1.56	370	0	62	1,620	7.6
Mar. 31.....	7,600	4.1	.40	14	2.2	20		66	27	1.0	.4	2.9	.12	.12	128	---	.17	44	0	49	170	7.2
Apr. 6.....	7,350	---	---	---	---	17		92	31	.5	---	---	---	---	---	---	---	---	---	34	213	7.3
Apr. 9.....	1,660	---	---	---	---	32		131	63	.5	---	---	---	---	---	---	---	---	---	40	341	7.4
June 8.....	373	---	---	---	---	78		237	149	.5	---	---	---	---	---	---	---	---	---	46	599	7.4
Sept. 6.....	103	---	---	---	---	145		316	228	1.0	---	---	---	---	---	---	---	---	---	63	934	7.5

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, March to September 1949.

Water temperatures: May 1947 to September 1948, March to September 1949.

Sediment records: May 1947 to September 1951 (discontinued).

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 11,700 ppm July 4; minimum daily, not determined.

Sediment loads: Maximum daily, 1,840 tons Mar. 26; minimum daily, less than 0.05 ton Feb. 1-15.

EXTREMES, 1947-51.--Sediment concentrations: Maximum daily, 17,300 ppm Aug. 13, 1947; minimum daily, not determined.

Sediment loads: Maximum daily, 8,190 tons Apr. 16, 1950; minimum daily, less than 0.05 ton on many days each year.

REMARKS.--Flow affected by ice Jan. 19 to Apr. 8. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.7			0.7			1.0		
2-----	1.0			.8			1.0		
3-----	1.2	34	a 0.1	.8			1.0		
4-----	1.4			.8			1.0		
5-----	4.9	59	.8	.7			1.0		
6-----	3.3	63	.6	.6			1.1	101	0.3
7-----	1.9			.7			1.1		
8-----	1.3	43	a 2	.8	52	0.1	1.0		
9-----	1.0			.8			.8		
10-----	1.0			.8			.8		
11-----	1.0			.9			.9		
12-----	.9			.9			1.0		
13-----	.9			.9			1.0		
14-----	.9			.8			1.0		
15-----	.8	34	.1	1.0			1.1		
16-----	.8			1.3			1.0	95	.2
17-----	.8			1.2			1.0		
18-----	.8			1.1			.9		
19-----	.8			1.0			.9		
20-----	.8			1.0			.8		
21-----	.8			.9			.8		
22-----	.8			1.0	32	.1	.8		
23-----	.8			1.2			1.0		
24-----	.8			1.1			1.0		
25-----	.8			.9			1.0		
26-----	.8	44	.1	.9			1.0	76	.2
27-----	.9			1.0			1.1		
28-----	.8			.9			1.0		
29-----	.7			.9			.9		
30-----	.7			1.0			1.0		
31-----	.7			--	--	--	1.0		
Total-	34.8	--	4.6	27.4	--	3.0	30.0	--	7.2

a Computed from partly-estimated concentration graph.

HEART RIVER BASIN--Continued

HEART RIVER NEAR SOUTH HEART, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1.0			0.4			65		
2-----	1.0			.4			40		
3-----	1.0			.4			30	35	3.4
4-----	1.1			.4			25		
5-----	1.1			.4			20		
6-----	1.0			.4			15		
7-----	1.0			.4			10		
8-----	1.0	47	0.1	.4	31	(t)	7	66	1.6
9-----	.9			.4			5.0		
10-----	1.0			.4			2.3		
11-----	1.0			.4			2.9		
12-----	1.0			.4			3.2	38	.3
13-----	1.0			.4			3.1		
14-----	1.0			.4			2.0		
15-----	.9			.5			1.5		
16-----	.9			.7			1.4		
17-----	.9			1.0			1.3	29	.1
18-----	.8			15	345	14	1.2		
19-----	.8			45	236	29	1.0		
20-----	.7			200	184	99	.8		
21-----	.7			250	98	66	1.8	110	.5
22-----	.7			250	64	43	140	202	76
23-----	.6			150	54	22	577	150	234
24-----	.6	44	.1	75	82	17	649	180	315
25-----	.6			50	370	50	1,500	315	1,280
26-----	.5			100	115	31	2,050	332	1,840
27-----	.5			150	54	22	1,610	410	1,780
28-----	.5			85	40	10	659	325	578
29-----	.5			--	--	--	278	240	180
30-----	.4			--	--	--	204	150	83
31-----	.4			--	--	--	144	160	62
Total-	25.1	--	3.1	1,377.8	--	403.6	8,050.5	--	6,453.8
Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	104	155	44	17	2,890	s416	1.5	148	0.6
2-----	84	152	34	26	8,250	s630	7.8	512	11
3-----	71	180	35	29	5,100	399	36	8,370	s988
4-----	69	220	41	13	3,500	123	20	9,800	529
5-----	65	342	60	9.7	5,000	131	9.0	9,500	224
6-----	46	358	44	6.0	3,220	s55	7.6	7,700	158
7-----	33	275	25	4.4	90	1.1	4.7	5,200	66
8-----	26	198	14	3.8	92	.9	3.1	5,700	48
9-----	21	144	8.2	3.2	90	.8	2.1	30	.2
10-----	17	95	4.4	2.5	72	.5	1.7		
11-----	11	82	2.4	2.2	60	.4	1.3		
12-----	8.6	62	1.4	2.0			1.3		
13-----	7.1			1.8			1.1		
14-----	6.7	71	1.2	1.6			1.0		
15-----	5.4			1.5	65	.3	1.0		
16-----	4.4			1.4			1.0	48	.1
17-----	4.6			1.5			1.0		
18-----	4.1			3.0	174	s3.4	1.0		
19-----	3.6	54	.6	9.9	489	s12	1.0		
20-----	3.9			20	235	13	1.1		
21-----	3.8			7.0	236	s4.4	1.2		
22-----	3.1			3.5	138	1.3	2.5	120	.8
23-----	3.0			2.4	128	.8	17	1,600	s60
24-----	2.9			1.8	123	.6	5.7	3,440	s57
25-----	3.0	58	.5	1.4	122	.5	9.8	669	s15
26-----	3.1			1.3	104	.4	16	205	s10
27-----	3.6			1.2	114	.4	15	92	3.7
28-----	8.6	70	1.6	1.0	106	.3	8.7	94	2.2
29-----	6.9	65	1.2	1.0	90	.2	4.6	84	1.0
30-----	4.9	62	.8	1.0	110	.3	3.0	98	.8
31-----	--	--	--	1.3	114	.4	--	--	--
Total-	638.3	--	327.2	182.4	--	1,797.5	187.8	--	2,176.5

s Computed by subdividing day.

t Less than 0.05 ton.

HEART RIVER BASIN--Continued

HEART RIVER NEAR SOUTH HEART, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2.4	90	0.6	0.4			0.9	58	0.1
2-----	2.1	75	.4	.3			1.0	116	.3
3-----	13	1,290	s 158	.3			3.2	117	1.0
4-----	34	11,700	s 1,040	.3			12	1,450	s 74
5-----	10	11,400	308	.3			32	10,700	s 914
6-----	5.3	8,300	119	.3	90	0.1	34	6,280	577
7-----	22	7,290	s 549	.3			19	933	s 54
8-----	14	6,050	s 245	.3			9.5	238	s 6.6
9-----	6.5	2,500	44	.3			5.2	50	.7
10-----	5.0	1,400	19	.3			3.2	60	.5
11-----	3.1	58	.5	.3			2.4	62	.4
12-----	2.2		.3	.3			1.7	68	.3
13-----	1.8		.4	.4			1.4	70	.3
14-----	1.7		.4	.4			1.2	54	.2
15-----	1.4		.4	.4			1.0	58	.2
16-----	1.2	85	.3	.4	78	.1	.9		
17-----	1.0		.5	.5			.9		
18-----	1.0		.7	.7			.9		
19-----	.9		.7	.7			.8		
20-----	.8		1.0	1.0			.8	54	.1
21-----	.7			8.3	100	s 3.4	.7		
22-----	.6			16	355	15	.7		
23-----	.6			14	233	s 9.5	.6		
24-----	.6			6.9	120	2.2	.7		
25-----	.5			3.9	190	2.0	.9	125	.3
26-----	.5	68	.1	3.7	324	s 3.5	.8	106	.2
27-----	.5			6.0	347	s 5.9	.6		
28-----	.5			2.6	137	1.0	.6		
29-----	.4			1.6	82	.4	.6	62	.1
30-----	.4			1.1	68	.2	.6		
31-----	.4			.9	64	.2	--	--	--
Total--	135.1	--	2,487.3	73.2	--	45.3	138.8	--	1,631.4

Total discharge for year (cfs-days) 10,901.2

Total load for year (tons) 15,340.5

s Computed by subdividing day.

HEART RIVER BASIN--Continued

HEART RIVER NEAR SOUTH HEART, N. DAK.--Continued

Particle-size analyses of suspended sediment, February to September 1951
(Methods of analysis: C, chemically dispersed; D, decantation; P, pipette; S, sieve; W, in native water;
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Instantaneous discharge (cfs)	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		0.350	0.500	1.000	
Feb. 20, 1951	5:40 p. m.	190	208	387	85	90	94	100									BWCM
Mar. 23	12:00 m.	512	145	658	79	89	93	94	94	98							BWCM
Mar. 25	8:55 a. m.	1,310	239	916	79	93	98	99	99	99	100						BWCM
Mar. 26	6:20 p. m.	2,010	429	897	51	66	76	86	89	92	96	100					BWCM
Mar. 28	6:20 p. m.	2,010	429	972	38	56	72	85	92	96	99	100					BNM
Mar. 28	11:30 a. m.	600	275	352	51	71	77	85	90	97	98	99		100			BWCM
Mar. 28	6:30 p. m.	58	404	1,670	87	95	99	99	99	99	100						BWCM
Apr. 9	3:40 p. m.	21	156	375	77	90	95	98	98	99	100						BWCM
May 3	11:15 a. m.	29	5,140	5,950	--	92	--	99	--	100	--						PWCM
June 3	3:50 p. m.	54	11,900	9,590	--	96	--	98	--	99	--						PWCM
June 5	4:55 p. m.	10	8,030	6,600	--	99	--	100	--	--	--						PWCM
July 4	7:15 a. m.	40	11,700	8,620	--	98	--	100	--	--	--						PWCM
July 8	6:50 a. m.	17	7,120	4,680	--	98	--	99	--	100	--						PWCM
Sept. 5	7:30 a. m.	37	10,600	4,040	--	99	--	99	--	100	--						SPWCM
Sept. 7	5:45 a. m.	23	1,300	853	97	99	100	--	--	--	--						BWCM

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.--1,240 square miles (revised), approximately.

RECORDS AVAILABLE.--Sediment records: March 1946 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 2,350 ppm Mar. 26; minimum daily, not determined.

Sediment loads: Maximum daily, 42,100 tons Mar. 27; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1946-51.--Sediment concentrations: Maximum daily, 5,910 ppm June 4, 1948; minimum daily, no flow Jan. 6 to Mar. 3, 1950.

Sediment loads: Maximum daily, 152,000 tons Apr. 17, 1950; minimum daily, 0 tons Jan. 6 to Mar. 3, 1950.

REMARKS.--Flow affected by ice Nov. 9 to Mar. 25. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	8.2			7.6			6.8		
2-----	11			7.9			6.6		
3-----	10			8.5			5.8		
4-----	10			8.2			5.6		
5-----	9.7			7.9	26	1	5.4		
6-----	12	26	1	7.3			5.0	58	1
7-----	11			7.3			4.7		
8-----	10			5.8			4.6		
9-----	9.7			6.0			4.7		
10-----	9.4			7.3			5.0		
11-----	9.4			7.6	26	(t)	5.6		
12-----	9.4			6.8			5.8		
13-----	9.4	34	1	6.6			6.6		
14-----	9.4			7.0			6.8		
15-----	8.2			4.6			6.6	68	1
16-----	7.9			8.2			6.2		
17-----	10	29	1	7.9			6.2		
18-----	9.1			7.6			6.2		
19-----	7.9			7.6	68	1	6.4		
20-----	8.8			7.3			6.6		
21-----	7.0			7.3			6.6		
22-----	8.5	20	(t)	6.6			6.8		
23-----	7.3			6.0			7.0		
24-----	7.6			5.4			7.0		
25-----	6.8			5.8			7.3		
26-----	8.5			6.2	92	2	7.3	83	2
27-----	9.1			6.2			7.6		
28-----	7.9	19	(t)	6.4			7.9		
29-----	8.2			6.6			7.6		
30-----	7.9			6.8			7.9		
31-----	7.9			--	--	--	7.9		
Total--	277.2	--	23	208.3	--	36	198.1	--	42

t Less than 0.50 ton.

HEART RIVER BASIN--Continued

HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	7.9			2			150		
2-----	8.2			2			100		
3-----	8.2			2			80	135	37
4-----	8.2			2			100		
5-----	7.9			2			80		
6-----	7.6			2			60		
7-----	7.3			2			50		
8-----	7.3	79	2	2	64	(t)	35		
9-----	7.3			2			20		
10-----	7.3			2			17		
11-----	7.3			2			17	51	4
12-----	7.0			2			18		
13-----	6.5			2			17		
14-----	6.5			2			15		
15-----	6.5			2			15		
16-----	6.5			2			15		
17-----	6.5			5	106	1	13		
18-----	6.5			5			10	81	3
19-----	6			30	36	3	10		
20-----	6			200	48	26	10		
21-----	6	75	1	220	78	46	15	40	2
22-----	6			200	60	32	100	50	14
23-----	6			170	66	30	1,500	330	1,340
24-----	5			120			1,800	360	1,750
25-----	5			80			4,500	1,790	21,700
26-----	5			130	101	38	6,450	2,350	40,900
27-----	5			200			7,500	2,080	42,100
28-----	4			160			6,150	1,870	31,100
29-----	4	92	1	--	--	--	3,560	1,730	16,600
30-----	3			--	--	--	1,620	1,060	4,640
31-----	2			--	--	--	1,030	760	2,110
Total--	193.5	--	46	1,552	--	335	35,057	--	162,496
	April			May			June		
1-----	710	540	1,040	58			26		
2-----	544	354	520	58			39		
3-----	440	356	423	56			47	85	9
4-----	426	370	426	51			47		
5-----	386	298	311	50			39		
6-----	315	242	206	49	42	6	32		
7-----	266	192	138	47			27		
8-----	234	170	a 110	46			24	75	5
9-----	190	140	a 70	44			20		
10-----	154	100	a 42	40			18		
11-----	129			37			16		
12-----	107			32			15		
13-----	98	93	26	35			15		
14-----	93			35			15		
15-----	81			31			15		
16-----	87			28	53	4	16	75	3
17-----	72			27			13		
18-----	67	42	8	26			12		
19-----	63			25			13		
20-----	60			24			15		
21-----	58			22			14		
22-----	58			21			20		
23-----	54	29	4	20			34		
24-----	52			17			37	83	6
25-----	54			16			33		
26-----	51			15	39	2	26		
27-----	59			15			169	600	sa 500
28-----	61	48	7	20			187	960	485
29-----	60			23			96	920	238
30-----	58			22			65	628	110
31-----	--	--	--	23			--	--	--
Total--	5,087	--	3,511	1,013	--	122	1,145	--	1,469

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

HEART RIVER BASIN--Continued

HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	52	464	65	3.1			13		
2-----	46	342	42	2.8			32	37	2
3-----	56	270	41	2.5	86	1	41		
4-----	55	158	23	2.2			29	63	6
5-----	44	128	15	2.0			28		
6-----	37			2.0			29		
7-----	32			9.1			23		
8-----	29	79	6	16	82	2	24	70	5
9-----	26			14			31		
10-----	25			9.0			24		
11-----	23			9.0			21		
12-----	20			11			19		
13-----	17			11			16		
14-----	14			12			15	78	3
15-----	13	85	3	9.0			12		
16-----	11			9.0	63	2	14		
17-----	11			8.5			14		
18-----	11			9.0			14		
19-----	22			11			12	66	2
20-----	32	99	7	14			12		
21-----	19			44			11		
22-----	13			54			11		
23-----	9.8			54	57	7	11	56	2
24-----	7.9			43			11		
25-----	7.4			34			11		
26-----	6.8			34			9.8		
27-----	5.8	80	2	23			9.8		
28-----	4.7			17	37	2	9.0	58	1
29-----	3.6			15			9.0		
30-----	3.6			13			8.5		
31-----	3.1			12			--	--	--
Total-	660.7	--	276	509.2	--	82	524.1	--	88

Total discharge for year (cfs-days) 46,425.1
 Total load for year (tons) 168,526

HEART RIVER BASIN--Continued

HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Particle-size analyses of suspended sediment, March to April 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	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	0.350	0.500	1.000	
Mar. 25, 1951	5:00 p. m.	4,500	1,830	1,300	29	37	44	53	65	79	87	93		95	97	BWCM
Mar. 26	7:10 p. m.	7,050	2,980	2,020	--	36	--	52	--	80	90	97		100		SPWCM
Mar. 27	3:35 p. m.	7,350	2,570	2,110	27	34	43	53	62	81	91	98		100		SPWCM
Mar. 27	3:35 p. m.	7,350	2,570	2,250	15	22	31	40	54	80	92	98		100		SPWCM
Mar. 29	12:20 p. m.	3,440	1,960	3,020	--	36	--	50	--	76	87	98		100		SPWCM
Mar. 31	12:10 p. m.	972	844	1,780	--	46	--	63	--	88	96	100		--		SPWCM
Apr. 3	12:30 p. m.	366	354	778	33	54	64	78	86	98	98	99		100		BWCM
Apr. 3	12:30 p. m.	386	354	810	29	39	55	74	86	96	98	100		--		BNM

a Mean daily discharge.

HEART RIVER BASIN--Continued

HEART RIVER BELOW HEART BUTTE DAM, NEAR GLEN ULLIN, N. DAK.

LOCATION.--Three hundred feet downstream from Heart Butte Dam, half a mile upstream from gaging station, 10½ miles upstream from Heart Butte Creek, 14 miles south of Glen Ullin, Morton County, and 14 miles north of Elgin.

DRAINAGE AREA.--1,710 square miles (revised), approximately (above gaging station).

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1947.

water temperatures: March to August 1947.

Sediment records: October 1950 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 248 ppm Apr. 2, 6; minimum daily, not determined.

Sediment loads: Maximum daily, 2,170 tons Apr. 2; minimum daily, less than 0.50 ton on many days.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209. No inflow between sampling point and gaging station except during periods of heavy local inflow.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	46			18			18		
2-----	46			18			18		
3-----	15			18			18		
4-----	5			18			18		
5-----	19			18			18		
6-----	32			18		e 1	18		
7-----	43			18			18		
8-----	43	--	e 1	18			18		
9-----	22			18			18		
10-----	4			18			18		
11-----	3			18			18		
12-----	3			18			18		
13-----	26			18			18		
14-----	41	--		18			18		
15-----	41	--		18			18		
16-----	41	--		18		(t)	18		(t)
17-----	41	--		18			18		
18-----	41	--		18			18		
19-----	41	--		18			18		
20-----	41	--		18			18		
21-----	41	--		16			18		
22-----	41	--		18			18		
23-----	41	--	e 1	18			18		
24-----	41	--		18			18		
25-----	41	12	.	18		(t)	18		
26-----	41	--		18			18		
27-----	41	--		18			18		
28-----	41	--		18			18		
29-----	31	--		18			18		
30-----	18	14		18	2		18		
31-----	18	--		--	--	--	18		
Total-	975.5	--	31	538		15	558		3

e Estimated.

t Less than 0.50 ton.

HEART RIVER BASIN--Continued

HEART RIVER BELOW HEART BUTTE DAM, NEAR GLEN ULLIN, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	18			18			18	--	
2-----	18			18			18	--	
3-----	18			18			18	--	
4-----	18			18			18	--	
5-----	18			18			18	--	
6-----	18			18			18	--	
7-----	18			18			18	--	
8-----	18			18			18	--	
9-----	18			18			18	--	
10-----	18			18			18	--	
11-----	18			18			18	--	
12-----	18			18			18	--	
13-----	18			18			18	--	(t)
14-----	18			14			18	--	
15-----	18			8.8		(t)	15	--	
16-----	18		(t)	18			14	--	
17-----	18			18			14	--	
18-----	18			18			14	--	
19-----	18			18			14	--	
20-----	18			18			14	--	
21-----	18			18	3		14	--	
22-----	18			18			15	--	
23-----	18			18			14	--	
24-----	18			18			15	--	
25-----	18			18			11	--	
26-----	18			18			828	25	s 84
27-----	18			18			2,950	60	478
28-----	18			18			3,320	82	735
29-----	18			--	--	--	3,420	172	1,590
30-----	18			--	--	--	3,430	216	2,000
31-----	18			--	--	--	3,360	236	2,150
Total-	558		2	490.8		4	17,734	--	7,040
Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3,310	236	2,110	92	68	17	73		
2-----	3,240	248	2,170	95	72	18	73	23	a 5
3-----	3,140	237	2,010	89	75	18	73		
4-----	2,850	228	1,750	86	75	17	41	17	2
5-----	2,130	244	1,400	79	72	15	8.6	--	
6-----	1,590	248	1,060	73	73	14	8.6	--	
7-----	1,230	247	820	70	71	13	10	--	
8-----	970	237	621	68	65	12	11	19	(t)
9-----	790	225	480	65	64	11	9.3	--	
10-----	654	210	371	62	60	10	10	--	
11-----	535	192	277	59	58	9	9.3	--	
12-----	442	187	223	46	--	--	9.3	--	
13-----	374	175	177	51	--	--	9.3	--	
14-----	326	167	147	54	--	--	9.3	--	
15-----	266	141	101	51	--	--	9.3	--	
16-----	230	134	83	48	--	--	11	17	(t)
17-----	201	124	67	43	--	e 3	8.6	--	
18-----	180	115	56	65	19	--	10	--	
19-----	160	125	54	86	--	--	10	--	
20-----	148	108	43	70	--	--	54	--	e 2
21-----	133	112	40	65	--	--	105	--	
22-----	122	100	33	70	--	--	102	--	
23-----	105	100	28	82	--	--	102	--	
24-----	98	99	26	92	--	--	102	--	e 4
25-----	92	97	24	89	30	--	105	14	
26-----	89	94	23	76	--	--	102	--	
27-----	95	89	23	70	--	e 6	108	--	
28-----	92	84	21	70	--	--	105	--	
29-----	76	43	9	73	--	--	102	37	a 10
30-----	86	62	14	70	--	--	98	--	
31-----	--	--	--	70	--	--	--	--	--
Total-	23,754	--	14,261	2,179	--	244	1,488.6	--	84

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

HEART RIVER BASIN--Continued

HEART RIVER BELOW HEART BUTTE DAM, NEAR GLEN ULLIN, N. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	95	--		125	--		0.3		
2-----	95	--		110	--		.4		
3-----	95	--		105	18		.5		
4-----	95	--		148			.8		
5-----	95	--		144	--	e 6	.6	--	(t)
6-----	95	--	e 8	144	--		.5		
7-----	95	31		144	--		.8		
8-----	102	--		144	--		140	17	a 7
9-----	98	--		144	--		144		
10-----	98	--		144	--	e 7	45	--	e 2
11-----	98	--		144	17		.6		
12-----	102	--		144	--		.4		
13-----	102	--		49	--	e 2	.4		(t)
14-----	105	17		.1	--		.4	20	
15-----	105	--		.1	--		140		
16-----	108	--	e 5	.1	--		261	--	
17-----	108	--		.2	--		261	--	
18-----	108	--		.3	16		257	--	e 10
19-----	108	--		.4	--	(t)	257	--	
20-----	108	--		.4	--		257	--	
21-----	105	17		.3	--		125	16	
22-----	105	--		.3	--		56	--	
23-----	105	--	e 5	.4	--		56	--	
24-----	102	--		.4	--		100	--	
25-----	102	--		1.1	11		144	--	
26-----	102	--		.3	--		93	--	e 3
27-----	105	14		.2	--		56	--	
28-----	105	--		.2	--	(t)	56	17	
29-----	105	--	e 4	.2	--		56	--	
30-----	105	--		.3	--		56	--	
31-----	92	--		.3	8		--	--	--
Total--	3,148	--	179	1,694.6	--	79	2,568.5	--	113
Total discharge for year (cfs-days).....									55,687.0
Total load for year (tons).....									22,055

e Estimated.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

HEART RIVER BASIN--Continued

HEART RIVER BELOW HEART BUTTE DAM, NEAR GLEN ULLIN, N. DAK.--Continued

Particle-size analyses of suspended sediment, April 1951

(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 of collection	Time	Instantaneous discharge (cfs)	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		0.350	0.500	1.000
Apr. 2, 1951.....	2:05 p.m.	3,210	228	1,630	92	98	99	99	99	99	100					BWCM
Apr. 2.....	2:05 p.m.	3,210	228	1,630	67	91	--	99	100	--						BNM
Apr. 9.....	12:35 p.m.	784	212	3,100	90	96	98	98	99	100						BWCM

CANNONBALL RIVER BASIN
MISCELLANEOUS ANALYSES OF STREAMS IN CANNONBALL RIVER BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Boiron (B)	Residue at 180°C	Tons per acre-foot	Calcium	Non-carbonate			
CANNONBALL RIVER NEAR NEW LEIPZIG																					
Oct. 13, 1950	14	8.0	0.02	69	30	171		396		318	7.5	0.1	1.6	0.30	812		297	0	56	1,190	8.0
Nov. 9,	9.1	8.3	.06	75	36	198		453		368	8.5	.3	1.2	--	932		337	0	56	1,370	7.9
Dec. 8,	7	14	.02	53	50	253		472		460	12	.6	3.9	.55	1,100	1,080	337	0	62	1,500	7.8
CEDAR CREEK NEAR PRETTY ROCK																					
Oct. 12, 1950,	8.6	11	0.02	87	42	234		392		540	10	0.1	2.3	--	1,120	1,120	391	70	57	1,570	7.8
Nov. 8,	8.2	7.8	.04	85	53	258		420		603	12	.6	1.0	0.43	1,260	1,230	431	87	57	1,660	7.8
Dec. 7,	5.5	15	.04	67	74	366		441		845	15	.6	2.7	.58	1,610	1,500	470	108	63	2,100	7.9

GRAND RIVER BASIN

NORTH YORK GRAND RIVER AT HALEY, N. DAK.

LOCATION.--At gaging station at bridge on county road about 300 feet south of Post Office at Haley, Bowman County, and half a mile north of South Dakota State line.

DRAINAGE AREA.--509 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1951.

EXTREMES, February to September 1951.--Dissolved solids: Maximum, 1,840 ppm June 8 to July 4; minimum, 194 ppm July 29-30.

Hardness: Maximum, 265 ppm Mar. 10-16; minimum, 53 ppm Mar. 26-28.

Specific conductance: Maximum daily, 3,180 microhos June 11; minimum daily, 275 microhos Mar. 26.

Water temperatures (March to September 1951): Maximum, 76°F Aug. 4, 6; minimum, freezing point on several days in March.

REMARKS.--Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Daily samples for chemical analysis composited by discharge. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids				Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million		Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
															Residue at 180°C	Sum							

Nov. 6, 1950 a...	2.1	5.8	0.04	39	25	478	6.4	546	0	800	7.0	0.8	1.0	1.1	1,690	1,630	2.30	9.58	200	0	83	2,390	8.0
Dec. 5 a.....	1.5	8.4	.04	30	38	636	8.2	644	0	1,060	11	1.0	2.1	1.4	2,140	2,120	2.91	5.78	232	0	85	2,850	8.1
Jan. 2, 1951 a...	.2	11	.45	64	39	600	7.3	726	0	1,020	10	.8	.9	1.1	2,140	2,110	2.91	8.67	320	0	80	2,850	8.0
Feb. 25-Mar. 9.				44	29	417	5.8	533	0	665	7.5	.5	2.8	.86	1,470	1,450	2.00	.79	228	0	79	2,110	7.9
Mar. 10-16.....	.54	13	.13	57	30	467	6.6	610	0	730	8.0	.6	1.8	.94	1,620	1,620	2.20	2.36	265	0	79	2,310	8.0
Mar. 17-19.....	1	8.8	.06	25	11	80	19	195	0	125	5.0	.6	2.0	.86	1,040	1,040	1.55	1.09	106	0	57	592	7.2
Mar. 20-21.....	3.5	16	.06	48	21	251	28	450	0	360	9.0	.6	3.0	.84	1,040	960	1.41	9.83	208	0	69	1,470	7.5
Mar. 22-24.....	86.7	7.6	.18	22	9.4	108	12	137	0	184	4.0	4	5.4	.21	638	--	.60	103	94	0	68	649	7.4
Mar. 25-26.....	700	7.2	--	15	5.4	73	12	104	0	127	2.0	--	6.1	.19	342	--	.47	646	60	0	68	460	7.1
Mar. 26-28.....	323	7.4	.22	16	3.2	41	8.0	82	0	75	1.5	.6	2.9	.13	320	--	.30	192	53	0	59	311	7.0
Mar. 29-Apr. 1.	158	7.8	.18	17	5.7	66	7.8	106	0	124	1.5	.5	2.7	.16	314	--	.43	134	66	0	65	449	7.2
Apr. 2-6.....	35.4	7.4	.04	22	8.3	110	6.6	160	0	194	3.5	.5	3.2	.23	454	--	.62	43.4	89	0	71	681	7.3
Apr. 7-15.....	16.3	8.6	.05	31	12	186	6.2	248	0	318	4.0	.5	2.9	.35	692	--	.94	30.5	125	0	75	1,040	7.6
Apr. 16-May 14.	7.98	8.4	.03	39	21	305	7.4	402	0	610	6.5	.5	1.9	.65	1,100	1,100	1.50	23.7	183	0	77	1,920	8.1
May 15-June 3.	3.58	8.4	.02	42	24	376	8.1	486	0	605	7.0	.5	2.2	.78	1,320	1,320	1.80	12.8	204	0	79	1,920	8.1
June 4-7.....	31.5	5.4	.03	32	26	418	8.0	475	6	700	7.0	.5	1.9	.85	1,470	1,440	2.00	125	187	0	82	2,120	8.2
June 8-July 4...	4.30	7.2	.02	36	29	558	8.0	571	0	900	5.5	.4	2.4	1.1	1,840	1,830	2.50	21.4	210	0	85	2,600	7.9
July 5-6.....	103	6.6	.06	22	24	500	8.2	503	0	780	4.5	.4	3.1	1.0	1,620	1,600	2.20	451	153	0	87	2,320	8.1
July 7-10.....	30.5	7.8	.10	24	16	286	6.7	333	0	445	3.0	.2	2.5	.57	980	--	1.33	80.7	127	0	82	1,450	7.4
July 11-28.....	3.42	9.0	.04	30	20	278	7.0	376	0	443	3.5	.2	2.5	.64	996	--	1.35	9.20	156	0	79	1,480	7.6
July 29-30.....	1,218	6.2	.10	15	5.0	38	5.9	91	0	65	.5	.2	4.0	.18	194	--	.68	58	58	0	56	305	7.0
Aug. 1-13.....	289	10	--	18	6.6	58	6.2	138	0	92	1.0	.2	3.0	.18	264	--	.36	206	72	0	61	423	7.4
Aug. 14-Sept. 5.	12.5	13	.06	46	22	296	7.4	320	0	325	5.0	.5	1.7	.75	1,120	1,110	1.52	37.8	205	0	75	1,630	8.0
Sept. 6-8.....	14.1	9.4	.06	35	10	178	6.7	261	0	303	1.0	.6	2.4	.48	718	--	1.98	273	130	0	74	1,960	7.8
Sept. 9-30.....	10.8	9.4	.04	54	19	229	7.1	352	0	365	3.0	.5	2.1	.49	860	--	1.17	25.1	162	0	74	1,960	8.0
Weighted average b.....	38.3	8.1	0.08	22	9.0	119	7.4	617	--	198	2.0	0.4	3.4	0.30	475	--	0.65	49.1	92	0	72	698	--

a Not included in weighted average.

b For period of daily sampling only. Represents 97 percent of runoff for water year October 1950 to September 1951.

c Includes carbonate as bicarbonate.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

GRAND RIVER BASIN--Continued

NORTH FORK GRAND RIVER AT HALEY, N. DAK.--Continued

Temperature (°F) of water, March to September 1951
 /Once-daily temperature measurement at approximately 2 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1					--	36	34	85	45	58	75	67
2					--	35	34	55	44	60	74	67
3					--	34	34	60	50	61	74	62
4					--	36	45	63	61	64	76	65
5					--	34	44	62	64	67	75	63
6					--	34	44	54	68	72	76	64
7					--	32	45	60	68	74	75	65
8					--	32	46	58	65	67	73	65
9					--	32	40	56	65	66	73	64
10					--	32	39	58	64	64	73	65
11					--	32	39	58	66	64	71	64
12					--	32	40	65	66	66	67	64
13					--	32	40	60	67	68	64	58
14					--	34	45	60	68	74	64	55
15					--	34	36	68	68	74	67	54
16					--	32	45	62	68	66	74	58
17					--	32	45	63	65	70	--	59
18					--	32	45	66	66	72	72	60
19					--	32	35	63	64	70	72	60
20					--	32	36	60	64	70	66	58
21					--	32	36	60	63	68	65	52
22					--	32	42	66	65	69	70	51
23					--	32	40	66	65	70	70	52
24					--	34	45	64	63	70	73	53
25					--	34	--	48	58	63	74	68
26					--	36	34	54	55	66	70	65
27					--	36	34	58	58	64	72	64
28					--	34	34	64	64	58	72	66
29					--	34	66	58	58	--	64	44
30					--	34	68	50	58	74	66	54
31					--	34	--	48	--	75	63	--
Average					--	33	44	60	63	69	70	58

GRAND RIVER BASIN--Continued

NORTH FORK GRAND RIVER AT HALEY, N. DAK.--Continued

Periodic determinations of suspended-sediment discharge, December 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Dec. 5, 1950	a 1	12	(t)
Jan. 2, 1951	a 1.5	21	0.1
Feb. 23	a .2	12	(t)
Mar. 23	a 32	52	4.5
Mar. 24	a 317	130	111
Apr. 6	27	72	5.2
May 1	7.5	32	.6
May 21	2.9	41	.3
June 15	3.6	24	.2
July 11	17	68	3.1
July 30	1,850	1,140	5,690
July 31	490	1,310	1,730
Aug. 13	14	65	2.5
Aug. 29	4.7	35	.4
Sept. 17	7.5	58	1.2

t Less than 0.05 ton.

a Mean daily discharge.

GRAND RIVER BASIN--Continued

NORTH FORK GRAND RIVER AT HALEY, N. DAK.--Continued

Particle-size analyses of suspended sediment, March to July 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	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	0.350		0.500	1.000
Mar. 24, 1951	4:20 p. m.	a 317	130	269	50	64	76	88	91	95	97	99		99	100
July 30	11:40 a. m.	1,850	1,140	2,480	78	92	96	99	99	100					
July 31	3:30 p. m.	490	1,310	2,930	92	97	99	100	--	--					

a Mean daily discharge.

GRAND RIVER BASIN--Continued
NORTH FORK GRAND RIVER NEAR WHITE BUTTE, S. DAK.

LOCATION.--At gaging station at county highway bridge, a quarter of a mile upstream from nearest tributary, 9½ miles south of White Butte, Perkins County, and 13 miles upstream from confluence with South Fork.
DRAINAGE AREA.--1,190 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Residue at 180°C	Tons per acre-foot	Calcium	Non-carbonate magnesium			
Oct. 12, 1950.....	5.0	8.3	0.06	62	49	417		371	5	890	13	0.7	0.7	0.50	1,650	1,650	354	42	72		2,260	8.2
Nov. 8.....	5.7	5.4	.10	64	48	413		413	0	920	13	.6	1.4	.72	1,720	1,700	358	19	73		2,370	8.0
Dec. 5.....	4.1	1.6	.10	62	608	608		1,200	7	1,200	16	1.9	1.4	--	2,250	2,220	382	0	78		3,070	8.2
Jan. 6, 1951.....	3.5	8.6	.04	81	61	606		662	0	1,180	15	.7	1.6	1.1	2,450	2,280	311	478	0	73	3,150	7.9
Feb. 7.....	1.2	7.4	.20	120	68	665		762	0	1,320	17	.9	1.4	.96	2,610	2,580	355	580	0	71	3,370	7.9
Mar. 23.....	200	4.3	--	23	8.9	72		112	0	141	5.0	.5	2.2	.32	356	--	94	2	62		495	7.0
Apr. 4.....	90	--	--	--	101		--	159	0	195	2.5	--	--	.20	--	--	--	--	82		875	7.1
Apr. 27.....	20	--	--	--	230		--	340	0	450	6.0	--	--	.48	--	--	--	--	66		1,460	8.1
May 3.....	21	--	--	--	275		--	373	0	538	7.0	--	--	.55	--	--	--	--	68		1,630	7.7
May 23.....	12	--	--	--	364		--	445	0	688	9.5	--	--	.74	--	--	--	--	72		1,990	7.7
June 17.....	10	--	--	--	428		--	463	0	785	8.5	--	--	.88	--	--	--	--	77		2,230	7.7
June 28.....	7.0	--	--	--	441		--	418	30	810	9.0	--	--	.94	--	--	--	--	77		2,240	8.2
July 17.....	12	--	--	--	436		--	480	0	775	7.5	--	--	.99	--	--	--	--	78		2,310	8.0
July 31.....	1,390	--	--	--	458		--	457	0	835	9.0	--	--	.98	--	--	--	--	79		2,350	7.6
Aug. 15.....	29	--	--	--	202		--	331	0	328	5.5	--	--	.55	--	--	--	--	71		1,170	8.0
Sept. 12.....	40	--	--	--	345		--	429	5	540	5.0	--	--	.85	--	--	--	--	81		1,730	8.2

GRAND RIVER BASIN--Continued

NORTH FORK GRAND RIVER NEAR WHITE BUTTE, S. DAK.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Oct. 12, 1950	5.0	39	0.5
Nov. 8	5.7	31	.5
Dec. 5	4.5	7	.1
Jan. 4, 1951	3.5	15	.1
Feb. 7	1	39	.1
Mar. 23	197	101	54
Apr. 4	86	119	28
Apr. 18	25	42	2.8
May 3	20	31	1.7
May 23	12	37	1.2
June 17	10	41	1.1
July 17	12	64	2.1
July 31	1.0	52	.1
July 31	1,370	1,080	3,990
Aug. 15	29	60	4.7
Sept. 12	40	49	5.3

GRAND RIVER BASIN--Continued
NORTH FORK GRAND RIVER NEAR WHITE BUTTE, S. DAK.--Continued

Particle-size analyses of suspended sediment, April to July 1951
(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 of collection	Time	Instantaneous discharge (cfs)	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		0.350	0.500	1.000
Apr. 4, 1951	3:45 p. m.	86	119	596	88	94	97	100							BWCM
July 31	5:30 p. m.	1,370	1,060	2,430	56	70	82	93	98	99	100				BWCM BWCM

GRAND RIVER BASIN--Continued
SOUTH FORK GRAND RIVER NEAR CASH, S. DAK.

LOCATION.--At gaging station at county highway bridge, 1 mile upstream from Little Nasty Creek, 4 miles north of Cash, Perkins County, 10 miles south of Lodgepole, 12 miles northwest of Bison, and 16 miles downstream from Big Nasty Creek.
DRAINAGE AREA.--1,350 square miles.
RECORDS AVAILABLE.--Chemical analyses. March 1950 to September 1951.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951																							
Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million		Tons per acre-foot	Calcium magnesium	Non-carbonate				
															Residue at 180°C	Sum							
Oct. 10, 1950	20	12	0.04	15	5.0	414		642	15	378	6.5	0.6	3.9	0.30	1,190	1,170	1.62	58	0	94	1,740	8.4	
Nov. 7	10	7.4	.04	16	9.7	509		718	33	503	12	.6	.9	.30	1,520	1,450	2.07	80	0	93	2,280	8.4	
Dec. 5	2	15	.04	16	26	1,130		1,140	159	1,310	21	.8	.9	--	3,240	3,240	4.41	148	0	94	4,480	8.8	
Jan. 3, 1951	3	10	.10	24	19	888		1,160	37	990	17	.8	1.0	.57	2,560	2,560	3.48	138	0	93	3,620	8.4	
Feb. 7	1	12	.10	59	26	783		1,170	0	950	18	.7	2.3	.59	2,520	2,440	3.43	254	0	87	3,390	8.1	
Apr. 5	58	--	--	--	--	237		377	0	255	5.0	--	--	.18	--	--	--	--	--	--	89	1,130	7.7
May 1	29	--	--	--	--	502		742	9	525	9.0	--	--	.41	--	--	--	--	--	--	92	2,170	8.2
May 22	24	--	--	--	--	428		568	0	533	5.5	--	--	.44	--	--	--	--	--	--	90	1,940	8.0
June 16	14	--	--	--	--	508		731	8	545	8.5	--	--	.47	--	--	--	--	--	--	93	2,200	8.2
June 28	14	--	--	--	--	540		726	49	560	8.0	--	--	.46	--	--	--	--	--	--	92	2,290	8.7
July 16	9.3	--	--	--	--	510		660	39	558	8.0	--	--	.49	--	--	--	--	--	--	93	2,210	8.7
July 31	140	--	--	--	--	139		251	0	122	1.0	--	--	.19	--	--	--	--	--	--	90	657	7.6
Aug. 14	16	--	--	--	--	462		616	37	485	8.5	--	--	.47	--	--	--	--	--	--	93	2,020	8.7
Sept. 18	9.3	--	--	--	--	404		562	27	423	7.5	--	--	.33	--	--	--	--	--	--	92	1,780	8.6

Chemical analyses, in parts per million, water year October 1950 to September 1951

GRAND RIVER BASIN--Continued

SOUTH FORK GRAND RIVER NEAR CASH, S. DAK.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Oct. 10, 1950	20	2,060	111
Nov. 7	10	114	3.1
Dec. 5	2	65	.4
Jan. 3, 1951	3	96	.8
Feb. 7	1	68	.2
Feb. 19	2	103	.6
Mar. 22	20	59	3.2
Mar. 23	100	162	44
Mar. 24	500	798	1,080
Mar. 30	171	1,260	582
Apr. 5	75	1,320	267
Apr. 17	21	198	11
May 1	29	309	24
May 11	19	303	3.7
May 22	24	298	19
June 16	14	107	4.0
July 16	9	158	3.8
July 23	7.9	115	25
July 30	11	84	2.5
July 31	140	3,510	1,330
Aug. 14	16	138	6.0
Sept. 18	9.3	124	3.1

GRAND RIVER BASIN--Continued
SOUTH FORK GRAND RIVER NEAR CASH, S. DAK.--Continued

Particle-size analyses of suspended sediment; March to July 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Mar. 24, 1951...	6:10 p. m.	500		798	1,720	--	89	--	97	--	100					PWCM
Mar. 30	12:20 p. m.	171		1,260	1,810	82	88	92	97	97	98					PWCM
Mar. 30	12:20 p. m.	171		1,260	1,910	9	10	90	97	97	99					PN
Apr. 5	2:50 p. m.	75		1,320	2,110	--	93	--	97	--	98					PWCM
July 31	10:45 p. m.	140		3,510	5,520	--	98	--	99	--	100					SPWCM

GRAND RIVER BASIN--Continued

GRAND RIVER NEAR WAKPALA, S. DAK.

LOCATION.--At gaging station at bridge on U.S. Highway 12, 5 miles west of Wakpala, Corson County, 8 miles upstream from Deep Bank Creek, and 21 miles upstream from mouth.

DRAINAGE AREA.--5,510 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: March to September 1951.

EXTREMES, March to September 1951.--Dissolved solids: Maximum, 1,120 ppm May 25 to June 2; minimum, 184 ppm Mar. 24-25.

Hardness: Maximum, 286 ppm May 25 to June 2; minimum, 43 ppm Mar. 24-25.

Specific conductance: Maximum daily, 1,920 micromhos May 26, 28; minimum daily, 181 micromhos Mar. 24.

REMARKS.--Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Daily samples for chemical analysis composited by discharge. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, March to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carb- onate (CO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids			Hardness as CaCO ₃		Per- cent so- dium	Specific conduct- ance (micro- mhos at 25° C)	pH	Color	
															Parts per million	Tons per acre- foot	Tons per day	Calcium	Non-carbon- ate					
																								Residue at 180° C	Sum
Mar. 24-25, 1951.....	30	10	0.02	12	3.2	17	8.6	59	0	36	2.0	0.2	2.7	0.19	184	--	14.9	43	0	41	187	6.8	160	
Mar. 26-30	5,156	13	.17	26	5.1	41	3.4	132	0	64	2.5	.2	2.4	.08	282	--	3,930	86	0	50	349	7.3	120	
Mar. 31-...																								
Apr. 11...	382	9.7	.01	32	9.7	92	5.2	181	0	158	5.0	.2	2.2	.17	452	--	.61	466	120	0	61	632	7.7	24
Apr. 12-15	102	12	.01	50	16	142	5.9	262	0	253	7.5	.3	1.7	.14	680	--	.92	187	190	0	61	959	7.8	19
Apr. 16-...																								
May 24-...	61.7	12	.01	71	26	237	7.7	369	0	450	12	.2	1.0	.20	1,060	999	1.44	177	282	0	64	1,450	8.1	12
May 25-...																								
June 2....	41.7	13	.02	65	30	251	8.8	299	6	565	12	.7	1.8	.30	1,120	1,100	1.52	126	286	31	65	1,570	8.2	7
June 4,	720	18	.08	61	21	276	9.6	376	0	493	14	.4	4.6	.31	1,090	1,080	1.48	238	0	71	1,600	7.5	23	
June 5-7...	289	21	.20	37	9.1	165	7.1	362	14	162	6.0	.8	8.4	.29	632	--	.86	493	130	0	72	924	8.2	80
June 8...	688	22	.10	25	8.1	161	6.5	274	0	206	6.0	.4	5.4	.21	576	--	.78	1,070	96	0	77	879	7.5	45
June 9-14...	338	15	.12	23	6.0	101	4.8	193	0	143	2.0	.5	2.9	.35	396	--	.54	361	82	0	71	593	7.9	40
June 15-20	491	13	.04	27	6.9	102	5.1	203	0	150	3.0	.4	2.7	.20	418	--	.57	554	96	0	68	624	7.9	35
June 21-22	793	29	.16	26	5.6	112	5.5	272	0	95	5.0	.4	7.4	.23	446	--	.61	955	88	0	72	643	7.7	60
June 23-...																								
July 10...	173	15	.04	33	9.4	146	5.6	248	0	228	5.0	.4	4.2	.18	566	--	.77	264	121	0	71	836	8.0	45
July 11-28...	64.4	16	.02	61	21	232	9.1	308	18	468	9.0	.3	3.8	.35	1,010	990	1.37	176	240	0	67	1,430	8.3	23
July 30-...																								
Aug. 29...	49.1	20	.02	42	11	179	7.1	262	10	303	7.0	.3	1.7	.22	732	--	1.00	97.0	152	0	71	1,080	8.5	43
Aug. 30...																								
Sept. 1...	1,513	20	.02	30	7.8	111	5.2	208	0	165	3.0	.4	1.6	.14	450	--	.61	1,840	107	0	68	683	7.6	42
Sept. 2-10...	417	15	.02	20	4.4	73	4.4	161	0	97	3.0	.4	1.8	.10	307	--	.42	346	68	0	68	473	7.6	40
Sept. 11-28	60.0	15	.02	45	12	147	7.0	272	0	264	7.0	.3	1.5	.14	652	--	.89	108	162	0	65	976	7.8	30
Weighted average	308	15	0.10	31	8.0	91	4.7	b 191	--	146	4.0	0.3	2.6	0.14	434	--	0.59	361	111	0	63	604	--	--

b Includes carbonate as bicarbonate.

a Represents 95 percent of runoff for water year October 1950 to September 1951.

GRAND RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN GRAND RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃	Percent sodium	Specific conductance (micro-mhos at 25°C)		
														Parts per million		Tons per acre-foot					
														Residue at 180°C	Sum						
GRAND RIVER AT SHADEHILL																					
Oct. 11, 1950	0.4	11	0.10	24	11	306	499	14	280	32	0.8	0.5	0.34	930	1.26	1.26	107	0	86	1,380	8.4
Nov. 8.....	.3	13	.04	32	15	322	597	0	288	36	1.0	.4	.99	1,010	1,000	1.37	142	0	83	1,540	8.0

GRAND RIVER AT SHADEHILL

MOREAU RIVER BASIN

MOREAU RIVER AT BIXBY, S. DAK.

LOCATION.--At gaging station at county highway bridge, a quarter of a mile east of Bixby, Perkins County, and 2½ miles downstream from Bixby dam site.
DRAINAGE AREA.--1,570 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1949 to September 1951.

Water temperatures: April 1949 to September 1951 (discontinued).

Sediment records: April 1949 to September 1951 (discontinued).

EXTREMES, 1950-51.--Dissolved solids: Maximum, 2,680 ppm Dec. 1-25; minimum, 386 ppm July 5.

Hardness: Maximum, 421 ppm June 6; minimum, 53 ppm July 5.

Specific conductance: Maximum daily, 4,300 microhmhos Dec. 7; minimum daily, 454 microhmhos Mar. 24.

Water temperatures: Maximum, 90°F Aug. 6; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 21,500 ppm May 29; minimum daily, not determined.

Sediment loads: Maximum daily, 18,600 tons Aug. 13; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1949-51.--Dissolved solids: Maximum, 3,100 ppm Dec. 1-21, 1949; minimum, 148 ppm Mar. 27, 1949.

Hardness: Maximum, 425 ppm May 6-9, 1949; minimum, 28 ppm Mar. 8, 27, 1949.

Specific conductance: Maximum daily, 5,360 microhmhos Dec. 21, 1949; minimum daily, 168 microhmhos Mar. 27, 1949.

Water temperatures: Maximum, 90°F Aug. 6, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 21,500 ppm Sept. 21, 1950, May 29, 1951; minimum daily, no flow on many days during 1949-50.

Sediment loads: Maximum daily, 169,000 tons Apr. 15, 1950; minimum daily, 0 tons on many days during 1949-50.

REMARKS.--Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Neb. Flow affected by ice Nov. 8 to Apr. 4. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

MOREAU RIVER BASIN

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Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids				Hardness as CaCO ₃	Percent sodium carbonate	Specific conductance (microhmhos at 25°C)	pH	
														Boiling residue at 180°C	Parts per million		Tons per acre-foot					Tons per day
															Residue	Sum						
Oct. 1-31, 1950	6.36	10	0.04	27	22	410	6.2	543	0	570	11	0.5	1.5	0.10	1,360	1,330	1.85	160	0	84	1,910	8.1
Nov. 1-30	5.27	12	.04	41	27	618	7.1	753	15	825	16	.5	.7	.20	1,940	1,930	2.64	212	0	86	2,670	8.3
Dec. 1-25	2.52	14	.10	66	33	824	9.4	1,010	30	1,140	29	.6	1.3	.50	2,690	2,640	3.64	300	0	85	3,900	8.3
Dec. 26-Jan. 31, 1951	3.74	10	.10	81	34	740	6.6	980	18	1,050	22	.5	1.0	.47	2,540	2,450	3.45	340	0	82	3,540	8.3
Feb. 1-28	.92	10	.10	85	35	636	6.2	758	16	1,020	22	.6	.8	.48	2,240	2,210	3.05	358	0	77	3,130	8.2
Mar. 1-5	1.50	11	.10	89	38	656	6.1	820	14	970	23	.6	.9	.40	2,420	2,320	3.29	378	0	78	3,260	8.2
Mar. 6-22	1.54	11	.10	77	42	644	5.7	886	24	990	25	.6	1.1	.45	2,340	2,260	3.18	364	0	79	3,180	8.3
Mar. 23-31	1.68	9.0	.10	34	9.5	196	4.8	262	0	330	7.5	.6	1.8	.15	772	---	1.05	124	0	76	1,130	8.1
Apr. 1-8	37.8	9.8	.03	28	13	213	4.3	258	0	350	6.0	.3	2.0	.26	754	---	1.03	122	0	78	1,120	7.9
Apr. 9-May 8	10.7	8.2	.04	40	19	366	5.0	452	0	585	11	.4	1.5	.29	1,260	1,260	1.71	136	0	81	1,820	8.1
May 9-11	24.0	12	.12	34	11	374	6.6	458	0	588	4.5	.5	2.5	.31	1,250	1,240	1.70	129	0	86	1,800	8.1
May 12-27	9.39	6.9	.03	26	21	524	6.7	500	19	790	13	.6	1.0	.43	1,660	1,660	2.28	153	0	88	2,350	8.4
May 28-June 1	38.2	21	.06	25	9.8	333	6.6	392	0	508	7.5	.6	4.1	.18	1,130	1,110	1.54	103	0	87	1,670	7.9

MOREAU RIVER BASIN--Continued

MOREAU RIVER AT BIXBY, S. DAK.--Continued

Chemical analyses, in parts per million, water year October 1950 to September 1951.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
June 2-5, 1951	138	16	0.04	18	4.1	246	4.9	338	0	310	3.5	0.5	5.2	0.16	782	1.06	291	62	0	89	1,190	8.2
June 6	102	15	.06	91	4.7	482	8.8	290	0	1,180	11	.4	3.4	.19	2,050	2.79	565	421	183	71	2,720	8.1
June 7-9	46.0	15	.04	52	25	352	9.2	290	10	720	7.5	.5	6.4	.16	1,350	1.84	168	231	0	76	1,920	8.3
June 10-13	16.3	10	.05	59	31	387	7.2	388	--	765	10	--	.1	--	--	--	--	276	0	75	--	--
June 14-18	14.6	10	.05	32	19	333	6.3	393	0	553	7.0	.5	3.0	.21	1,160	1.58	45.7	160	0	81	1,720	8.1
June 19	31	15	.10	31	7.2	240	6.6	258	0	378	4.0	.6	7.6	.13	854	1.16	71.5	107	0	82	1,260	8.0
June 20-30	48.5	14	.04	42	21	295	6.5	301	0	570	6.0	.5	2.8	.17	1,120	1.52	147	193	0	76	1,610	7.8
July 1-2	10	--	--	46	24	261	6.2	245	--	555	8.0	--	.3	--	--	--	--	214	13	72	--	--
July 3-4	113	15	.04	21	6.7	174	5.3	249	0	246	3.0	.4	3.2	.11	614	.84	187	80	0	81	930	7.8
July 5	88	15	.20	15	3.6	107	4.2	194	0	122	2.0	.6	2.3	.07	386	.52	91.7	53	0	80	547	7.5
July 6-9	81.5	13	.03	48	20	208	7.0	197	0	488	5.5	.5	3.5	.13	902	1.23	198	196	34	69	1,310	7.6
July 10-26	7.14	9.4	.03	39	27	285	7.4	246	0	623	9.0	.5	3.2	.24	1,150	1.26	22.2	207	5	74	1,660	8.0
July 27-31	.54	8.2	.04	22	23	418	7.9	275	17	775	12	.2	1.9	.41	1,450	1.97	2.11	151	0	85	2,080	8.5
Aug. 1-11	2.15	8.4	.04	25	19	408	8.6	280	10	770	12	.6	2.5	.36	1,420	1.93	8.24	142	0	85	2,050	8.2
Aug. 12-16	358	14	.20	27	7.9	124	4.9	197	0	193	5.0	.4	5.0	.18	490	.97	476	140	0	72	744	7.8
Aug. 17-31	20.2	12	.04	54	13	160	6.4	269	0	840	4.0	.2	2.0	.18	716	1.04	36.1	139	0	72	1,080	7.6
Sept. 1-30	14.6	13	.04	22	7.1	237	5.6	343	0	280	4.5	.4	2.6	.21	764	1.04	30.1	84	0	85	1,150	7.9
Weighted average	21.9	12	0.09	33	13	252	5.2	316	--	409	7.0	0.5	3.1	0.19	910	1.24	53.8	146	0	79	1,320	--

a Represents 100 percent of runoff for water year October 1950 to September 1951.

b Includes carbonate as bicarbonate.

MOREAU RIVER BASIN--Continued

MOREAU RIVER AT BIXBY, S. DAK.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement generally between 1 and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	43	48	32	--	--	--	35	59	--	a 62	83	69
2	44	40	32	--	--	--	49	62	--	64	87	a 64
3	48	42	32	32	--	--	50	--	a 48	a 61	83	65
4	52	50	a 32	--	--	--	45	69	a 50	a 64	88	73
5	59	48	32	--	--	32	48	a 60	a 57	70	a 77	63
6	54	39	a 32	--	--	--	57	a 52	a 62	--	90	65
7	47	41	a 32	--	--	--	a 40	--	a 64	82	84	69
8	--	32	32	a 32	--	--	a 47	60	a 61	--	75	78
9	56	34	a 32	--	--	--	44	58	a 63	68	81	--
10	57	32	a 32	--	--	--	43	69	79	61	79	75
11	60	34	32	--	32	--	44	72	77	66	77	62
12	61	35	a 32	--	--	35	47	64	72	a 64	--	54
13	64	35	a 32	--	--	--	54	a 69	75	83	86	60
14	57	32	a 32	--	--	--	50	68	76	86	61	54
15	61	a 32	a 32	32	--	--	40	--	86	a 71	70	61
16	59	32	a 32	--	--	--	50	68	--	78	78	a 50
17	57	33	a 32	--	--	--	48	66	--	88	77	70
18	58	32	a 32	--	--	--	46	75	--	87	--	72
19	57	--	--	--	--	32	45	--	70	89	--	69
20	56	a 32	--	--	--	--	--	62	66	a 77	72	58
21	45	32	--	--	--	--	41	74	65	73	77	51
22	52	32	--	--	--	--	43	75	70	a 78	72	59
23	51	--	--	32	--	--	34	54	78	67	85	a 49
24	49	a 32	--	--	--	35	50	67	75	86	82	60
25	52	32	--	--	--	35	57	60	a 71	67	76	55
26	51	a 32	--	--	32	35	--	68	--	86	79	a 51
27	51	32	--	--	--	35	65	64	a 68	85	74	52
28	52	a 32	--	32	--	35	a 68	67	a 66	a 78	70	53
29	55	32	--	--	--	35	70	a 56	a 62	a 81	70	65
30	53	a 32	--	--	--	38	60	55	a 60	89	73	a 57
31	41	--	--	--	--	35	--	48	--	85	67	--
Average	53	35	b 32	b 32	b 32	b 33	50	65	68	76	77	61

a Temperature measurement made between 8 a. m. and 12 m.

b Includes estimated temperature, 32°F, on missing days.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

MOREAU RIVER BASIN--Continued

MOREAU RIVER AT BIXBY, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3.4	62	1	4.7			2		
2-----	5.8	255	4	4.7			1		
3-----	12	136	4	5.0			1		
4-----	11	222	7	5.4			1		
5-----	8.5	204	5	5.4	108	2	1	113	(t)
6-----	17	366	s 18	5.8			1		
7-----	16	665	29	6.2			1		
8-----	12	262	9	6			1		
9-----	9.0	205	5	6			1		
10-----	8.0	178	4	6			1		
11-----	6.6	130	2	6			2		
12-----	5.8	110	2	6	120	2	3	140	1
13-----	5.4	110	2	6			3		
14-----	5.0	110	1	6			3		
15-----	4.4	104	1	6			3		
16-----	3.7			6			3		
17-----	3.7	100	1	6			3		
18-----	4.0			6			3		
19-----	3.7			6			3		
20-----	3.7			6			3	140	1
21-----	4.0	95	1	6	98	1	4		
22-----	4.0			5			4		
23-----	4.0			5			4		
24-----	4.4			4			5		
25-----	4.4			4			5		
26-----	4.4			4			5		
27-----	4.4	102	1	4	87	1	5	120	e 2
28-----	4.7			4			5		
29-----	4.7			4			5		
30-----	4.7			3			5		
31-----	4.7			--	--	--	5		
Total-	197.1	--	110	158.2	--	46	93	--	36
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5	--		0.4	--		1.5	--	
2-----	5	--		.4	--		1.5	--	
3-----	4.5	94		.4	--		1.5	--	
4-----	4	--		.4	160		1.5	--	
5-----	4	--		.4	--		1.5	40	
6-----	4	--		.4	--		1.5	--	
7-----	4	--		.4	--		1.5	--	
8-----	4	119		.4	73		1.5	--	
9-----	4	--		.4	--		1.5	--	
10-----	4	--		.4	--		1.5	--	
11-----	4	--		.4	129		1.5	--	
12-----	4	--		.4	--		1.5	25	(t)
13-----	4	--		.4	--		1.5	--	
14-----	4	--	e 1	.4	--		1.5	--	
15-----	4	97		.4	(t)		1.5	--	
16-----	4	--		.8	--		1.5	--	
17-----	4	--		.8	--		1.5	--	
18-----	4	--		.8	--		1.5	--	
19-----	4	--		.8	40		1.5	50	
20-----	4	--		1	--		1.5	--	
21-----	4	--		2	--		1.5	--	
22-----	4	--		2	--		2	1,260	7
23-----	3	129		2	--		70	2,000	378
24-----	3	--		2	--		70	1,630	308
25-----	3	--		2	--		300	1,440	1,170
26-----	3	--		2	38		250	1,270	887
27-----	2	--		2	--		200	1,790	967
28-----	2	121	(t)	1.5	--		200	1,290	697
29-----	1	--		--	--	--	200	640	454
30-----	.4	--		--	--	--	150	1,100	446
31-----	.4	--		--	--	--	70	794	150
Total-	108.3	--	28	25.7	--	4	1,543.5	--	5,437

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

MOREAU RIVER BASIN--Continued

MOREAU RIVER AT BIXBY, S. DAK.--Continued

Suspended sediment water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	50	758	102	24	223	14	38	2,780	s 413
2-----	45	586	71	13	197	7	129	5,870	s 2,100
3-----	50	510	69	10			168	4,390	s 2,150
4-----	40	396	43	9.0			116	3,200	1,000
5-----	36	253	25	11	85	2	140	3,980	1,500
6-----	32			10			102	2,030	559
7-----	28			9.5				3,920	709
8-----	21	168	10	11	110	3	43	1,970	229
9-----	16			33	10,600	s 1,180	28	308	23
10-----	16			23	10,200	633	19		
11-----	14			16	2,200	95	13		
12-----	9.4			13			12	88	4
13-----	13			9.0			21		
14-----	10			9.5			18		
15-----	9.0	95	2	16			15	108	4
16-----	6.2			14			16	170	7
17-----	8.5			12	133	4	12	219	7
18-----	9.0			9.5			12	168	5
19-----	8.0			9.5			31	4,170	s 552
20-----	9.0			11			71	4,260	s 839
21-----	9.5			8.0			90	2,300	559
22-----	8.0			8.5			91	5,250	s 1,340
23-----	9.5			7.0			94	1,800	457
24-----	8.0			6.2	111	2	61	790	130
25-----	8.0	80	2	6.2			41	540	60
26-----	9.0			5.8			29		
27-----	9.5			5.0			21		
28-----	8.5			13	1,120	s 122	15	100	5
29-----	9.5			83	21,500	s 5,100	13		
30-----	15			28	3,210	s 292	8.0		
31-----	--	--	--	29	1,370	s 117	--	--	--
Total-	524.6	--	400	472.7	--	7,625	1,534.0	--	12,688
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5.0	--	e 1	5.2	416	s 13	68	5,450	s 983
2-----	15	1,050	s 116	10	488	s 14	75	6,020	s 1,260
3-----	105	7,250	s 2,000	3.7	83	1	50	2,300	310
4-----	120	4,880	s 1,820	2.3			29	1,760	138
5-----	88	4,600	1,090	.7			22	1,100	65
6-----	116	4,600	1,440	.4			27	527	38
7-----	107	3,400	982	.1	51	(t)	27	730	53
8-----	62	860	144	.1			16	300	13
9-----	41	250	28	.4			10	147	4
10-----	26	140	10	.4			7.5		
11-----	18			.4			7.0		
12-----	16			468	10,100	s 17,400	7.5	112	2
13-----	13	63	2	818	8,250	s 18,600	5.8		
14-----	11			180	7,800	3,790	4.4		
15-----	9.0			135	6,820	s 2,500	3.4		
16-----	5.8			187	2,960	s 1,510	3.1	74	1
17-----	2.3			80	3,400	734	4.0		
18-----	2.0	72	1	45	1,200	146	3.1		
19-----	2.0			38	170	17	4.4		
20-----	2.0			26	135	9	4.4		
21-----	1.5			17	90	4	4.4		
22-----	1.3			14			4.4	90	1
23-----	1.3	53	(t)	12	88	3	4.7		
24-----	1.0			10			6.2		
25-----	6.4	840	s 35	7.5			11	75	2
26-----	2.8	390	s 5	7.0			9.5	164	4
27-----	.8			5.8			4.4		
28-----	.7			4.0	69	1	4.4	114	1
29-----	.4	77	(t)	4.7			4.4		
30-----	.4			5.8			4.7		
31-----	.4			26	1,200	s 211	--	--	--
Total-	783.1	--	7,687	2,114.5	--	44,965	436.7	--	2,893
Total discharge for year (cfs-days)-----									7,991.4
Total load for year (tons)-----									81,919

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

MOREAU RIVER BASIN--Continued

MOREAU RIVER AT BIXBY, S. DAK.--Continued

Particle-size analyses of suspended sediment, March to September 1951

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

Date of collection	Time	Instantaneous discharge (cfs)	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. 24, 1951.....	1:15 p.m.	69	1,470	3,360	--	91	--	97	--	99	--	--	--	--	PWCM
Mar. 27.....	9:45 a.m.	163	1,780	2,100	80	86	91	95	97	98	--	--	--	--	PWCM
Mar. 27.....	9:45 a.m.	163	1,780	2,100	1	4	80	94	95	98	--	--	--	--	PN
Mar. 28.....	5:00 p.m.	117	982	997	75	83	90	96	98	99	99	100	--	--	BWCM
Apr. 5.....	1:00 p.m.	34	249	249	75	86	90	93	97	98	98	99	100	--	BWCM
June 19.....	8:00 p.m.	61	11,000	8,260	--	93	--	--	--	--	--	--	--	--	PWCM
June 22.....	6:00 p.m.	108	7,170	4,430	--	96	--	--	--	--	--	--	--	--	PWCM
July 4.....	9:30 a.m.	128	2,940	2,100	--	90	--	96	--	98	--	--	--	--	PWCM
Aug. 12.....	8:30 a.m.	590	8,520	4,670	--	73	--	85	--	94	--	--	--	--	SPWCM
Aug. 12.....	6:30 p.m.	680	17,800	7,030	--	82	--	96	--	100	--	--	--	--	SPWCM
Aug. 13.....	1:30 p.m.	1,040	7,260	5,440	--	81	--	92	--	98	--	--	--	--	SPWCM
Aug. 14.....	12:20 p.m.	181	7,600	2,000	--	94	--	98	--	100	--	--	--	--	SPWCM
Sept. 1.....	1:00 p.m.	58	5,490	4,280	--	94	--	100	--	--	--	--	--	--	SPWCM
Sept. 2.....	8:00 a.m.	100	7,360	5,760	--	95	--	99	--	100	--	--	--	--	SPWCM
Sept. 3.....	5:00 p.m.	45	3,220	2,600	90	95	97	99	100	--	--	--	--	--	BWCM

MOREAU RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN MOREAU RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH		
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
																						Residue at 180° C	Sum
MOREAU RIVER NEAR EAGLE BUTTE																							
Dec. 21, 1950.....	1.2	16	0.04	237	79	920		743	0	2,150	47	0.8	0.8			3,870	3,820	5.26	917	308	69	4,630	7.7
Apr. 3, 1951.....	356	10	.10	31	6.5	104		168	0	180	3.0	--	2.3			438		.60	104	0	69	677	8.1
Apr. 25.....	32	--	--	--	--	319	--	360	0	655	14	--	--			85		--	--	--	70	1,860	7.7
June 19.....	447	11	.02	57	13	147		210	0	350	4.0	.4	5.3	0.16		682		.93	196	57	62	997	7.2
Aug. 20.....	165	--	--	--	--	133	--	213	8	178	2.6	--	--	--		--		--	--	--	77	731	8.4
Sept. 10.....	112	--	--	--	--	128	--	188	0	258	5.0	--	--	--		--		--	--	--	65	840	7.4
MOREAU RIVER AT PROMISE																							
Jan. 15, 1951.....	1.4	14	0.10	376	78	527		505	0	1,840	53	0.4	0.5	0.24		3,200	3,140	4.35	1,260	846	47	3,580	7.7
Apr. 2.....	600	6.6	.30	45	5.7	82		146	0	176	5.5	3.3	3.1	.15		434		.59	136	16	58	636	7.3
July 6.....	223	11	.02	67	15	246		249	0	525	6.5	4.2	2.1	--		1,010	996	1.37	228	24	70	1,440	7.4
Aug. 21.....	237	--	--	--	--	124		210	0	193	3.2	--	--	--		--		--	--	--	71	1,739	7.9
Sept. 11.....	99	--	--	--	--	112		155	0	248	4.3	--	--	--		--		--	--	--	62	771	7.3

CHEYENNE RIVER BASIN

LANCE CREEK AT SPENCER, WYO.

LOCATION.--At cableway 150 feet downstream from gaging station, which is three-eighths of a mile south of Spencer, Niobrara County, 1 mile upstream from mouth, and 34 miles south of Newcastle.

DRAINAGE AREA.--2,070 square miles, approximately (above gaging station).

RECORDS AVAILABLE.--Sediment records: April 1950 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 40,000 ppm June 18; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 166,000 tons July 31; minimum daily, 0 tons on many days.

EXTREMES, April 1950 to September 1951.--Sediment concentrations: Maximum daily, 55,300 ppm July 3, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 237,000 tons June 18, 1950; minimum daily, 0 tons on many days.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, February to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃	Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH			
													Parts per million Residue at 180°C	Tons per acre-foot	Sum								
																					Calcium	Non-sodium carbonate	
Feb. 20, 1951....	0.3	12	0.04	116	42	270	270	297	745	18	0.5	0.5	1,380	1,350	1,88	481	216	56	1,880	7.8	0.001		
May 21.....	.3	11	.06	93	27	233	233	216	583	43	.9	1.6	1,140	1,100	1,55	343	166	60	1,570	7.7	.000		
May 23.....	.3	13	.02	118	34	251	251	250	648	70	.9	1.8	1,300	1,260	1,77	436	231	56	1,880	7.9	.000		
June 6.....	4.8	12	.02	84	28	174	200	473	28	.7	3.5	5.5	1,26	1,228	--	323	159	54	1,300	7.7	.000		
July 3.....	1,250	17	.10	69	18	60	221	182	4.0	.6	2.1	4.2	928	--	--	248	67	35	1,686	7.2	.004		
July 31.....	2,420	20	.09	67	17	55	254	134	4.2	.6	2.0	2.0	472	--	--	238	30	33	650	7.3	.000		
Sept. 4.....	4,400	14	.16	62	16	44	198	143	2.0	.6	1.2	1.2	391	--	--	220	58	30	590	7.2	.000		

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment	
		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day
1-----									
2-----									
3-----									
4-----									
5-----									
6-----									
7-----									
8-----									
9-----									
10-----									
11-----									
12-----									
13-----									
14-----									
15-----									
16-----									
17-----									
18-----									
19-----									
20-----									
21-----									
22-----									
23-----									
24-----									
25-----									
26-----									
27-----									
28-----									
29-----									
30-----									
31-----									
Total-	0		0	0		0	0		0
January			February			March			
1-----			0		0				
2-----			0		0				
3-----			0		0				
4-----			0		0				
5-----			0		0				
6-----			0		0				
7-----			0		0				
8-----			0		0				
9-----			0		0				
10-----			.4						
11-----			.5						
12-----			.4						
13-----			.2						
14-----			.3						
15-----			.4						
16-----			.5						
17-----			.4						
18-----			.3						
19-----			.3						
20-----			.3	18	(t)				
21-----			.4						
22-----			.3						
23-----			.2						
24-----			.3						
25-----			.3						
26-----			.3						
27-----			.2						
28-----			.1						
29-----			--						
30-----			--						
31-----			--						
Total-	0		0	6.1		1	0		0

t Less than 0.50 ton.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				0	--	0	0.2	--	e 1
2-----				0	--	0	.4	668	1
3-----				0	--	0	44	22,800	s 3,530
4-----				0	--	0	20	9,300	s 532
5-----				0	--	0	14	6,490	245
6-----				0	--	0	8.7	3,680	s 98
7-----				0	--	0	6.0	2,270	37
8-----				0	--	0	4.8	1,440	s 24
9-----				0	--	0	7.6	10,000	s 181
10-----				0	--	0	3.3	10,700	s 103
11-----				0	--	0	2.0	3,780	s 23
12-----				0	--	0	84	15,100	s 5,570
13-----				0	--	0	56	22,500	s 4,540
14-----				0	--	0	12	15,800	s 607
15-----				0	--	0	17	14,000	s 719
16-----				0	--	0	5.4	14,000	s 285
17-----				0	--	0	51	16,000	sa 8,100
18-----				0	--	0	70	40,000	sa 8,300
19-----				0	--	0	520	29,000	sa 57,000
20-----				0	--	0	20	2,650	s 323
21-----				.1	347	(t)	1.6	344	s 2
22-----				.2	370	(t)	2.5	332	s 4
23-----				.2	633	s 1	914	37,000	sa 100,000
24-----				.1	662	(t)	874	38,200	93,500
25-----				0	--	0	266	22,600	s 18,700
26-----				0	--	0	78	9,650	s 2,150
27-----				0	--	0	40	4,680	s 535
28-----				0	--	0	20	1,600	86
29-----				0	--	0	9.9	900	sa 26
30-----				0	--	0	3.4	460	4
31-----				0	--	0	--	--	--
Total-	0		0	0.6	--	2	3,175.8	--	305,226
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3.4	1,200	sa 26	540	19,600	s 32,700	1.3		
2-----	1,030	26,100	s 107,000	146	7,860	s 3,370	.3	--	(t)
3-----	1,070	27,800	s 85,900	91	2,600	639	.1		
4-----	285	15,000	b 12,000	73	1,700	b 340	1,790	26,200	s 165,000
5-----	114	5,500	1,690	58	1,200	b 190	818	27,200	s 69,500
6-----	49	12,100	s 1,480	38	900	b 90	159	10,900	s 4,910
7-----	28	26,800	2,010	23	550	34	515	16,200	s 40,100
8-----	15	16,000	b 650	25	250	17	620	25,100	s 45,700
9-----	8.3	5,800	b 130	20	200	11	155	10,700	s 4,760
10-----	19	3,630	s 247	32	300	b 26	104	4,900	1,380
11-----	28	2,830	214	308	12,000	sa 34,000	80	2,700	583
12-----	108	15,000	sb 5,200	685	31,700	s 63,500	58	1,400	b 220
13-----	116	17,300	5,420	181	13,900	s 7,600	42	950	b 110
14-----	65	10,900	1,910	89	7,760	1,860	32	490	42
15-----	32	5,500	475	62	4,200	703	25	586	40
16-----	21	3,300	187	42	1,650	187	20	390	21
17-----	12	695	23	28	1,000	b 75	16	158	7
18-----	4.0	240	b 3	20	800	b 44	14	106	4
19-----	2.8	170	b 1	15	500	20	12	160	b 5
20-----	1.3	150	b 1	13	250	9	11	132	4
21-----	21	6,500	sa 1,300	9.1	150	b 4	9.0	85	b 2
22-----	42	13,000	sa 1,700	2.4	144	1	6.5		
23-----	164	21,100	s 22,300	383	33,600	s 48,300	5.0		
24-----	210	26,800	s 20,700	104	22,800	s 7,660	3.8		
25-----	47	10,700	s 1,440	33	5,850	s 584	2.8	--	e 1
26-----	15	4,100	166	16	1,540	s 72	2.2		
27-----	4.0	1,600	17	13	400	b 14	1.6		
28-----	1,560	24,700	s 136,000	12	233	8	1.2	--	(t)
29-----	1,860	28,900	145,000	11	134	4	.9		
30-----	970	18,700	s 52,300	11	130	4	.7		
31-----	1,720	29,500	s 166,000	9.1	118	3	--	--	--
Total-	9,624.8	--	771,480	3,092.6	--	202,069	4,506.4	--	332,393

Total discharge for year (cfs-days)..... 20,406.3
 Total load for year (tons)..... 1,611,181

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Particle-size analyses of suspended sediment, May to September 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
May 21, 1951.....	7:00 p. m.	0.3	63	870	3,020	78	97	99	100	--	--	--	--	--	--	BWCM
May 23, 1951.....	2:30 p. m.	0.3	83	1,160	3,480	64	83	87	93	96	98	99	100	--	--	BWCM
June 13, 1951.....	2:00 p. m.	82	69	36,300	10,000	56	72	87	95	97	98	--	--	--	--	SPWCM
June 13, 1951.....	2:00 p. m.	82	69	36,300	10,600	1	2	11	95	97	98	--	--	--	--	SPWCM
June 15, 1951.....	1:15 p. m.	22	80	11,000	10,200	--	79	--	98	--	99	--	--	--	--	SPWCM
June 19, 1951.....	6:00 p. m.	193	69	16,300	7,850	--	77	--	93	--	97	--	--	--	--	SPWCM
June 23, 1951.....	7:15 a. m.	825	--	28,400	9,810	--	53	--	75	--	92	--	--	--	--	SPWCM
June 23, 1951.....	10:00 a. m.	745	55	34,700	8,030	44	58	71	81	86	93	--	--	--	--	SPWCM
June 23, 1951.....	10:00 a. m.	745	55	34,700	7,990	0	1	12	79	86	92	--	--	--	--	SPWCM
June 26, 1951.....	6:30 p. m.	58	75	7,090	9,080	--	89	--	97	--	99	--	--	--	--	SPWCM
June 28, 1951.....	5:20 p. m.	16	64	1,340	3,170	--	97	--	97	--	99	--	--	--	--	SPWCM
July 2, 1951.....	5:30 p. m.	1,410	--	61,800	11,200	--	50	--	75	--	92	--	--	--	--	SPWCM
July 2, 1951.....	6:20 p. m.	1,460	--	55,800	8,340	--	50	--	75	--	92	--	--	--	--	SPWCM
July 3, 1951.....	3:45 a. m.	1,610	--	31,100	6,470	--	53	--	73	--	90	95	99	100	--	SPWCM
July 3, 1951.....	6:45 a. m.	1,290	54	29,200	7,800	42	53	62	72	81	91	96	100	--	--	SPWCM
July 3, 1951.....	6:45 a. m.	1,290	54	29,200	7,530	1	3	18	70	80	91	--	--	--	--	SPWCM
July 10, 1951.....	3:00 p. m.	28	--	2,620	3,240	--	90	--	98	--	99	--	--	--	--	SPWCM
July 23, 1951.....	7:00 p. m.	440	--	50,800	9,300	--	64	--	89	--	98	--	--	--	--	SPWCM
July 24, 1951.....	2:30 p. m.	138	--	22,300	6,270	69	81	91	96	97	98	--	--	--	--	SPWCM
July 24, 1951.....	2:30 p. m.	138	--	22,300	10,000	2	5	39	94	96	98	--	--	--	--	SPWCM
July 28, 1951.....	11:00 a. m.	2,380	--	24,400	8,140	--	52	--	72	--	91	--	--	--	--	SPWCM
July 28, 1951.....	7:00 p. m.	1,640	72	34,600	5,560	--	52	--	73	--	91	--	--	--	--	SPWCM
July 31, 1951.....	2,360	2,360	72	38,700	6,280	--	44	--	62	--	88	--	--	--	--	SPWCM
Aug. 2, 1951.....	5:00 p. m.	121	--	6,300	6,760	--	81	--	89	--	92	--	--	--	--	SPWCM
Aug. 12, 1951.....	8:30 p. m.	385	68	26,300	7,370	60	72	84	92	96	98	--	--	--	--	SPWCM
Aug. 12, 1951.....	8:30 p. m.	385	68	26,300	7,080	2	5	55	88	92	96	--	--	--	--	SPWCM
Aug. 23, 1951.....	8:00 a. m.	690	--	49,400	9,030	--	95	--	81	--	98	--	--	--	--	SPWCM
Aug. 23, 1951.....	11:00 a. m.	655	--	43,700	7,430	--	54	--	76	--	95	--	--	--	--	SPWCM

CHEYENNE RIVER BASIN--Continued
LANCE CREEK AT SPENCER, WYO.--Continued

Particle-size analyses of suspended sediment, May to September 1951.--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Sept. 4, 1951.....	8:30 a.m.	1,150	--	38,200	7,430	--	43	--	66	--	95	--	--	--	SPWCM
Sept. 4.....	7:00 p.m.	3,590	51	33,800	6,020	--	49	--	66	--	83	--	--	--	SPWCM
Sept. 5.....	11:00 a.m.	705	--	31,200	6,050	--	60	--	79	--	93	--	--	--	SPWCM
Sept. 7.....	9:00 a.m.	111	--	6,600	4,420	--	84	--	93	--	97	--	--	--	SPWCM
Sept. 7.....	6:30 a.m.	1,120	--	30,400	12,500	--	50	--	70	--	91	--	--	--	SPWCM
Sept. 9.....	9:00 a.m.	159	--	11,000	3,660	--	81	--	93	--	96	--	--	--	SPWCM
Sept. 11.....	2:45 p.m.	75	59	1,880	3,290	--	94	--	98	--	99	--	--	--	SPWCM

CHEYENNE RIVER BASIN--Continued
BEAVER CREEK NEAR NEWCASTLE, WYO.

LOCATION.--At gaging station at bridge on county road, 1 mile downstream from Sheep Creek, and 23 miles south of Newcastle, Weston County.
DRAINAGE AREA.--1,320 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1951.

Sediment records: March 1950 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 10,800 ppm Aug. 17; minimum daily, not determined.

Sediment loads: Maximum daily, 9,400 tons Sept. 6; minimum daily, less than 0.50 ton on many days.

EXTREMES, March 1950 to September 1951.--Sediment concentrations: Maximum daily, 13,700 ppm June 21, 1950; minimum daily, no flow on many days during July, August, and September 1950.

Sediment loads: Maximum daily, 15,800 tons Apr. 12, 1950; minimum daily, 0 tons on many days during July, August, and September 1950.

REMARKS.--Flow affected by ice Nov. 8-9, Nov. 22 to Apr. 11. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH			
														Parts per million	Residue at 180°C	Tons per acre-foot	Calcium	Non-carbonate						
																						Sum	Sum	Sum
Oct. 2, 1950	1.9	4.4	0.02	147	45	254	114	740	167	0.8	1.3	0.20	1,510	1,420	2.05	550	457	50	2,089	7.3				
Nov. 2	10	8.1	.02	458	157	525	184	1,690	722	.8	1.2	.30	3,880	3,650	5.28	1,790	1,640	39	4,750	7.6				
Nov. 17, 11:30 a.m.	--	9.4	.02	495	117	489	216	1,630	640	.8	1.5	.20	3,530	3,490	4.80	1,720	1,540	38	4,370	7.6				
Nov. 17, 3:30 p.m.	10	5.7	.02	478	160	590	176	1,740	832	.8	1.2	.40	4,160	3,990	5.66	1,850	1,710	41	5,150	7.5				
Dec. 7	a 9.0	9.7	.02	655	157	728	272	2,250	915	.8	2.1	.30	5,030	4,850	6.84	2,280	2,060	41	6,240	7.6				
Jan. 2, 1951	a 2.7	6.2	.02	615	221	1,090	298	2,430	1,400	.8	2.3	.20	6,250	5,880	8.50	2,450	2,210	49	7,980	7.7				
Feb. 5	a 1.3	11	.10	755	303	1,240	434	3,400	1,360	.9	3.6	--	7,730	7,290	10.51	3,130	2,770	46	8,840	7.7				
Mar. 6	a 13	12	.08	545	109	403	266	1,610	560	.5	2.1	--	3,650	3,380	4.96	1,810	1,590	33	4,410	7.7				
Apr. 3	a 22	7.5	.06	538	105	516	220	1,510	810	2.1	2.2	.21	3,700	3,600	5.03	1,780	1,600	39	4,960	8.0				
Apr. 30	3.3	3.0	.03	503	232	890	219	2,370	1,060	.7	2.2	--	5,540	5,170	7.53	5,540	5,170	47	6,780	7.2				
June 5	.6	4.0	.05	409	221	888	133	2,370	908	1.0	1.7	--	5,270	4,870	7.17	1,930	1,820	50	6,400	7.2				
July 4	11	7.4	.03	202	84	321	127	940	328	.5	1.2	--	2,050	1,950	2.79	850	746	45	2,780	7.1				
Aug. 1	5.0	7.0	.05	128	55	279	85	690	286	.5	2.2	--	1,520	1,460	2.07	547	477	53	2,180	7.1				
Sept. 5	56	--	--	--	--	422	--	--	447	--	--	--	--	--	--	--	--	--	--	3,410	--			

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	0.3	11	(t)	10			9.0		
2-----	1.9	50	(t)	10	42	1	8.0	74	a 2
3-----	5.2	78	1	10	126	3	7.5		
4-----	33	417	s 57	11			7.0		
5-----	76	3,050	s 657	9.7	53	1	6.0		
6-----	41	3,760	s 441	6.8			7.0		
7-----	18	945	s 49	6.5	35	1	9.0		
8-----	9.4	166	4	5.0			10	79	a 2
9-----	6.2			3.0			11		
10-----	5.7	11	(t)	4.0			13		
11-----	5.0			4.7		(t)	12		
12-----	6.0			6.2			12		
13-----	6.0	61	1	7.8			11		
14-----	6.5			12			10		
15-----	9.4			13			9.0		
16-----	9.4	71	2	13		e 1	9.4	68	a 2
17-----	9.4			10	43		9.6		
18-----	9.4			12			8.8		
19-----	9.4	--	e 2	9.0			8.0		
20-----	9.4			8.4			8.4		
21-----	9.0			9.4			8.0		
22-----	10	53	1	8.0		e 1	8.2	81	a 2
23-----	10			5.0			8.0		
24-----	10	68	2	4.0			8.3		
25-----	10			4.5			8.6		
26-----	10			6.0			6.0		
27-----	10	105	3	10			5.0		
28-----	6.5			12			5.2		
29-----	1.6	--	(t)	11	74	a 2	5.0	78	a 1
30-----	9.0			10			4.5		
31-----	10	43	1	--	--	--	4.2		
Total-	372.7	--	1,243	252	--	33	256.7	--	56
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	3.0			0.7			13		
2-----	2.7			.9			13		
3-----	2.7	65	(t)	1.0	46	(t)	12		
4-----	2.0			1.0			13		
5-----	1.5			1.3			14		
6-----	1.0			1.2			13	50	a 2
7-----	1.1			1.1			12		
8-----	1.1			1.5	95	(t)	15		
9-----	1.1			2.0			17		
10-----	1.1	173	a 1	3.0			17		
11-----	1.1			4.0			22		
12-----	1.1			3.5			20		
13-----	1.1			3.0	32	(t)	23		
14-----	1.2			4.0			24		
15-----	1.1			5.0			26		
16-----	1.1			7.0			25		
17-----	1.2			8.0			24	31	a 2
18-----	1.2	269	a 1	8.0	42	a 1	23		
19-----	1.0			9.0			22		
20-----	.9			10			21		
21-----	.9			14			25		
22-----	1.1			13			28		
23-----	1.0			12	38	a 1	33		
24-----	1.2			13			31		
25-----	1.0			14			35		
26-----	.8			14	48	a 2	38		
27-----	.6	245	a 1	13			35	212	a 19
28-----	.5			12	29	a 1	33		
29-----	.6			--	--	--	31		
30-----	.7			--	--	--	29		
31-----	.7			--	--	--	27		
Total-	37.4	--	29	180.2	--	19	714	--	215

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from concentration of composited samples taken about three times per week.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	26	--	e 18	4.0	68	(t)	3.8	60	b 1
2-----	27	298	22	2.7			6.0	69	b 1
3-----	22	256	15	2.9			1.9	--	(t)
4-----	20	118	6	1.4			.9	120	(t)
5-----	18	113	6	.8			.7	130	(t)
6-----	14	102	a 4	.5	87	(t)	5.5	32	b 1
7-----	14			.2			5.0		
8-----	14			.3			2.5		
9-----	14			.5			1.4	30	(t)
10-----	13			.2			.7		
11-----	13	64	a 2	.2	68	(t)	.5	47	(t)
12-----	11			.1			2.5		
13-----	11			.1			2.5		
14-----	11	75	a 2	.1			1.4	46	(t)
15-----	9.4			.1			1.6		
16-----	6.8			.1			1.2	22	(t)
17-----	6.0	52	1	.3	51	(t)	.7		
18-----	5.0			.3			1.0		
19-----	6.5			.6			131	5,500	sb 2,300
20-----	6.8	46	1	1.9			25	762	s 62
21-----	7.8			1.0			8.1	--	e 3
22-----	8.1			.5			9.8	125	s 6
23-----	7.1			24	170	sb 16	182	5,000	sb 3,600
24-----	5.0			9.7	40	1	154	--	e 2,400
25-----	3.5			5.0	50	1	66	1,430	s 282
26-----	3.1	32	(t)	2.7	--	(t)	31	312	s 28
27-----	3.1			1.6	--	(t)	12	130	4
28-----	.8			1.0	23	(t)	7.8	90	2
29-----	3.3	56	b 1	.8	--	(t)	6.5	70	1
30-----	3.5			.6			5.0	--	e 1
31-----	--			.5			--	--	--
Total-	313.8	--	107	64.7	--	22	678.0	--	8,896
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5.5	--	e 1	13	154	s 8	4.5	--	e 2
2-----	142	4,700	sb 3,000	4.2	74	1	262	--	e 3,900
3-----	43	2,350	s 328	2.2	67	(t)	128	--	e 1,600
4-----	12	176	6	1.7	--	(t)	23	--	e 30
5-----	6.2	74	1	1.2	--	(t)	68	1,600	sb 430
6-----	3.1	56	1	.6	48	(t)	437	--	e 9,400
7-----	1.3	--	(t)	.3	40	(t)	351	6,780	s 6,770
8-----	.7	--	(t)	1.5	51	(t)	125	--	e 1,700
9-----	.4	40	(t)	1.2	23	(t)	188	--	e 3,800
10-----	1.3	49	(t)	.2	19	(t)	34	3,690	s 418
11-----	5.2	69	s 2	6.0	--	e 3	18	461	22
12-----	13	--	e 6	2.9	82	1	10	--	e 9
13-----	3.3	75	1	1.4	59	(t)	7.1	--	--
14-----	23	--	e 13	121	3,900	sb 4,500	6.5	82	a 1
15-----	14	--	e 5	188	9,000	sb 5,900	6.0		
16-----	7.4	86	2	98	4,900	sb 1,900	5.2	70	a 1
17-----	4.4	80	1	184	10,800	s 5,620	3.5		
18-----	2.9	71	1	26	--	e 240	3.1		
19-----	1.9	46	(t)	11	--	e 8	3.5		
20-----	.9			6.5	117	2	5.2		
21-----	1.7			35	--	e 550	4.4	45	a 1
22-----	2.2	42	(t)	32	4,210	s 458	4.4		
23-----	1.6			9.0	--	e 22	4.7		
24-----	2.4			5.2	110	2	4.7		
25-----	2.4			3.1	--	(t)	4.2	70	a 1
26-----	5.0	187	s 14	1.9	--	(t)	4.0		
27-----	3.5			1.2	--	(t)	3.8		
28-----	19			.7	32	(t)	2.5	70	a 1
29-----	3.1	--	e 1	.6			3.5		
30-----	2.2	68	(t)	.5			4.7		
31-----	190	5,000	sb 4,300	.7	--	--	--	--	--
Total-	524.6	--	7,686	760.8	--	19,218	1,729.5	--	28,099
Total discharge for year (cfs-days)									5,884.4
Total load for year (tons)									65,423

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from concentration of composited samples taken about three times per week.

b Computed from partly-estimated concentration graph.

CHEYENNE RIVER BASIN--Continued
BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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	0.350	0.500		1.000
Oct. 5, 1950	8:15 a.m.	89	--	2,560	2,130	80	90	95	97	98	96	98	100			BWCM
Oct. 6	9:50 a.m.	42	--	4,100	3,020	--	89	--	97	--	100	--	--			SPWCM
June 19, 1951	2:20 p.m.	92	65	4,610	4,710	69	75	92	97	98	100	--	--			SPWCM
June 19	2:20 p.m.	92	65	4,610	4,710	5	8	25	--	--	98	--	--			SPWCM
June 23	1:30 p.m.	172	59	2,620	5,850	--	82	--	93	--	99	--	--			SPWCM
June 26	3:00 p.m.	26	75	263	802	80	88	93	96	98	99	100	--			BWCM
July 3	1:30 a.m.	44	63	1,500	3,770	--	91	--	99	--	100	--	--			SPWCM
July 31	3:45 p.m.	99	78	1,680	3,600	--	76	--	93	--	100	--	--			SPWCM
Aug. 15	10:15 a.m.	144	--	8,200	6,080	--	79	--	98	--	100	--	--			SPWCM
Aug. 15	6:00 p.m.	53	64	6,550	7,470	--	83	--	99	--	100	--	--			SPWCM
Aug. 17	10:10 a.m.	256	--	12,100	4,620	72	86	96	99	99	100	--	--			SPWCM
Aug. 17	10:10 a.m.	256	--	12,100	4,420	3	5	22	99	100	100	--	--			SPWCM
Sept. 5	9:45 a.m.	56	63	984	1,830	66	83	91	98	99	100	--	--			BWCM
Sept. 7	10:20 a.m.	415	--	7,020	6,030	--	79	--	97	--	100	--	--			SPWCM

CHEYENNE RIVER BASIN--Continued

HAT CREEK NEAR EDMONT, S. DAK.

LOCATION.--At gaging station at bridge on State Highway 87, 2 miles upstream from mouth, 2 miles west of Heppner, and 12½ miles southeast of Edgemont, Fall River County.

DRAINAGE AREA.--1,044 square miles.

RECORDS AVAILABLE.--Water temperatures: April to September 1951.

Sediment records: October 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures (April to September 1951): Maximum, 82°F Aug. 6.

Sediment concentrations: Maximum daily, 23,400 ppm July 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 28,500 tons July 29; minimum daily, 0 tons on many days.

REMARKS.--Flow affected by ice Dec. 2 to Mar. 14. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Temperature (°F) of water, April to September 1951

/Once-daily temperature measurement generally between 12 m. and 7 p. m.7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	66	--	a 68	a 74	80
2							--	65	53	--	74	70
3							54	65	50	67	a 69	70
4							--	75	a 52	--	--	60
5							a 45	51	67	--	80	67
6							53	56	70	a 72	a 82	a 50
7							45	67	--	--	a 75	--
8							48	73	--	--	--	71
9							--	65	--	--	--	a 60
10							--	66	--	--	a 73	a 58
11							50	75	a 65	--	80	a 59
12							55	60	78	--	--	a 53
13							a 45	--	--	--	a 71	a 50
14							43	65	--	--	56	a 52
15							44	59	a 61	--	--	a 50
16							66	--	73	--	a 68	67
17							62	60	a 58	a 71	78	a 53
18							55	81	a 60	--	--	67
19							54	--	--	a 76	a 78	68
20							a 40	58	65	--	76	58
21							39	55	61	--	a 60	--
22							52	a 68	a 69	--	a 70	60
23							55	a 64	59	--	a 71	59
24							44	a 69	70	--	81	59
25							54	68	a 66	--	a 69	a 50
26							--	a 62	72	--	78	60
27							64	70	a 65	--	76	--
28							65	a 60	--	a 66	a 71	63
29							65	--	--	78	--	65
30							64	a 50	75	--	--	68
31							--	53	--	a 71	a 71	--
Average							53	64	--	--	--	61

a Reading obtained between 6 a. m and 10 a. m.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

CHEYENNE RIVER BASIN--Continued

HAT CREEK NEAR EDMONT, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----							0		0
2-----							0		0
3-----							0		0
4-----							0		0
5-----		12					0		0
6-----							0		0
7-----							0		0
8-----							0		0
9-----							0		0
10-----							0		0
11-----							0		0
12-----							.1		(t)
13-----							0		0
14-----							0		0
15-----							.1		(t)
16-----	1						.1		(t)
17-----							0		0
18-----							0		0
19-----							0		0
20-----							0		0
21-----							0		0
22-----							0		0
23-----							0		0
24-----							0		0
25-----							0		0
26-----							0		0
27-----							0		0
28-----							0		0
29-----							0		0
30-----							0		0
31-----							0		0
Total-	31		e 1	0		0	0.3		(t)
	January			February			March		
1-----	0	--	0	0	--	0	1		
2-----	0	--	0	0	--	0	1		
3-----	0	--	0	0	--	0	1	23	(t)
4-----	0	--	0	0	--	0	1		
5-----	0	--	0	.5			3		
6-----	0	--	0	.5	96	(t)	0	--	0
7-----	0	--	0	.5			3	110	1
8-----	0	--	0	0	--	0	0	--	0
9-----	0	--	0	0	--	0	0	--	0
10-----	0	--	0	.5			0	--	0
11-----	0	--	0	2	122	(t)	0	--	0
12-----	0	--	0	5			0	--	0
13-----	0	--	0	2	69	1	0	--	0
14-----	0	--	0	1			0	--	0
15-----	0	--	0	1			0	--	0
16-----	0	--	0	1			.1		
17-----	0	--	0	1	220	1	.5		
18-----	0	--	0	3			.4	48	(t)
19-----	0	--	0	2			.5		
20-----	0	--	0	2			1.3		
21-----	0	--	0	2			3.4	95	1
22-----	0	--	0	2	86	(t)	3.4	67	1
23-----	14		e 6	1			22	73	4
24-----	7	149	3	.5			16	162	7
25-----	.5	145	(t)	.5			.5	72	(t)
26-----	.1	79	(t)	.5	32	(t)	19	62	3
27-----	0	--	0	1			15	84	3
28-----	0	--	0	2			21	100	6
29-----	0	--	0	--	--	--	26	80	6
30-----	0	--	0	--	--	--	15	76	3
31-----	0	--	0	--	--	--	10	49	1
Total-	21.6	--	9	31.5	--	11	164.1	--	37

e Estimated.

t Less than 0.50 ton.

CHEYENNE RIVER BASIN--Continued

HAT CREEK NEAR EDMONT, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	4			0.3			1	63	(t)
2-----	3			.3			1		
3-----	2			.3			16	86	s 6
4-----	1.1			.3			69	9,120	s 1,940
5-----	.6			.3			29	7,020	s 613
6-----	.5	29	(t)	.3			12	193	s 7
7-----	.4			.3			3.7	77	1
8-----	.3			.3			2.0	80	(t)
9-----	.3			.3			1.0	65	(t)
10-----	.2			.3			1.1	42	(t)
11-----	.6			.3	46	(t)	1.3	65	(t)
12-----	.2			.3			1.6	153	1
13-----	.7			.3			1.9	100	1
14-----	.6			.3			94	7,690	s 2,430
15-----	.4			.3			44	1,640	s 233
16-----	.4	42	(t)	.3			24	203	13
17-----	.5			.3			9.8	170	4
18-----	.5			.3			2.3	120	1
19-----	.3			.3			657	8,790	s 25,700
20-----	.3			.3			633	7,650	s 12,900
21-----	.5			4			193	4,930	s 2,060
22-----	.3			37	--	e 200	53	1,320	s 225
23-----	.4			21	142	8	169	3,220	s 1,660
24-----	.5			8	58	1	415	8,220	s 9,590
25-----	.3			4			536	4,980	7,210
26-----	.4	56	(t)	2			150	5,880	s 2,510
27-----	.3			1			52	2,750	s 412
28-----	.3			1	55	(t)	30	750	61
29-----	.3			1			24	290	19
30-----	.3			1			12	140	5
31-----	--	--	--	1			--	--	--
Total--	20.5	--	2	87.0	--	212	3,238.7	--	68,503
	July			August			September		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	7.6	130	3	113	566	s 187	2.2	270	a 2
2-----	114	3,200	s 1,540	246	8,890	s 6,280	1.9	170	1
3-----	941	4,080	s 10,200	63	3,310	s 602	3.4	157	1
4-----	960	5,080	13,200	50	560	76	74	4,810	s 2,060
5-----	308	2,830	s 2,760	40	310	33	421	8,790	s 12,400
6-----	74	1,160	s 244	31	198	17	338	8,400	7,670
7-----	40	480	52	26	152	11	75	9,080	s 1,920
8-----	24	232	15	21	121	7	35	3,390	320
9-----	14	172	6	21	50	3	48	3,540	s 451
10-----	14	165	6	20	45	2	21	1,480	s 91
11-----	22	135	8	18	35	2	13	275	10
12-----	18	167	8	32	--	e 280	8.2	199	4
13-----	52	811	s 167	182	10,700	s 5,470	3.4	199	2
14-----	74	15,300	s 3,270	64	3,300	s 614	1.9	195	1
15-----	35	2,600	246	26	1,040	s 83	1.8	179	1
16-----	20	557	s 34	14	292	11	1.1		
17-----	15	250	10	9.8	270	7	.8		
18-----	15	197	8	6.0	261	4	.8		
19-----	12	170	6	4.6	75	1	.6		
20-----	12	172	6	2.3	50	(t)	.7	114	(t)
21-----	12	170	6	2.3	100	1	.8		
22-----	60	3,140	s 543	34	206	19	.9		
23-----	36	23,400	2,270	16	121	5	1.4		
24-----	17	8,450	s 446	6.6	95	2	1.5		
25-----	8.2	180	4	2.9	168	1	1.6		
26-----	5.5	111	2	1.5	150	1	1.4	82	(t)
27-----	12	230	s 23	1.0	138	(t)	1.1		
28-----	130	3,970	s 1,830	.8	140	(t)	.9		
29-----	1,350	9,140	s 28,500	.7	138	(t)	1.6		
30-----	861	3,150	s 7,640	1.6	213	1	3.1	91	1
31-----	143	1,790	s 776	2.3	360	2	--	--	--
Total--	5,406.3	--	73,829	1,059.4	--	13,703	1,066.1	--	24,939
Total discharge for year (cfs-days).....									11,126.5
Total load for year (tons).....									181,246

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued
HAT CREEK NEAR EDGE MONT, S. DAK.--Continued

Particle-size analyses of suspended sediment, June to September, 1951
(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 of collection	Time	Instantaneous discharge (cfs)	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	0.350		0.500	1.000
June 19, 1951.....	7:45 p. m.	1,760	12,300	4,080	--	80	--	95	--	99	--	--	--	--	SPWCM
June 19.....	12:00 m.	1,290	6,820	4,660	66	80	89	95	97	98	98	99	--	100	BWCM
June 19.....	12:00 m.	1,290	6,820	4,500	3	6	19	--	--	96	97	100	--	--	BNM
June 20.....	5:45 a. m.	699	7,290	5,920	--	80	--	97	--	99	--	--	--	--	SPWCM
June 22.....	8:15 p. m.	41	956	2,950	--	88	--	98	--	100	--	--	--	--	SPWCM
June 23.....	3:30 p. m.	212	3,900	4,470	--	82	--	97	--	100	--	--	--	--	SPWCM
June 26.....	3:00 p. m.	119	4,850	5,800	--	85	--	98	--	100	--	--	--	--	SPWCM
July 3.....	5:00 p. m.	1,080	3,840	4,790	--	83	--	95	--	99	--	--	--	--	SPWCM
July 6.....	9:30 a. m.	73	2,920	2,920	--	91	--	--	--	100	--	--	--	--	SPWCM
July 14.....	8:30 a. m.	94	20,400	8,720	79	90	99	99	100	--	--	--	--	--	PWCM
July 14.....	8:30 a. m.	94	20,400	9,100	1	1	--	100	--	--	--	--	--	--	PWCM
July 24.....	7:00 p. m.	13	308	461	79	95	99	100	--	--	--	--	--	--	BWCM
Aug. 1.....	11:00 a. m.	88	485	683	64	80	88	93	95	96	99	100	--	--	BWCM
Aug. 1.....	8:00 p. m.	112	485	756	75	92	97	100	--	--	--	--	--	--	BWCM
Aug. 2.....	8:00 a. m.	378	14,000	6,060	65	86	95	96	97	99	--	--	--	--	SPWCM
Aug. 2.....	8:00 a. m.	378	14,000	5,890	1	2	19	97	98	99	--	--	--	--	SPNM
Aug. 2.....	2:45 p. m.	163	8,540	4,860	75	89	99	99	99	100	--	--	--	--	SPWCM
Aug. 2.....	2:45 p. m.	163	8,540	4,920	1	1	6	99	100	--	--	--	--	--	SPNM
Aug. 3.....	9:15 a. m.	64	3,740	3,220	83	83	--	99	--	100	--	--	--	--	SPWCM
Aug. 13.....	8:15 a. m.	245	14,800	6,520	--	83	--	98	--	100	--	--	--	--	SPWCM
Aug. 13.....	4:30 p. m.	174	8,400	3,270	--	79	--	97	--	100	--	--	--	--	SPWCM
Aug. 14.....	2:45 p. m.	120	3,810	2,890	--	72	--	90	--	98	--	--	--	--	SPWCM
Sept. 5.....	11:45 a. m.	564	13,500	4,500	--	78	--	96	--	100	--	--	--	--	SPWCM
Sept. 5.....	6:09 p. m.	609	11,900	4,890	--	78	--	98	--	99	--	--	--	--	SPWCM
Sept. 5.....	2:45 p. m.	684	13,200	7,930	64	80	94	99	99	100	--	--	--	--	SPWCM
Sept. 5.....	2:45 p. m.	684	13,200	7,960	1	2	6	98	--	100	--	--	--	--	SPNM
Sept. 6.....	5:00 p. m.	402	10,200	10,600	--	87	--	99	--	100	--	--	--	--	SPWCM
Sept. 7.....	5:00 p. m.	49	8,640	3,380	--	91	--	100	--	--	--	--	--	--	SPWCM

CHEYENNE RIVER BASIN--Continued
CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.

LOCATION.--At gaging station 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 1947 to September 1951.

Water temperatures: July 1947 to September 1949, April to September 1951.

EXTREMES, 1950: After temperatures: April 10 to September 1951: Maximum, 78°F July 24.

Sediment concentrations: April 10 to September 1951: Maximum, 78°F July 24.

Sediment loads: Maximum daily, 278,000 tons, July 29, 1949; minimum, 657 ppm Feb. 25 to Mar. 10, 1949.

Hardness (1947-49): Maximum, 1,760 ppm Nov. 22, 1947; minimum, 344 ppm Feb. 25 to Mar. 10, 1949.

Specific conductance (1947-49): Maximum daily, 3,920 microhms Apr. 3, 1947; minimum daily, 713 microhms Aug. 18, 1948.

Water temperatures (1947-49, 1951): Maximum, 85°F July 5, 1948; minimum freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 55,000 ppm June 19, 1950; minimum daily, 1 ppm Sept. 30, 1949.

Sediment loads: Maximum daily, 476,000 tons June 19, 1946; minimum daily, less than 0.50 ton on many days each year.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (microhms at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Residue at 180°C	Tons per acre-foot	Calcium	Non-magnesium carbonate				
Oct. 5, 1950, right channel.....	29	17	0.02	490	83	91		183	1,450	70	1.0	1.1		2,520	2,290	3.43	1,560	1,410	11	2,630	7.6	0.000
Oct. 5, left channel.....	29	18	.02	520	82	77		182	1,520	47	1.0	1.0		2,510	2,360	3.41	1,630	1,480	9	2,570	7.4	.000
Oct. 17, right channel.....	27	20	.04	505	85	93		191	1,510	58	.8	.7		2,450	2,370	3.33	1,610	1,450	11	2,500	7.5	--
Oct. 17, left channel.....	27	19	.10	565	61	46		190	1,480	44	.8	1.1		2,480	2,310	3.37	1,660	1,500	6	2,500	7.7	--
Oct. 23, right channel.....	28	21	.04	500	75	151		186	1,540	89	.8	.8		2,470	2,470	3.36	1,560	1,410	17	2,610	7.6	--
Oct. 23, left channel.....	28	20	.02	588	51	45		187	1,490	46	.9	.7		2,480	2,330	3.37	1,680	1,530	5	2,500	7.7	--
Nov. 2.....	27	18	.02	513	95	64		188	1,490	72	1.0	1.1		2,510	2,350	3.41	1,670	1,520	8	2,610	7.6	.000
Nov. 16.....	19	21	.04	520	92	66		196	1,510	58	.9	1.3		2,540	2,370	3.45	1,680	1,520	8	2,600	7.6	--
Dec. 8.....	22	16	.04	528	91	55		197	1,500	58	1.2	1.2		2,520	2,350	3.43	1,690	1,530	7	2,620	7.6	.005
Jan. 2, 1951.....	33	16	.04	535	89	78		202	1,520	83	1.2	1.2		2,610	2,420	3.55	1,700	1,530	9	2,750	7.7	.000
Feb. 5.....	21	17	.04	545	83	46		196	1,510	46	1.0	1.0		2,520	2,350	3.43	1,700	1,540	6	2,610	7.5	.000
Mar. 8.....	34	13	.04	520	122	268		246	1,740	260	1.2	1.0		3,280	3,050	4.43	1,800	1,600	24	3,630	7.6	.000
Apr. 3.....	62	7.8	.01	394	113	406		191	1,480	445	.7	2.4		3,170	2,940	4.31	1,450	1,290	38	3,880	7.8	.000
May 7.....	16	15	.02	525	96	49		180	1,530	49	.9	8.0		2,520	2,350	3.43	1,710	1,560	6	2,600	7.7	.000
June 6.....	34	16	.02	231	58	248		199	1,945	145	.8	4.0		1,870	1,750	2.54	816	653	40	2,320	7.5	.000
July 3.....	4,180	17	.08	153	38	127		225	535	49	.7	1.7		1,080	1,030	1.47	358	354	34	1,420	7.2	.004
Aug. 1.....	4,570	19	.08	102	25	68		242	274	13	.6	1.6		1,653	1,517	1.67	358	358	160	917	7.2	.000
Sept. 5.....	3,230	15	.01	71	18	64		222	188	7.5	.4	1.4		484	--	.67	250	68	36	716	7.3	.000

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Temperature (°F) of water, April to September 1951

/Once-daily temperature measurement generally between 6 and 11 a. m. Temperatures in divided channel were averaged. 7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	a 86	40	--	73	a 72
2							--	59	58	--	73	a 71
3							a 57	a 87	58	a 65	72	a 72
4							56	60	64	61	74	62
5							59	a 64	57	66	73	60
6							55	a 64	72	75	--	52
7							a 52	a 68	72	76	73	67
8			56			49	a 56	--	a 64	72	69	68
9							--	a 64	a 69	72	72	65
10							a 50	a 66	a 65	62	70	58
11							--	a 64	a 73	59	71	59
12							a 58	a 64	a 73	65	73	54
13							54	a 58	a 68	72	69	52
14							a 51	a 66	58	69	67	50
15							a 53	a 60	72	75	63	51
16		54						a 65	a 58	69	70	a 64
17								60	a 62	70	71	54
18								a 56	a 66	74	72	67
19								a 58	a 65	62	74	a 72
20								a 54	a 60	62	--	a 59
21								a 52	a 61	60	--	53
22								a 62	a 72	58	--	--
23								a 54	64	a 65	--	a 59
24								a 54	a 68	--	a 78	71
25								a 58	a 69	65	75	62
26								a 56	--	66	74	a 74
27								a 68	a 68	67	76	63
28								a 70	66	61	76	72
29								a 68	a 60	63	73	--
30								a 60	a 60	--	75	a 76
31								--	a 50	--	72	--
Average							58	63	64	--	71	61

a Reading obtained between 2 p. m. and 8 p. m.

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951.

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	24	12	1	28			28	62	5
2-----	25	19	1	28			27	43	3
3-----	26			28			27	25	2
4-----	27			26			27	20	a 2
5-----	27	30	2	25	20	1	24	17	1
6-----	28			24			22		
7-----	50	2,390	s 342	26			22		
8-----	49	1,270	168	27			22		
9-----	41	167	16	24			22	10	1
10-----	35	64	6	22			22		
11-----	30	33	3	22	5	(t)	22		
12-----	28			22			21		
13-----	28	15	1	20			21		
14-----	28			19			21		
15-----	27			19	6	(t)	22	7	(t)
16-----	27			19			21		
17-----	27			20			21		
18-----	27	8	1	22			22		
19-----	27			22	65	4	21		
20-----	27			22			21		
21-----	27			25	118	6	21		
22-----	27			33	390	35	21	7	(t)
23-----	28			22	156	9	21		
24-----	26			22	31	2	21		
25-----	26	11	1	22	17	1	21		
26-----	27			24	23	1	21		
27-----	28			27			22		
28-----	27			27	34	2	31		
29-----	27			27			32	33	3
30-----	27	13	1	26	24	2	32		
31-----	27			--	--	--	27	16	1
Total-	905	--	567	722	--	90	726	--	35
	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	26			21			60	110	18
2-----	26			21			38	46	5
3-----	25			21			44		
4-----	25			21			45	42	5
5-----	25	10	1	21	8	(t)	45	44	5
6-----	24			21			49	50	7
7-----	24			21			38	29	3
8-----	24			20			33		
9-----	24			20			33		
10-----	23			20			34		
11-----	24	11	1	21	7	(t)	33	9	1
12-----	24			21			34		
13-----	23			21			34		
14-----	23			22			35	12	1
15-----	23			21			39	24	3
16-----	24			21			52	72	10
17-----	24			21	6	(t)	72	153	30
18-----	24	7	(t)	22			70	150	28
19-----	24			23			74	250	50
20-----	24			24	7	(t)	72	237	46
21-----	24			32	73	6	101	496	s 147
22-----	24			30	35	3	135	1,060	394
23-----	24			36	65	6	85	472	108
24-----	23	4	(t)	64	299	52	74	360	76
25-----	23			81	420	92	94	740	s 212
26-----	23			83	477	107	153	1,350	558
27-----	24			38	128	s 16	85	520	119
28-----	22			55	126	s 21	85	494	113
29-----	21	7	(t)	--	--	--	72	288	56
30-----	21			--	--	--	66	299	53
31-----	21			--	--	--	62	230	39
Total-	733	--	20	843	--	311	1,946	--	2,097

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	64	220	38	23			21	31	2
2-----	70	241	46	23			38	51	5
3-----	62	246	42	20	9	1	28	21	2
4-----	56	211	32	17			77	3,330	s 642
5-----	54	124	18	16			52	6,000	s 876
6-----	49	130	17	16	15	1	38	2,950	303
7-----	45	96	12	16			30	740	60
8-----	39	52	5	15			24	165	11
9-----	35	58	5	15			22	63	4
10-----	36	46	4	14			22	47	3
11-----	37			14	8	(t)	24	60	4
12-----	38			12			29	59	5
13-----	38	47	5	10			30	--	e 30
14-----	35			10			132	--	e 3,700
15-----	32	37	3	10	14	(t)	111	5,940	1,780
16-----	31			11			48	2,200	285
17-----	30	27	2	11			32	365	s 34
18-----	30			13	30	1	27	135	10
19-----	29			14			1,470	28,200	s 178,000
20-----	29			17			1,640	21,700	s 102,000
21-----	28	11	1	17	34	2	825	16,800	37,400
22-----	27			28	93	s 6	310	10,900	s 9,420
23-----	28			49	354	s 71	573	8,850	s 15,200
24-----	30			16	71	3	2,810	22,700	172,000
25-----	29			15			2,280	22,000	135,000
26-----	28			15	32	1			
27-----	27			14			830	17,100	36,300
28-----	25	21	1	14	30	1	400	10,100	10,900
29-----	24			14			251	6,100	4,130
30-----	22			13	22	1	153	2,610	1,080
31-----	--	--	--	12	21	1	104	1,010	284
Total--	1,107	--	257	504	--	106	12,429	--	711,670
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	72	440	86	3,190	29,500	s 287,000	43	105	12
2-----	168	2,560	s 1,930	1,430	20,300	s 82,600	56	388	s 62
3-----	3,010	24,000	s 238,000	605	10,400	s 17,603	77	659	s 142
4-----	2,140	15,600	90,100	400	4,920	5,310	376	15,600	s 17,600
5-----	1,140	13,700	42,200	290	2,720	2,130	2,370	31,100	s 226,000
6-----	425	9,700	11,100	228	1,620	997	1,530	23,000	95,000
7-----	270	4,650	s 3,470	162	1,090	477	1,330	18,400	66,100
8-----	172	1,950	906	144	900	350	2,090	19,800	112,000
9-----	127	860	295	127	550	189	1,910	23,100	s 125,000
10-----	97			156	1,000	421	675	13,300	24,200
11-----	104	380	103	101	480	131	376	7,300	7,410
12-----	111	410	123	97	210	55	232	4,900	3,070
13-----	196	1,660	s 978	740	26,500	s 58,100	159	2,200	944
14-----	310	8,250	s 6,660	540	22,700	33,100	135	1,050	383
15-----	193	6,080	s 3,290	310	13,200	s 11,300	104	558	157
16-----	153	4,000	1,650	353	11,600	11,100	90	276	67
17-----	122	2,470	814	450	17,700	s 22,000	79	140	30
18-----	90	800	194	425	12,500	14,300	66	109	19
19-----	64	270	47	290	7,020	s 5,710	60	70	11
20-----	44	120	14	162	2,700	1,330	55	60	9
21-----	44	190	23	172	1,300	604	48	40	5
22-----	84	1,440	s 554	169	700	319	43	30	3
23-----	106	8,940	s 2,130	179	690	333	42	30	3
24-----	60	8,900	1,440	280	8,770	s 9,900	39	30	3
25-----	189	30,000	s 16,200	247	23,300	15,500	37	30	3
26-----	119	16,100	s 5,500	150	12,000	s 5,070	34	19	2
27-----	75	6,100	1,240	106	3,700	1,080	31		
28-----	797	14,000	s 61,800	83	804	180	31		
29-----	3,610	29,100	s 278,000	61	312	51	31	17	1
30-----	3,740	19,600	s 208,000	54	148	22	31		
31-----	1,760	17,800	84,600	43	90	10	--	--	--
Total--	19,592	--	1,059,550	11,764	--	567,249	12,180	--	680,239
Total discharge for year (cfs-days)									63,451
Total load for year (tons)									3,022,191

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

CHEYENNE RIVER BASIN--Continued
CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(Methods of analysis: B, both with and without wax; D, decantation; P, pipette; S, sieve; N, in native water;
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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		0.350	0.500	1.000
Oct. 7, 1950.....	6:00 p.m.	60	--	2,340	4,050	--	88	--	97	--	99	--	--	--	SPWCM
June 4, 1951.....	10:30 a.m.	88	64	576	939	61	75	83	90	92	94	95	97	98	99 BWCM
June 4,.....	7:00 p.m.	94	--	9,650	8,050	70	88	96	100	--	--	--	--	--	PWCM
June 4,.....	7:00 p.m.	94	--	9,650	7,680	0	1	1	86	99	100	--	--	--	SPN
June 6,.....	2:30 p.m.	37	--	2,680	3,920	--	93	--	98	--	100	--	--	--	SPWCM
June 19,.....	1:30 p.m.	1,530	--	51,000	7,900	50	64	74	83	90	93	--	--	--	SPWCM
June 19,.....	3:20 p.m.	3,230	--	45,600	8,510	65	65	--	84	--	92	--	--	--	SPWCM
June 19,.....	8:15 p.m.	3,230	--	41,800	8,500	65	66	--	84	--	92	--	--	--	SPWCM
June 20,.....	6:30 a.m.	1,880	--	25,600	9,900	80	80	--	83	--	90	--	--	--	SPWCM
June 22,.....	6:00 p.m.	7,270	--	8,120	7,400	--	86	--	97	--	98	--	--	--	SPWCM
June 23,.....	540	--	--	8,730	10,700	--	73	--	93	--	97	--	--	--	SPWCM
June 24,.....	6:15 p.m.	3,610	--	26,600	15,300	--	60	--	80	--	91	--	--	--	SPWCM
June 26,.....	4:00 p.m.	680	75	16,000	6,050	64	77	86	92	94	94	--	--	--	SPWCM
June 28,.....	4:00 p.m.	680	73	16,000	12,000	--	1	7	91	93	95	--	--	--	SPN
July 3,.....	11:00 a.m.	5,400	--	34,000	5,420	--	61	--	77	--	89	--	--	--	SPWCM
July 3,.....	3:00 p.m.	4,370	65	30,900	6,000	--	62	--	81	--	91	--	--	--	SPWCM
July 6,.....	10:30 a.m.	75	75	10,200	7,360	--	83	--	97	--	98	--	--	--	SPWCM
July 24,.....	6:15 p.m.	50	78	6,330	5,300	--	93	--	--	--	100	--	--	--	SPWCM
Aug. 1,.....	12:30 p.m.	4,570	78	36,100	5,490	47	57	67	75	84	92	--	--	--	SPWCM
Aug. 1,.....	12:30 p.m.	4,570	78	36,100	11,400	1	2	6	75	83	92	--	--	--	SPN
Aug. 1,.....	8:45 p.m.	2,140	--	30,200	9,600	--	64	--	83	--	95	--	--	--	SPWCM
Aug. 2,.....	1:45 p.m.	1,430	--	18,100	14,300	--	71	--	88	--	95	--	--	--	SPWCM
Aug. 2,.....	7:15 p.m.	1,050	77	15,800	12,300	--	73	--	89	--	95	--	--	--	SPWCM
Aug. 15,.....	3:32	63	--	14,200	5,780	--	85	--	95	--	99	--	--	--	SPWCM
Sept. 4,.....	11:30 a.m.	540	--	24,600	10,600	--	74	--	94	--	98	--	--	--	SPWCM
Sept. 5,.....	1:30 p.m.	3,420	--	41,500	7,230	1	3	15	68	82	90	94	98	99	SPN
Sept. 5,.....	1:30 p.m.	3,420	--	41,500	8,000	38	49	60	70	80	88	91	95	97	100 BWCM
Sept. 5,.....	5:00 p.m.	3,420	62	30,600	11,000	--	55	--	76	--	93	--	--	--	SPWCM
Sept. 6,.....	6:00 a.m.	2,420	52	18,400	7,180	--	62	--	83	--	94	--	--	--	SPWCM
Sept. 8,.....	6:15 p.m.	2,420	69	23,500	8,100	--	54	--	73	--	91	--	--	--	SPWCM

CHEYENNE RIVER BASIN--Continued

ANGOSTURA RESERVOIR NEAR HOT SPRINGS, S. DAK.

LOCATION.--On Cheyenne River, 4 miles upstream from Fall River and from bridge on U. S. Highway 18 and State Highway 79, and 6½ miles southeast of Hot Springs Fall River County.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

REMARKS.--Samples collected at upstream face of spillway of Angostura Dam.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Reser- voir storage (acre- feet)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Car- bonate (CO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids			Hardness as CaCO ₃		Per- cent so- dium	Specific conduct- ance (micro- mhos at 25°C)	pH
															Parts per million		Tons per acre- foot	Calcium	Non- carbon- ate			
															Residue at 180°C	Sum						
Oct. 5, 1950.....	3,000	11	0.20	283	35	156	176	0	880	88	0.7	1.0	--	--	1,660	1,540	2.26	848	704	29	1,990	7.7
Nov. 2.....	3,500	9.0	.02	256	65	151	9.3	176	0	900	89	7	.5	0.30	1,710	1,570	2.33	906	762	28	2,130	7.8
Nov. 16.....	4,000	12	.10	272	63	161	9.4	177	0	975	89	1.2	.6	.20	1,790	1,680	2.43	938	793	27	2,130	7.6
Dec. 8.....	4,500	9.8	.04	285	55	149	9.4	177	0	955	90	.8	.4	.22	1,770	1,640	2.41	936	791	25	2,140	7.9
Jan. 2, 1951.....	5,000	5.4	.02	280	68	154	9.0	177	0	1,010	93	.7	.4	.18	1,840	1,710	2.50	980	835	25	2,230	7.9
Feb. 5.....	6,000	8.0	.02	309	60	153	9.6	180	0	1,050	94	.7	.3	.20	1,910	1,770	2.60	1,020	872	24	2,250	7.9
Mar. 6.....	7,800	5.9	.04	204	48	112	6.9	128	0	765	69	.6	.3	--	1,330	1,270	1.81	707	604	25	1,670	7.5
Apr. 3.....	10,000	10	.04	335	62	138	8.0	179	0	1,100	90	.8	.8	--	1,990	1,840	2.71	1,090	943	21	2,250	7.9
May 7.....	11,500	8.2	.02	345	79	146	8.8	179	0	1,160	101	.8	.7	--	2,100	1,940	2.86	1,190	1,040	20	2,380	7.9
June 6.....	12,000	6.8	.04	353	75	142	7.7	169	0	1,170	105	.8	.4	--	2,110	1,940	2.87	1,190	1,050	20	2,420	8.0
July 2.....	37,000	8.2	.02	310	80	147	9.5	135	5	1,090	97	.8	1.1	--	1,910	1,810	2.60	1,100	981	22	2,270	8.3
Aug. 1.....	65,500	8.1	.04	234	55	127	9.3	129	5	865	67	.7	1.3	--	1,540	1,440	2.09	812	698	25	1,840	8.2
Sept. 6.....	86,000	8.7	.02	199	47	115	9.2	140	0	735	56	.7	1.4	--	1,310	1,240	1.78	690	575	26	1,640	7.8

CHEYENNE RIVER BASIN--Continued

ANGOSTURA RESERVOIR NEAR HOT SPRINGS, S. DAK.--Continued

Nitrogen, phosphorus, and related physical measurements, water year October 1950 to September 1951
 /Analytical results in parts per million except as indicated/

	Date of collection	Reservoir storage (acre-feet)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
					Ammonia	Nitrite	Nitrate	Organic	Total		
	Oct. 5, 1950.....	3,000	55	6	0.01	0.003	0.1	0.22	0.3	0.008	0.02
	Nov. 2.....	3,500	--	.8	.00	.001	.1	.15	.3	.004	.04
	Dec. 8.....	4,500	34	2	.00	.002	.1	.33	.4	.004	.02
	Jan. 2, 1951.....	5,000	--	.7	.03	.000	.1	.35	.5	.005	.05
	Feb. 5.....	6,000	32	1	.03	.002	.1	.15	.3	.006	.05
	Mar. 6.....	7,800	--	2	.04	.01	.1	.43	.6	.004	.04
	Apr. 3.....	10,000	44	2	.00	.002	.2	.14	.3	.008	.02
	May 7.....	11,500	55	1	.00	.002	.2	.39	.6	.008	.03
	June 6.....	12,000	62	3	.00	.001	.1	.40	.5	.001	.04
	July 2.....	37,000	--	4	.00	.01	.8	.40	1.2	.008	.05
	Aug. 1.....	65,500	74	4	.04	.009	.5	.45	1.0	.004	.04
	Sept. 6.....	86,000	--	3	.01	.004	.1	.30	.4	.009	.08

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.

LOCATION.--At gaging station 100 feet upstream from mouth of Trail Creek, three-quarters of a mile downstream from Donkey Creek, and 2.8 miles northwest of Moorcroft, Crook County.

DRAINAGE AREA.--1,670 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1950.

Water temperatures: November 1950 to September 1951.

Sediment records: May 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures (November 1950 to September 1951): Maximum, 86° F July 23; minimum, freezing point on several days during November to March.

Sediment concentrations: Maximum daily, 10,000 ppm Aug. 15; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 12,400 tons Sept. 5; minimum daily, no flow on many days.

EXTREMES, May 1950 to September 1951.--Sediment concentrations: Maximum daily, no flow on many days.

Sediment loads: Maximum daily, 12,400 tons Sept. 5, 1951; minimum daily, 0 tons on many days.

REMARKS.--Prior to Jan. 17, 1951, at site 5 1/2 miles downstream. Flow affected by ice Nov. 25 to Mar. 31. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, February to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Calcium	Non-magnesium					
																			Residue at 180° C				Sum
Feb. 8, 1951.....	0.1	14	0.30	128	62	468		629	0	1,010	14	0.7	1.7	--	2,020	2,010	2.75	574	58	64	2,700	7.5	
Mar. 9.....	.1	10	.20	178	86	622		807	0	1,410	15	.7	.3	--	2,770	2,710	3.77	799	137	62	3,580	7.7	
Apr. 5.....	.2	3.1	.10	78	67	368		424	12	852	9.5	.8	.5	0.12	1,670	1,600	2.27	470	103	82	2,280	8.3	
Sept. 5.....	718	9.8	.04	24	10	30		98	0	79	.2	.4	2.3	.05	210	--	.29	101	21	39	305	6.8	

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.--Continued

Temperature (°F) of water, November 1950 to September 1951

/Once-daily temperature measurement generally before noon during February and March and between 3 and 8 p. m.
April to September. Many days of no flow./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	--	--	--	32	--	--	--	--	76	57
2		--	--	--	33	35	--	--	--	--	78	--
3		--	--	--	--	34	--	--	--	--	71	61
4		--	--	--	--	32	--	67	--	--	71	59
5		--	--	--	33	32	50	--	--	--	--	62
6		--	--	--	--	32	52	--	--	--	--	62
7		--	--	--	33	33	54	--	--	--	--	60
8		--	--	--	33	36	51	--	--	--	--	58
9		--	34	--	33	33	45	--	--	--	--	--
10		--	--	--	--	36	--	--	--	--	--	--
11		--	34	--	--	36	--	--	--	--	--	--
12		--	--	--	--	34	--	--	--	--	--	--
13		--	34	--	--	34	--	--	--	69	71	--
14		--	--	--	--	32	--	--	--	70	63	--
15		--	34	--	--	33	--	--	--	71	58	--
16		--	--	--	--	34	--	--	--	72	--	--
17		--	--	34	--	33	--	--	--	71	62	--
18		--	34	--	--	36	--	--	--	--	66	--
19		--	--	34	--	36	--	58	55	--	71	--
20		--	35	--	--	36	--	56	--	--	67	--
21		--	--	--	33	37	--	75	61	--	65	--
22		--	--	34	34	39	--	64	67	--	66	--
23		--	35	--	34	33	--	73	60	86	--	--
24		--	--	35	35	--	--	--	63	73	--	--
25		--	--	--	35	--	--	57	61	75	--	--
26		52	--	34	32	--	--	--	68	71	--	--
27		50	--	--	34	--	--	--	--	72	--	--
28		--	--	--	36	--	--	--	--	--	--	--
29		--	--	33	--	--	--	--	--	--	--	--
30		49	--	--	--	--	--	--	--	--	--	--
31		46	--	33	--	--	--	--	--	--	--	--
Average		--	--	--	--	--	--	64	62	73	66	--

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	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	.1		
10-----				0		0	.2		
11-----				0		0	.1	134	(t)
12-----				0		0	.1		
13-----				0		0	.1		
14-----				0		0	.1		
15-----				0		0	.1		
16-----				0		0	.1	87	(t)
17-----				0		0	.1		
18-----				0		0	.1		
19-----				0		0	.1		
20-----				0		0	.1		
21-----				0		0	.1	61	(t)
22-----				0		0	.1		
23-----				0		0	.1		
24-----				0		0	.1		
25-----				0		0	.1		
26-----				.1	42	(t)	0	--	0
27-----				.1			0	--	0
28-----				.1			0	--	0
29-----				.1			0	--	0
30-----				.1			0	--	0
31-----				--		--	0	--	0
Total-	0		0	0.5		0.1	1.8	--	0.4
	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0	--	0	0.1	150	(t)	0.1	81	(t)
2-----	0	--	0	.1			.1		
3-----	0	--	0	.1			.1		
4-----	0	--	0	.1			.1		
5-----	0	--	0	.1			.1		
6-----	0	--	0	.1	55	(t)	.1	50	(t)
7-----	0	--	0	.1			.1		
8-----	0	--	0	.1			.1		
9-----	0	--	0	.1			.1		
10-----	0	--	0	.1			.1		
11-----	0	--	0	.1	95	(t)	.1	65	(t)
12-----	0	--	0	.1			.1		
13-----	0	--	0	.1			.1		
14-----	0	--	0	.1			.1		
15-----	0	--	0	.1			.1		
16-----	0	--	0	.1	208	.1	.1	226	.1
17-----	.2	208	.1	.1			.1		
18-----	.2			.1			.1		
19-----	.2			.1			.1		
20-----	.2			.1			.1		
21-----	.2	226	.1	.1	95	(t)	.1	65	(t)
22-----	.2			.1			.1		
23-----	.2			.1			.1		
24-----	.2			.1			.1		
25-----	.2			.1			.1		
26-----	.2	226	.1	.1	95	(t)	.1	65	(t)
27-----	.2			.1			.1		
28-----	.1			.1			.1		
29-----	.1			--			.1		
30-----	.1			--			.1		
31-----	.1			--			.1		
Total-	2.6	--	1.5	2.8	--	0.6	3.1	--	0.5

t Less than 0.05 ton.

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0.1	71	(t)	0	--	0	0	--	0
2-----	.1			0	--	0	0	--	0
3-----	.1			0	--	0	0	--	0
4-----	.2	66	(t)	.2	102	.1	0	--	0
5-----	.2			0	--	0	0	--	0
6-----	.1			0	--	0	0	--	0
7-----	.1	45	(t)	0	--	0	0	--	0
8-----	.1			0	--	0	0	--	0
9-----	.1			0	--	0	0	--	0
10-----	0	--	0	0	--	0	0	--	0
11-----	0	--	0	0	--	0	0	--	0
12-----	0	--	0	0	--	0	0	--	0
13-----	0	--	0	0	--	0	0	--	0
14-----	0	--	0	0	--	0	0	--	0
15-----	0	--	0	0	--	0	0	--	0
16-----	0	--	0	0	--	0	0	--	0
17-----	0	--	0	0	--	0	0	--	0
18-----	0	--	0	0	--	0	0	--	0
19-----	0	--	0	.1	75	(t)	.1	80	(t)
20-----	0	--	0	.1			1.2	67	sa 1.0
21-----	0	--	0	.6	46	s 3	4.8	242	s 3.6
22-----	0	--	0	3.8	152	s 1.7	.9	115	s .3
23-----	0	--	0	.8	88	.2	15	254	s 9.6
24-----	0	--	0	.2	88	(t)	2.7	229	s 1.9
25-----	0	--	0	.1	88	(t)	.3	172	.1
26-----	0	--	0	0	--	0	.2	136	.1
27-----	0	--	0	0	--	0	0	--	0
28-----	0	--	0	0	--	0	0	--	0
29-----	0	--	0	0	--	0	0	--	0
30-----	0	--	0	0	--	0	0	--	0
31-----	--	--	--	0	--	0	--	--	--
Total-	1.1	--	0.3	5.9	--	2.4	25.2	--	16.6
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	0	--	0	12	755	s 240	37	2,090	s 252
2-----	0	--	0	41	5,620	s 780	.3	1,400	sa 1.1
3-----	0	--	0	3.2	1,490	s 16	37	2,160	sa 650
4-----	0	--	0	.3	820	.7	634	7,020	s 11,800
5-----	0	--	0	0	--	0	710	6,450	12,400
6-----	0	--	0	0	--	0	118	4,580	1,460
7-----	0	--	0	0	--	0	78	3,740	788
8-----	0	--	0	0	--	0	175	6,520	3,080
9-----	0	--	0	0	--	0	86	4,740	s 1,240
10-----	0	--	0	0	--	0	17	2,600	a 119
11-----	0	--	0	0	--	0	8.8	2,200	a 52
12-----	0	--	0	0	--	0	2.0	2,000	11
13-----	62	4,040	s 415	3.0	524	s 5.1	.5	1,480	2.0
14-----	6.8	3,340	s 73	9.4	514	s 18	0	--	0
15-----	1.9	922	s 5.2	199	10,000	s 5,400	0	--	0
16-----	.2	420	.2	22	7,890	sa 504	0	--	0
17-----	.1	200	.1	6.8	4,900	sa 100	0	--	0
18-----	0	--	0	1.7	2,000	s 10	0	--	0
19-----	0	--	0	.1	830	.2	0	--	0
20-----	0	--	0	2.2	632	s 7.6	0	--	0
21-----	0	--	0	7.5	1,710	s 38	0	--	0
22-----	0	--	0	.9	1,450	3.5	0	--	0
23-----	38	738	s 253	0	--	0	0	--	0
24-----	24	6,940	s 403	0	--	0	0	--	0
25-----	3.6	3,860	s 43	0	--	0	0	--	0
26-----	.3	1,240	s 1.8	0	--	0	0	--	0
27-----	.1	448	s 2	0	--	0	0	--	0
28-----	0	--	0	0	--	0	0	--	0
29-----	0	--	0	0	--	0	0	--	0
30-----	0	--	0	0	--	0	0	--	0
31-----	0	--	0	0	--	0	--	--	--
Total-	137.0	--	1,194.5	309.1	--	7,123.1	1,903.6	--	31,855.1

Total discharge for year (cfs-days)..... 2,392.7

Total load for year (tons)..... 40,195.0

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued
BELLE FOURCHE RIVER BELOW MOORECROFT, WYO.--Continued

Particle-size analyses of suspended sediment, July to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
July 13, 1951 ...	5:30 p. m.	29	69	8,130	4,840	89	95	98	98	--	100	--	--	--	--	SPWCM
July 13	5:30 p. m.	29	69	8,130	4,910	8	28	100	--	--	--	--	--	--	--	PNM
July 23	5:20 p. m.	94	--	946	707	74	86	91	96	98	99	100	--	--	--	BWCM
July 23	6:35 p. m.	142	80	2,600	1,380	82	92	96	98	100	--	--	--	--	--	BWCM
July 23	9:30 p. m.	137	--	2,770	3,180	--	94	--	100	--	--	--	--	--	--	PWCM
July 24	10:00 a. m.	19	70	8,280	6,560	--	97	--	100	--	--	--	--	--	--	BWCM
Aug. 3	10:30 a. m.	3.4	79	1,380	2,040	93	97	98	99	99	100	--	--	--	--	BWCM
Aug. 15	3:00 p. m.	236	--	9,010	9,600	--	92	--	100	--	--	--	--	--	--	PWCM
Aug. 20	2:30 p. m.	2.7	68	1,170	1,800	84	96	97	99	99	100	--	--	--	--	BWCM
Sept. 5	4:00 p. m.	714	62	6,010	6,210	--	94	--	99	--	100	--	--	--	--	SPWCM
Sept. 6	8:00 a. m.	116	58	4,660	3,670	--	95	--	100	--	--	--	--	--	--	PWCM
Sept. 7	6:35 p. m.	42	60	3,220	2,170	81	97	100	--	--	--	--	--	--	--	BWCM
Sept. 8	8:00 a. m.	202	58	6,780	4,330	--	94	--	99	--	100	--	--	--	--	SPWCM
Sept. 13	6:00 p. m.	a. 5	--	1,320	940	94	99	100	--	--	--	--	--	--	--	BWCM

Mean daily discharge.

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued
BELLE FOURCHE RIVER BELOW WHITEWOOD CREEK NEAR VALE, S. DAK.

LOCATION.--At bridge on State Highway 79, 1½ miles downstream from Whitewood Creek, 3 miles northwest of Vale, Butte County, and 6 miles south of Newell.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.
REMARKS.--Discharges calculated for this station by Pierre, S. Dak. Surface Water office.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Sum	Residue at 180°C	Calcium	Non-carbonate		
Dec. 15, 1950.....	59	14	0.10	250	115	153		300		1,110	18	0.9	0.2	0.41	1,880	1,810	1,810	1,100	854	23	2,150	7.5
Jan. 4, 1951.....	30	10	.10	352	83	138		344		1,160	18	.9	1.6	.30	2,010	1,930	2,730	1,220	938	20	2,770	7.3
Feb. 9.....	78	11	.04	310	144	116		398		1,210	20	.7	1.6	.20	2,170	2,010	2,950	1,360	1,030	16	2,400	7.5
Mar. 9.....	68	8.0	.10	278	113	104		332		1,040	20	.8	1.9	.25	1,890	1,730	2,570	1,160	888	16	2,110	7.7
Apr. 6.....	65	11	.10	184	73	97		213		744	13	.8	.1	.31	1,320	1,230	1,800	758	583	22	1,610	7.2
May 7.....	39	14	.16	177	80	103		219		763	13	.4	1.3	.19	1,280	1,260	1,740	771	591	22	1,570	7.4
June 5.....	120	11	.06	184	75	96		206		763	8.0	.4	1.6	.22	1,300	1,240	1,770	768	599	21	1,590	7.4
June 30.....	100	10	.02	204	82	115		216		825	9.0	.6	1.0	.22	1,390	1,330	1,890	846	669	20	1,670	7.3
Aug. 3.....	220	8.6	.02	258	93	115		190		1,060	11	.6	.7	.29	1,710	1,640	2,330	1,030	874	20	1,950	7.2
Sept. 5.....	300	7.0	.02	201	73	89		172		808	8.0	.8	1.0	.25	1,360	1,270	1,850	802	661	20	1,620	7.2

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER NEAR ELM SPRINGS, S. DAK.

LOCATION.--At gaging station at county highway bridge, 5½ miles downstream from Hay Creek, and 4½ miles northwest of Elm Springs, Meade County.
 DRAINAGE AREA.--7,210 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Sum	Calcium	Non-carbonate			
Oct. 17, 1950	66	6.1	0.04	242	123	193		162		1,300	25	0.6	6.2	0.44	2,180	1,980	1,980	1,110	977	27	2,400	7.8
Dec. 6	29	16	.04	375	172	225		410		1,680	33	1.0	.0	.52	2,970	2,700	2,700	1,640	1,300	23	3,160	7.6
Jan. 4, 1951	37	10	.10	370	205	345		433		1,990	48	.8	24	.54	3,520	3,210	3,210	1,770	1,420	30	3,570	7.9
Feb. 2	8	15	.20	865	380	696		670		3,880	99	1.1	7.2	.94	6,820	6,080	6,080	3,220	2,670	32	6,230	7.5
Mar. 26	292	4.6	.06	177	88	219		170		1,020	37	.8	29	.29	1,810	1,660	1,660	802	663	37	2,130	7.0
May 28	89					276												1,260		32	3,060	
June 18	545					175												1,040		38	1,040	
July 9	144					145												993		22	2,090	
Aug. 2	215					129												972		22	2,090	
Sept. 13	143					124												916		23	1,980	

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR EAGLE BUTTE, S. DAK.

LOCATION.--At gaging station at bridge on State Highway 63, 0.5 mile upstream from Hermaphrodite Creek, and 21 miles south of Eagle Butte, Dewey County. DRAINAGE AREA.--24,500 square miles, approximately. RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951. Dissolved solids: Maximum, 2,260 ppm Dec. 22; minimum, 804 ppm Sept. 2-11. EXTREMES, December 1950 to September 1951.--Dissolved solids: Maximum, 2,260 ppm Dec. 22; minimum, 804 ppm Sept. 2-11.

Hardness: Maximum, 1,190 ppm Jan. 17-31; minimum, 284 ppm Sept. 2-11.

Specific conductance: Maximum daily, 3,080 microhmhos Feb. 1; minimum daily, 968 microhmhos Sept. 10.

REMARKS.--Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Daily samples for chemical analysis composited by discharge. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (microhmhos at 25°C)	pH	Color			
														Tons per acre-foot	Tons per million	Tons per million	Calcium	Non-carbonate							
																							Residue at 180°C	Sum	Sum
Dec. 22, 1950	85	15	0.12	220	122	210	12	95	1,260	51	--	3.0	0.33	2,260	1,940	519	1,050	972	30	--	8.0	4			
Jan. 17-31, 1951	30.0	11	.01	300	107	213	9.8	306	1,280	56	0.6	3.6	.30	2,240	2,130	3,05	1,181	1,000	939	28	2,610	7.8	5		
Feb. 1-28	41.6	11	.06	278	86	207	9.8	278	1,150	52	.8	1.9	.26	2,130	1,940	2,90	239	1,050	822	30	2,480	8.0	5		
Mar. 1-20	71.5	9.5	.06	250	83	151	9.6	260	965	47	.6	3.0	.25	1,900	1,650	2.56	367	964	751	25	2,160	7.8	4		
Mar. 21, gage	110	11	.30	183	122	181	9.2	262	1,010	51	.5	6.6	.23	1,880	1,700	2.56	a 558	960	745	29	2,190	7.9	3		
Mar. 21, right channel	110	7.8	.26	183	123	185	9.0	260	1,020	52	.5	5.6	.25	1,870	1,710	2.54	--	964	751	29	2,190	7.8	4		
Mar. 21, left channel	110	7.8	.06	248	83	167	9.0	261	995	54	.8	5.2	.25	1,900	1,700	2.58	--	960	746	27	2,190	8.1	5		
Mar. 22-24	173	8.7	.06	220	67	151	8.1	234	850	47	.8	4.5	.21	1,650	1,470	2.24	771	824	28	2,050	7.9	5			
Mar. 25-27	6,500	8.8	.04	110	31	112	5.8	137	490	10	.2	2.6	.09	884	--	1.22	3,940	402	290	37	1,180	7.6	17		
Mar. 28	6,500	16	.12	115	27	117	8.0	196	423	19	--	28	.17	914	--	1.24	16,040	398	237	38	1,100	7.5	17		
Mar. 29-Apr. 1	1,652	11	.20	107	25	110	6.5	134	450	19	.2	4.6	.17	820	--	1.12	3,660	368	258	39	1,130	7.7	20		
Apr. 2-9	485	13	.05	149	51	157	8.5	171	713	31	.5	9.3	.21	1,270	1,220	1.73	1,660	580	440	37	1,630	7.5	6		
Apr. 10-May 10	162	12	.05	216	82	218	11	189	1,080	48	.6	4.2	.27	1,890	1,780	2.57	827	876	721	35	2,230	7.6	6		
May 11-June 1	183	15	.04	238	94	234	16	162	1,260	49	.7	8.8	.33	2,190	2,000	2.98	1,080	980	847	34	2,540	7.5	7		
June 2-8	870	24	.06	124	31	194	11	204	655	28	.5	2.2	.26	1,220	1,170	1.66	2,870	437	270	48	1,600	7.6	6		
June 10-18	490	20	.03	176	49	203	14	179	880	32	.7	4.5	.31	1,530	1,470	2.28	2,420	640	493	40	1,930	7.7	7		
June 19-21	1,460	16	.04	167	49	177	12	170	825	23	.8	6.6	.31	1,410	1,360	1.92	5,560	620	481	38	1,760	7.7	7		
June 22-24	1,134	18	.04	157	41	193	15	206	745	18	.5	.8	.29	1,340	1,290	1.82	4,100	560	391	42	1,730	7.4	6		
June 25-26	1,755	26	.04	95	18	181	10	228	470	17	.6	.8	.25	1,338	--	--	1,28	4,440	311	124	55	1,730	7.5	6	
June 27-July 3	588	26	.04	110	24	186	11	171	560	19	.5	5.9	.24	1,090	1,050	1.48	1,730	373	233	51	1,470	7.5	7		
July 4-6	1,134	21	.26	156	38	174	10	214	715	17	.6	1.2	.34	1,300	1,240	1.77	3,980	544	369	40	1,670	7.5	8		
July 7-Aug. 16	348	19	.02	177	62	169	13	142	885	27	.6	3.6	.32	1,540	1,430	2.09	1,450	698	580	34	1,860	7.4	5		

Mean for cross section.

a Mean for cross section.

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR EAGLE BUTTE, S. DAK.--Continued

Chemical analyses, in parts per million, December 1950 to September 1951--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids			Hardness as CaCO ₃		Per- cent soli- dum	Specific conduct- ance (micro- mhos at 25°C)	pH	Color	
														Parts per million		Tons per acre- foot	Tons per day	Calcium, Non- carbon- ate					Non- carbon- ate
														Residue at 180°C	Sum								
Aug. 17-18, 1951.	822	17	0.08	205	52	166	14	234	860	24	0.8	0.4	0.33	1,540	1,450	3,420	724	532	33	1,850	7.6	16	
Aug. 19-Sept. 1.	314	19	.02	199	64	161	13	147	945	25	.6	2.8	.39	1,600	1,500	2,180	760	639	31	1,920	7.6	5	
Sept. 2-11.....	1,323	24	.04	88	16	140	9.0	175	418	14	.6	1.0	.27	804	--	1,090	284	140	51	1,140	7.6	10	
Sept. 12-30.....	300	17	.02	189	61	149	12	154	870	25	.6	3.2	.30	1,500	1,400	2,040	722	596	31	1,810	7.6	5	
Weighted average b.....	403	18	0.06	152	45	164	11	175	721	25	0.6	5.0	0.27	1,300	--	1,770	1,410	564	420	38	1,630	--	--

b Represents 87 percent of runoff for water year October 1950 to September 1951.

CHEYENNE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN CHEYENNE RIVER BASIN

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Per cent so-dium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
																			Residue at 180°C				Sum
CHEYENNE RIVER NEAR WASTA, S. DAK.																						
Dec. 7, 1950.....	30	14	0.10	268	80	183		344		965	75	0.6	3.1		1,850	1,760	998	716	29	2,190	7.7	
Apr. 6, 1951.....	79	6.6	.06	149	47	102	--	192		540	48	.2	.7	0.20	1,050	989	566	409	28	1,380	8.1	
July 3.....	455	--	--	65	9.0	160	--	--	--	--	--	--	--	--	--	--	199	--	64	1,980	--	

CHEYENNE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN CHEYENNE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
SOUTH FORK CHEYENNE RIVER NEAR SPENCER, WYO.			
June 6, 1951.....	4.7	1,280	16
June 12.....	920	28,400	70,500
June 13.....	64	11,800	2,040
June 15.....	12	654	21
June 19.....	505	18,600	25,400
June 22.....	41	5,240	580
June 23.....	1,570	28,500	121,000
June 26.....	227	11,400	6,990
June 28.....	36	2,700	262
July 3.....	1,140	28,200	86,800
July 4.....	1,130	28,300	86,300
July 5.....	278	11,600	8,710
July 10.....	1.7	403	1.8
July 11.....	48	1,120	145
July 17.....	3.6	1,400	14
July 24.....	309	29,900	24,900
July 29.....	2,620	33,000	242,000
Aug. 1.....	759	19,400	39,800
Aug. 2.....	80	8,710	1,880
Aug. 7.....	55	661	98
Aug. 14.....	120	11,700	3,790
Aug. 16.....	777	21,100	44,300
Sept. 5.....	1,100	33,500	103,000
Sept. 6.....	422	16,400	18,700
Sept. 11.....	154	4,570	1,900
Sept. 20.....	4.2	74	.8
CHEYENNE RIVER AT ANGOSTURA RESERVOIR OUTLET, S. DAK.			
Nov. 16, 1950.....	12	13	0.4
Dec. 8.....	9	2	.05
May 7, 1951.....	.2	9	(t)
June 6.....	.7	20	(t)
Aug. 14.....	2.2	12	.07
Sept. 6.....	1.8	8	(t)
CHEYENNE RIVER BELOW ANGOSTURA RESERVOIR, S. DAK.			
Oct. 5, 1950.....	19	5	(t)
Dec. 8.....	9	7	.2
Jan. 2, 1951.....	1.2	8	(t)

t Less than 0.05 ton.

CHEYENNE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN CHEYENNE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350		0.500	1.000
SOUTH FORK CHEYENNE RIVER NEAR SPENCER, WYO.																	
June 22, 1951...	9:00 p. m.	41	59	5,240	6,470	--	95	--	98	--	98	--	--	--	--	SPWCM	
June 23	12:30 p. m.	1,570	--	28,500	7,610	44	54	63	71	80	91	96	100	--	--	SPWCM	
June 26	3:45 p. m.	227	77	11,400	7,320	--	89	--	96	--	98	--	--	--	--	SPWCM	
June 28	2:45 p. m.	36	64	2,700	3,120	--	97	--	97	--	97	--	--	--	--	SPWCM	
July 3	11:30 a. m.	1,140	61	28,200	8,120	--	56	--	74	--	88	--	--	--	--	SPWCM	
July 5	3:45 p. m.	278	80	11,600	3,240	71	84	91	92	92	94	--	--	--	--	SPWCM	
July 17	10:50 a. m.	3.6	--	1,400	3,220	--	97	--	99	--	100	--	--	--	--	SPWCM	
July 24	1:30 p. m.	309	--	29,900	7,130	--	69	--	87	--	90	92	94	97	100	SPWCM	
July 29	10:00 a. m.	2,620	75	33,000	7,090	--	56	--	72	--	90	--	--	--	--	SPWCM	
Aug. 2	7:00 p. m.	80	--	8,710	9,240	--	82	--	92	--	98	--	--	--	--	SPWCM	
Aug. 7	2:15 p. m.	55	--	661	1,070	84	91	94	94	95	96	97	99	99	100	MBWC	
Aug. 14	1:15 p. m.	120	67	11,700	6,780	--	85	--	94	--	97	--	--	--	--	SPWCM	
Aug. 16	11:30 a. m.	777	67	21,100	10,000	54	64	75	82	86	94	--	--	--	--	SPWCM	
Sept. 5	11:00 a. m.	1,100	62	33,500	8,030	--	54	--	73	--	88	--	--	--	--	SPWCM	
Sept. 11	12:45 p. m.	1,154	61	4,570	4,200	--	81	--	86	--	88	--	--	--	--	SPWCM	

MISSOURI RIVER MAIN STEM

MISSOURI RIVER AT PIERRE, S. DAK.

LOCATION.--At gaging station at Chicago and Northwestern Railway bridge at Pierre, Hughes County, 1.2 miles (revised) upstream from Bad River. DRAINAGE AREA.--243,500 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

Water temperatures: March to September 1951.

EXTREMES, January to September 1951.--Dissolved solids: Maximum, 540 ppm Mar. 1-3; minimum, 286 ppm July 1-23.

Hardness: Maximum, 289 ppm Feb. 15; minimum, 134 ppm July 9.

Specific conductance: Maximum daily, 394 microhos July 3.

Temperature: Maximum daily, 78° F. Mar. 15; minimum, 45° F. Mar. 15.

REMARKS.--Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Daily samples for chemical analysis composited by discharge. Monthly samples for nitrogen cycle determinations were collected from U.S. Highway 14 bridge at Pierre. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (microhos at 25° C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 3, 1950, sta. 600	27,100	11	0.04	61	19	67	4.8	180	202	10	0.6	2.2	0.30	474	0.64	b35,050	229	81	702	7.9	--
Oct. 3, sta. 950	27,100	11	0.04	61	19	66	4.6	180	204	12	0.6	1.6	0.24	474	0.64	229	229	81	702	7.9	--
Oct. 3, sta. 1200 a	27,100	11	0.04	61	20	67	4.2	180	204	11	0.6	1.6	0.24	474	0.65	229	229	81	702	7.9	--
Oct. 3, sta. 1350 a	27,100	12	0.04	61	20	69	5.1	180	214	11	0.6	1.6	0.20	490	0.67	229	229	87	719	7.8	--
Nov. 3, sta. 600 a	35,400	8.9	0.02	56	22	58	3.9	184	177	9.0	0.6	0.9	0.30	448	0.61	b42,920	228	77	666	8.0	--
Nov. 3, sta. 900 a	35,400	11	0.02	56	22	57	3.9	183	176	9.0	0.6	0.7	0.30	445	0.61	228	228	78	670	7.8	--
Nov. 3, sta. 1200 a	35,400	9.2	0.02	56	22	58	3.4	182	183	9.0	0.6	1.0	0.30	452	0.61	228	228	79	671	8.0	--
Nov. 3, sta. 1350 a	35,400	9.0	0.02	56	22	57	4.2	184	181	9.0	0.6	1.0	0.30	450	0.61	229	229	78	678	7.9	--
Jan. 8, 1951 c	17,300	11	0.02	65	24	64	3.8	212	210	11	0.5	1.7	--	514	0.70	b23,920	262	88	787	8.0	--
Jan. 8 c	17,300	11	0.02	66	23	65	3.5	212	205	11	0.5	1.7	0.17	510	0.69	262	262	84	772	8.0	--
Jan. 8 c	17,300	10	0.02	65	26	67	3.5	212	210	11	0.5	1.5	--	514	0.70	266	266	94	781	7.8	--
Jan. 8 c	17,300	7.8	0.02	66	25	66	3.8	214	218	12	0.5	1.7	--	510	0.69	266	266	93	792	7.9	--
Jan. 9-31	14,000	13	0.06	58	30	66	4.1	218	213	11	0.5	1.5	0.17	526	0.72	19,880	268	89	782	8.0	5
Feb. 1-9	13,590	15	0.06	69	22	65	3.7	216	216	12	0.5	1.8	0.17	526	0.72	19,520	264	87	773	7.6	5
Feb. 10-28	12,380	13	0.06	67	24	63	3.6	214	205	12	0.5	1.4	0.13	526	0.72	17,580	264	89	758	8.1	5
Feb. 15, sta. L 140 a	11,700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	779	--	--
Feb. 15, sta. L 260 a	11,700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	782	--	--
Feb. 15, sta. R 130 a	11,700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	781	--	--
Feb. 15, sta. R 330 a	11,700	12	0.04	70	23	65	3.5	218	218	11	0.6	1.9	--	524	0.71	16,550	269	90	782	7.9	--

a Not included in weighted average.

b Mean for cross section.

c Sample represents one-quarter of cross section. Station number unknown.

Mar. 1-3, 1951.....	16,300	17	0.02	68	23	73	4.0	220	222	13	0.6	2.6	0.13	540	0.73	23,770	264	84	37	793	7.8	0
Mar. 6-9.....	17,380	18	.02	65	23	64	3.8	206	204	11	.6	2.3	.16	500	.68	23,460	237	88	35	734	8.0	--
Mar. 14.....	14,600	10	.04	58	22	61	3.4	192	192	10	.5	2.1	--	472	.64	16,610	237	80	35	703	8.0	--
Mar. 14-16.....	13,630	13	.01	59	23	63	3.4	196	188	11	.5	2.2	.15	478	.65	17,850	240	79	36	708	7.8	8
Mar. 21-23.....	10,730	12	.01	62	24	64	3.4	200	201	11	.5	1.9	.14	494	.67	14,310	252	88	35	732	7.8	6
Mar. 27-Apr. 3.....	32,950	14	.01	68	19	68	4.5	186	216	10	.4	2.5	.13	512	.70	45,550	249	96	37	746	7.9	10
Apr. 4-5.....	71,750	11	.01	54	15	48	3.5	175	140	7.0	.4	3.4	.11	376	.51	72,940	196	52	34	574	7.9	10
Apr. 6.....	109,000	12	.01	49	13	42	2.9	177	104	4.5	.4	3.5	.10	332	.45	97,710	175	30	34	506	7.7	14
Apr. 8.....	106,000	13	.04	46	13	36	3.7	174	91	4.0	.3	4.8	.08	302	.41	86,430	169	26	31	455	7.8	9
Apr. 9.....	85,100	13	.02	43	10	36	3.4	168	88	5.0	--	5.2	.09	304	.41	69,850	149	11	34	448	7.7	9
Apr. 10-11.....	103,300	10	.02	44	11	35	2.8	164	86	4.0	.2	3.2	.08	302	.41	84,230	156	22	32	445	7.7	15
Apr. 18-30.....	31,180	12	.01	48	16	55	3.5	173	148	7.5	.3	2.3	.12	408	.55	34,350	187	45	38	593	7.9	12
Apr. 23, sta. 500 a.....	32,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	563	--	--
Apr. 23, sta. 820 a.....	32,000	7.3	.05	44	15	55	3.1	156	145	8.0	.3	2.0	--	366	.50	31,620	170	42	41	562	7.8	--
Apr. 23, sta. 1200 a.....	32,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	568	--	--
Apr. 23, sta. 1350 a.....	32,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	570	--	--
May 1-31.....	29,170	13	.01	49	19	64	4.3	180	171	8.5	.5	1.5	.13	466	.63	36,700	199	51	40	650	7.9	11
May 8, sta. 150 a.....	29,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	678	--	--
May 8, sta. 895.....	29,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	679	--	--
May 8, sta. 1075.....	29,600	9.6	.02	51	20	69	5.0	192	194	9.0	.4	1.2	--	466	.63	37,240	206	51	41	684	8.0	--
May 8, sta. 1330 a.....	29,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	687	--	--
June 1-30.....	44,730	17	.02	43	13	47	4.2	160	125	6.0	.4	2.4	.13	338	.46	40,820	160	29	38	517	7.5	6
July 1-23.....	36,420	15	.02	37	12	38	3.2	136	103	5.0	.6	2.0	.12	286	.39	28,120	140	28	36	444	7.4	5
July 9, sta. 440 a.....	33,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	421	--	--
July 9, sta. 750 a.....	33,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	429	--	--
July 9, sta. 1000 a.....	33,600	13	.02	36	11	43	4.3	123	116	5.5	.4	2.0	--	296	.40	26,850	134	33	40	452	8.2	--
July 9, sta. 1315 a.....	33,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	459	--	--
July 29-Aug. 31.....	36,100	14	.02	42	13	46	3.4	143	135	6.5	.4	1.9	.12	336	.46	32,750	160	43	38	518	7.5	5
Aug. 8, sta. 410 a.....	34,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	436	--	--
Aug. 8, sta. 710 a.....	34,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	439	--	--
Aug. 8, sta. 965 a.....	34,500	12	.03	36	12	37	3.4	118	118	5.5	.3	1.7	--	298	.41	27,760	139	42	36	448	8.0	--
Aug. 8, sta. 1300 a.....	34,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	454	--	--

a Not included in weighted average.

MISSOURI RIVER MAIN STEM--Continued
MISSOURI RIVER AT PIERRE, S. DAK.--Continued

Chemical analyses, in parts per million, water year October 1950 to September 1951--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Sept. 1-30, 1951.....	38,610	11	0.02	50	18	62	4.0	170	174	8.0	0.6	1.9	0.14	418	0.57	43,580	198	59	637	7.4	6
Sept. 13, sta. 410 a...	38,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	634	--	--
Sept. 13, sta. 585 a...	38,600	12	.02	50	18	64	4.6	166	182	7.5	.2	2.2	--	428	.58	44,610	198	60	641	7.7	--
Sept. 13, sta. 1365 a...	38,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	652	--	--
Weighted average d.	31,860	14	0.02	48	16	53	3.6	167	149	7.3	0.4	2.1	0.13	389	0.53	33,460	186	49	581	--	--

a Not included in weighted average.

d For period of daily sampling only. Represents 72 percent of runoff for water year October 1950 to September 1951.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT PIERRE, S. DAK.--Continued

Nitrogen, phosphorus, and related physical measurements, water year October 1950 to September 1951
 Analytical results in parts per million except as indicated

	Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
					Ammonia	Nitrite	Nitrate	Organic	Total		
	Oct. 3, 1950, sta. 600	27,100	46	400	0.04	0.000	0.5	0.44	1.0	0.03	0.09
	Oct. 3, sta. 950 ..	27,100	--	380	.03	.000	.4	.39	.8	.03	.09
	Oct. 3, sta. 1200 ..	27,100	--	500	.01	.000	.4	.41	.8	.03	.08
	Oct. 3, sta. 1350 ..	27,100	--	500	.04	.001	.4	.13	.6	.03	.09
	Nov. 3, sta. 600 ..	34,500	45	500	.03	.000	.2	.51	.7	.02	.13
	Nov. 3, sta. 900 ..	34,500	--	400	.03	.000	.2	.55	.8	.03	.10
	Nov. 3, sta. 1200 ..	34,500	--	400	.02	.000	.2	.58	.8	.02	.13
	Nov. 3, sta. 1350 ..	34,500	--	400	.02	.000	.2	.48	.7	.02	.18
	Jan. 8, 1951 a.....	17,600	--	70	.09	.003	.4	.40	.9	.05	.07
	Jan. 8 a	17,600	--	70	.03	.003	.4	.27	.7	.05	.05
	Jan. 8 a	17,600	--	70	.05	.003	.3	.40	.8	.03	.05
	Jan. 8 a	17,600	--	75	.06	.003	.4	.38	.8	.02	.05
	Feb. 15, sta. 140, L. chan.....	11,700	32	45	.05	.009	.5	.21	.8	.04	.07
	Feb. 15, sta. 260, L. chan.....	11,700	32	50	.05	.009	.4	.09	.5	.03	.08
	Feb. 15, sta. 130, R. chan.....	11,700	32	45	.15	.009	.4	.36	.9	.04	.07
	Feb. 15, sta. 330, R. chan.....	11,700	32	50	.06	.009	.4	.33	.8	.03	.09
	Mar. 14, right channel.....	14,900	33	40	.02	.007	.4	.32	.7	.02	.05
	Mar. 14, left channel.....	14,900	33	45	.04	.006	.4	.50	.9	.01	.05
	Apr. 23, sta. 500 ..	32,800	--	550	.06	.01	.4	.91	1.4	.01	.67
	Apr. 23, sta. 820 ..	32,800	--	650	.07	.01	.4	.74	1.2	.01	.66
	Apr. 23, sta. 1200 ..	32,800	--	370	.07	.01	.4	.91	1.4	.02	.66
	Apr. 23, sta. 1350 ..	32,800	--	500	.12	.01	.5	.92	1.6	.02	.74
	May 8, sta. 450 ..	29,600	56	600	.00	.02	.8	.71	1.5	.03	.22
	May 8, sta. 895 ..	29,600	56	650	.00	.02	.7	.72	1.4	.01	.12
	May 8, sta. 1075 ..	29,600	56	700	.00	.02	.8	.67	1.5	.004	.19
	May 8, sta. 1330 ..	29,600	56	700	.00	.02	1.1	.78	1.9	.000	.14
	July 9, sta. 440 ..	33,200	68	900	.00	.006	.4	1.1	1.5	.01	.72
	July 9, sta. 750 ..	33,200	68	1,000	.00	.003	.4	1.2	1.6	.007	.52
	July 9, sta. 1000 ..	33,200	68	1,200	.00	.006	.5	1.2	1.7	.01	.63
	July 9, sta. 1315 ..	33,200	68	900	.01	.006	.6	1.1	1.7	.008	.91
	Aug. 8, sta. 410 ..	34,500	75	600	.01	.002	.3	.42	.7	.03	.55
	Aug. 8, sta. 710 ..	34,500	75	600	.01	.002	.3	.46	.8	.04	.46
	Aug. 8, sta. 965 ..	34,500	75	600	.01	.003	.3	.40	.7	.03	.58
	Aug. 8, sta. 1300 ..	34,500	75	550	.02	.002	.4	.41	.8	.03	.47
	Sept. 13, sta. 410 ..	34,900	59	1,300	.00	.005	.5	.56	1.1	.05	1.4
	Sept. 13, sta. 585 ..	34,900	59	1,200	.00	.006	.5	.55	1.1	.05	1.4
	Sept. 13, sta. 1385 ..	34,900	59	1,600	.01	.006	.5	.57	1.1	.05	1.4

a Sample represents one-quarter of cross section. Station number unknown.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT PIERRE, S. DAK.--Continued

Temperature (°F) of water, March to September 1951

/Once-daily temperature measurement generally between 6:30 a.m. and 12:30 p.m. 7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	--	--	53	--	78	68
2						--	33	58	51	64	76	66
3						--	--	59	--	65	74	65
4						--	--	59	52	62	74	70
5						--	--	59	56	64	a 78	67
6						--	38	--	58	65	78	a 66
7						--	--	54	60	65	74	a 65
8						--	36	56	62	a 74	73	64
9						--	36	a 57	62	70	74	66
10						--	38	55	--	65	72	a 68
11						--	36	a 62	64	66	72	64
12						--	--	a 63	64	64	68	a 61
13						--	--	63	71	64	68	58
14						--	--	63	68	71	65	a 62
15						--	--	a 63	73	--	a 70	58
16						32	--	63	70	--	69	a 62
17						--	--	64	a 69	--	66	a 64
18						--	--	63	73	--	a 74	60
19						--	--	66	--	--	71	a 68
20						--	--	64	66	--	68	a 64
21						--	--	a 65	69	--	a 72	a 56
22						--	--	62	--	--	68	56
23						--	--	a 68	66	--	69	a 52
24						--	--	67	--	--	70	a 54
25						--	--	64	--	--	71	a 51
26						--	--	61	a 72	--	72	a 52
27						--	--	a 62	a 67	--	a 74	a 48
28						--	--	61	65	--	72	a 42
29						--	--	61	a 60	--	70	52
30						32	--	a 58	a 66	74	70	57
31						--	--	a 56	--	77	71	--
Average						--	--	61	--	--	72	60

a Temperature measurement made between 2 p.m. and 7 p.m.

MISCELLANEOUS ANALYSES OF STREAMS IN BAD RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1950 to September 1951

[illegible]

BAD RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN BAD RIVER BASIN IN SOUTH DAKOTA--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
BAD RIVER NEAR FORT PIERRE			
Mar. 26, 1951.....	1,030	24,200	67,300
Mar. 27.....	2,000	34,000	190,000
Mar. 29.....	1,230	25,200	83,700
Apr. 5.....	210	19,100	10,800
Apr. 20.....	9	100	2.4
June 4.....	76	6,590	1,350
June 8.....	2,280	57,800	369,000
June 29.....	99	10,800	2,890
July 10.....	53	1,050	150
Aug. 13.....	1.2	73	.2
Sept. 12.....	16	5,310	229
Sept. 26.....	2.5	122	.8

BAD RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN BAD RIVER BASIN IN SOUTH DAKOTA--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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
BAD RIVER NEAR FORT PIERRE															
Mar. 26, 1951...	4:00 p. m.	1,030	--	24,200	8,400	--	72	--	89	--	97	98	100		SPWCM
Mar. 27.....	4:10 p. m.	2,000	38	34,000	9,210	56	68	78	86	90	96	--	--		SPWCM
Mar. 27.....	4:10 p. m.	2,000	38	34,000	8,740	2	2	7	75	84	91	94	97	100	SPN
Apr. 5.....	3:10 p. m.	210	--	19,100	11,200	--	80	--	96	--	100	--	--		SPWCM
June 29.....	4:40 p. m.	99	--	10,800	6,470	--	88	--	--	--	100	--	--		SPWCM
Sept. 12.....	3:30 p. m.	16	--	5,310	4,530	--	95	--	100	--	--	--	--		PWCM

WHITE RIVER BASIN

WHITE RIVER NEAR OGLALA, S. DAK.

LOCATION.--At gaging station at bridge on U.S. Highway 18, 3 miles downstream from Blacktail Creek, and 7 miles northwest of Oglala, Shannon County. DRAINAGE AREA.--2,200 square miles, approximately 1946 to August 1947, December 1949 to September 1951.

RECORDS AVAILABLE.--Chemical analyses: November 1946 to August 1947, December 1949 to September 1951.

Water temperatures: April 1949 to September 1951.

Stream records: March 1947 to September 1951. 83°F Aug. 1; minimum, freezing point on many days during November to March.

EXTREMES, 1950-51.--Water temperatures: Maximum daily, 72°F July 25; minimum daily, not determined.

Sediment loads: Maximum daily, 27,800 tons July 31; minimum daily, not determined.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum, 83°F Aug. 1, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 34,400 ppm Nov. 2, 1948; minimum daily, not determined.

Sediment loads: Maximum daily, 36,400 tons May 24, 1949; minimum daily, 0.3 ton Jan. 19, Feb. 2, 1949, Jan. 29-30, 1950.

REMARKS.--Flow affected by ice Nov. 9 to Apr. 8. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./nesium	Non-carbonate				
Oct. 5, 1950	12		29	0.10	86	9.1	98		234	245	10	0.4	4.2	--	604	0.82		252	60	46	856	7.4	
Oct. 17	8.1		31	.20	72	7.4	111		289	178	12	.7	1.3	0.20	566	.77		210	0	53	815	7.5	
Nov. 2	28		40	.20	96	16	133		360	273	15	1.2	1.2	--	768	1.04		314	19	48	1,100	7.4	
Nov. 15	19		40	.04	97	23	138		341	318	17	.6	1.1	--	806	1.10		338	56	47	1,130	7.8	
Dec. 8	19		38	.04	101	21	156		417	293	19	1.2	2.5	--	844	1.15		340	0	50	1,210	7.7	
Jan. 3, 1951																							
Jan. 5	15		31	.10	72	22	103		308	210	13	.5	2.5	--	612	.83		270	17	45	894	7.8	
Feb. 6	13		31	.10	82	18	111		352	222	15	.7	4.0	.16	680	.92		304	15	44	952	7.7	
Mar. 6	40		25	.10	69	15	85		279	140	10	.7	2.9	.11	484	.66		234	11	40	682	7.8	
Apr. 4	46		29	.06	63	9.0	60		230	113	10	.5	4.0	.09	446	.61		194	7	23	624	7.6	
May 7	24		--	--	66	13	79	11	--	--	--	--	--	--	--	--		218	--	43	743	--	
June 6	84		--	--	36	4.4	85	8.4	--	--	--	--	--	--	--	--		108	--	61	574	--	
July 6	100		--	--	62	11	75	12	--	--	--	--	--	--	--	--		198	--	43	711	--	
Aug. 1	90		--	--	42	5.4	71	10	--	--	--	--	--	--	--	--		127	--	52	561	--	
Sept. 6	351		28	.50	58	7.7	84		244	140	8.5	.6	.9	--	468	.64		176	0	51	675	7.3	

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement generally between 4 p. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	45	47	--	35	33	34	34	59	48	69	83	70
2	42	42	--	33	33	33	35	59	47	65	80	a 66
3	42	40	--	35	a 32	32	35	59	49	69	72	a 65
4	45	45	--	32	35	35	35	51	54	68	79	64
5	50	45	--	33	32	34	36	57	56	a 65	75	65
6	50	45	--	33	33	32	39	60	64	71	79	64
7	48	50	--	--	33	33	39	61	65	76	75	73
8	59	38	33	a 32	a 35	33	49	64	58	70	73	66
9	52	36	a 33	34	36	--	43	60	a 49	70	74	65
10	54	39	38	34	a 34	33	44	62	66	64	70	65
11	55	32	--	a 33	34	34	41	67	63	62	63	62
12	55	34	34	34	a 33	34	42	64	67	65	72	59
13	60	33	a 33	34	33	34	40	61	65	70	73	59
14	a 50	34	32	34	36	35	49	65	66	75	63	a 56
15	62	a 34	--	a 32	35	36	43	59	72	74	69	55
16	58	--	35	34	36	35	41	59	70	73	69	58
17	61	a 34	a 33	34	35	34	50	60	69	73	78	58
18	58	a 33	a 33	35	36	36	55	63	62	75	71	60
19	55	32	35	33	35	34	51	64	a 57	78	73	60
20	56	33	a 34	32	a 32	35	42	61	61	78	a 61	57
21	48	--	35	35	36	a 39	40	62	60	68	a 64	55
22	48	a 32	35	--	33	a 34	48	68	64	70	a 63	52
23	49	--	a 32	--	35	35	47	66	61	72	70	49
24	50	--	35	33	36	36	46	62	64	75	70	55
25	50	--	34	a 33	36	35	49	61	69	78	71	59
26	49	--	a 32	32	36	36	49	60	70	80	71	54
27	50	--	--	32	34	35	55	64	69	78	72	45
28	49	--	--	33	35	39	63	68	68	80	74	51
29	53	--	34	33	--	36	62	65	65	75	75	55
30	53	--	36	32	--	35	58	58	65	77	74	59
31	50	--	34	32	--	31	--	54	--	77	71	--
Average	52	--	--	33	34	34	45	61	62	72	72	59

a Reading obtained between 6 a. m. and 10 a. m.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	22	3,400	202	9.1	88	2	20	126	7
2-----	20	3,100	167	24	197	s 14	20		
3-----	20	1,760	95	17	241	11	18	76	4
4-----	30	1,760	143	12	128	4	17		
5-----	27	1,670	122	10	108	3	12		
6-----	27	1,530	112	10			10	57	2
7-----	27	1,450	106	13			11		
8-----	18	1,030	50	15	97	3	12		
9-----	14		48	15			13	48	2
10-----	12	1,380	13	13			14		
11-----	11	400	12	14			16		
12-----	10	315	9	15	74	3	17		
13-----	8.1	186	4	16			17		
14-----	8.6	212	5	16			16		
15-----	13	212	7	17			16	--	e 2
16-----	11	169	5	18			18		
17-----	8.1	140	3	19	77	4	20		
18-----	7.2	132	3	22			21		
19-----	12	190	s 7	24			22	76	4
20-----	17	212	10	20	185	11	22		
21-----	12	156	5	22			24		
22-----	9.6	107	3	25			28		
23-----	8.1	89	2	20			28		
24-----	7.2	82	2	15			30	158	11
25-----	7.6			13			30		
26-----	7.4	82	2	15	152	7	20		
27-----	8.1			20			15		
28-----	11			22			16		
29-----	11			20	126	7	17	39	2
30-----	9.8	97	3	20			18		
31-----	8.6			--	--	--	20		
Total--	423.4	--	1,188	511.1	--	183	578	--	133
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	19			10			40		
2-----	18			10			45		
3-----	17	44	2	12	48	2	35	70	7
4-----	17			13			34		
5-----	14			15			36		
6-----	12			16			40		
7-----	13	35	1	12			35		
8-----	14			12	107	4	30	18	2
9-----	16			15			32		
10-----	15	61	3	20			35		
11-----	14			30			35		
12-----	15			35			35		
13-----	17	42	2	20	36	2	36	27	3
14-----	19			18			38		
15-----	22			20			40		
16-----	24			22			45		
17-----	25	65	4	25			44		
18-----	26			30	52	4	41	72	8
19-----	24			35			40		
20-----	20			40			40		
21-----	20	34	2	45			42		
22-----	22			50	--	e 6	45		
23-----	24			45			50	132	16
24-----	24	25	2	46			48		
25-----	24			50			45		
26-----	30			48	110	14	48		
27-----	20			45			52		
28-----	15	36	2	40			55	440	54
29-----	10			--	--	--	50		
30-----	9			--	--	--	40		
31-----	9			--	--	--	30		
Total--	568	--	69	779	--	148	1,261	--	504

e Estimated.

s Computed by subdividing day.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	30			40	1,660	166	46	5,580	s 851
2-----	30	570	47	34			53	3,800	544
3-----	30			32	1,880	162	76	5,100	1,050
4-----	32			29	1,430	112	129	8,190	s 3,760
5-----	34	1,010	95	27	683	50	183	23,300	11,500
6-----	36			26	482	34	87	12,000	2,820
7-----	34			24	420	27	150	12,000	s 6,120
8-----	32			24	398	26	112	17,600	s 5,500
9-----	32			24	405	26	55	4,400	653
10-----	32			24	405	26	86	4,060	s 1,120
11-----	39	480	51	24	373	24	47	7,900	1,000
12-----	33	470	42	28	442	33	39	5,700	800
13-----	30	327	26	29	415	32	36	10,900	1,060
14-----	28	319	24	26	341	24	46	5,500	683
15-----	27	282	21	26	289	20	103	6,650	1,850
16-----	27	240	17	26	285	20	47	8,000	1,020
17-----	26	189	13	28	364	28	39	7,400	779
18-----	24	188	12	29	1,130	93	140	9,040	s 4,810
19-----	23	184	11	32			84	11,000	s 2,590
20-----	24			65	1,560	s 307	309	11,800	s 10,800
21-----	25			63	2,000	340	546	10,100	14,900
22-----	26	125	9	63	20,000	3,400	255	13,900	s 9,700
23-----	25			108	12,200	s 3,620	172	11,400	s 5,220
24-----	26			76	13,800	2,830	232	6,940	s 4,500
25-----	42	403	46	53	18,700	2,680	120	4,300	1,390
26-----	46	510	63	44	12,300	1,460	183	4,500	2,220
27-----	49	670	89	32	9,000	778	120	9,380	s 2,860
28-----	54			27	5,700	416	78	13,000	2,740
29-----	53	1,090	151	25			84	7,900	1,790
30-----	47			28	2,430	171	70	5,700	1,080
31-----	--	--	--	25			--	--	--
Total--	996	--	1,507	1,141	--	17,506	3,727	--	105,510
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	73	2,500	493	133	11,200	s 4,340	8.4	330	7
2-----	257	8,580	s 7,040	87	6,450	1,520	9.1	160	4
3-----	270	10,100	s 7,790	79	4,900	1,050	7.9	130	3
4-----	120	7,600	2,460	58	4,140	648	44	5,520	s 716
5-----	134	7,000	2,530	42	4,790	543	94	8,360	s 2,620
6-----	100			36	1,610	156	361	16,800	s 16,800
7-----	81	3,400	753	31	1,420	119	571	13,400	s 20,600
8-----	65			26	1,160	81	177	12,100	s 5,940
9-----	61			22	760	45	103	7,650	2,130
10-----	56	2,100	318	23			87	4,350	1,020
11-----	56	1,450	219	24	520	33	68	2,050	376
12-----	65	4,100	720	23			52	1,400	197
13-----	68	3,150	578	27			44		
14-----	120	3,810	s 1,450	114	3,290	s 2,110	36	1,280	126
15-----	169	10,800	s 4,630	80	7,900	s 2,080	33		
16-----	81	15,800	3,460	25	3,400	230	33		
17-----	56	9,050	1,370	22	2,200	131	30	480	39
18-----	39	6,550	690	27	900	66	24	383	25
19-----	33	5,100	454	18	2,400	117	21	277	16
20-----	27	2,200	160	14	1,300	49	19	226	12
21-----	26	950	67	14	800	30	18		
22-----	54	2,170	s 416	43	1,500	174	18	177	9
23-----	164	12,000	5,310	21	2,200	125	18		
24-----	148	16,500	s 5,870	30	7,200	583	18		
25-----	48	27,600	3,580	17	4,660	214	16	166	7
26-----	32	21,800	1,880	13	1,350	47	16	146	6
27-----	25	15,400	1,040	11	380	11	18	130	6
28-----	20	5,700	308	12	400	13	18	112	5
29-----	431	11,800	s 13,500	10	300	10	18	103	5
30-----	551	9,020	s 11,400	7.4	300	6	17	100	5
31-----	376	25,600	s 27,800	15	520	21	--	--	--
Total--	3,806	--	108,171	1,106.4	--	14,651	1,997.4	--	51,079
Total discharge for year (cfs-days).....									16,894.3
Total load for year (tons).....									300,649

s Computed by subdividing day.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OJALA, S. DAK.--Continued

Particle-size analysis of suspended sediment, water year October 1950 to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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	0.350		0.500	1.000
Oct. 4, 1950.....	9:00 a.m.	32	58	2,120	1,740	77	85	93	97	98	99	99	100	100	BWCM
Oct. 5.....	8:30 a.m.	29	--	1,750	2,250	68	87	94	98	99	99	100	--	--	BWCM
Oct. 6.....	7:15 a.m.	a 32	34	677	1,620	53	77	88	98	99	99	100	--	--	BWCM
Apr. 4, 1951.....	7:30 a.m.	a 34	34	742	579	55	80	93	97	98	99	99	100	100	BWCM
Apr. 7.....	8:15 p.m.	33	59	563	891	61	79	90	99	98	100	100	--	--	BWCM
May 17.....	10:00 a.m.	28	60	4,790	7,600	--	75	--	98	--	100	--	--	--	SPWCM
May 18.....	1:55 p.m.	68	--	30,800	7,120	--	79	--	100	--	--	--	--	--	PWCM
May 22.....	8:00 a.m.	120	59	14,800	6,600	--	78	--	94	--	100	--	--	--	SPWCM
May 23.....	11:30 a.m.	52	62	19,800	12,000	60	80	93	99	99	100	100	--	--	SPWCM
May 25.....	11:30 a.m.	52	62	19,800	12,100	1	2	79	96	99	100	100	--	--	SPN
June 3.....	11:30 a.m.	78	48	10,600	6,130	--	75	--	96	--	100	--	--	--	SPWCM
June 6.....	10:15 a.m.	87	60	12,300	10,400	--	71	--	95	--	99	--	--	--	SPWCM
June 12.....	4:40 p.m.	36	67	8,020	10,100	--	81	--	98	--	100	100	--	--	SPWCM
June 20.....	11:15 a.m.	343	68	14,600	9,250	--	44	--	81	--	99	--	--	--	SPWCM
June 22.....	4:00 p.m.	156	64	13,900	12,200	--	0	2	90	98	100	--	--	--	PN
June 22.....	4:00 p.m.	156	64	13,900	3,970	45	63	76	90	96	99	100	--	--	BWCM
July 2.....	1:45 p.m.	426	--	8,660	4,620	--	56	--	87	--	100	--	--	--	SPWCM
July 2.....	5:45 p.m.	202	65	10,700	8,910	--	38	--	74	--	99	--	--	--	SPWCM
July 3.....	5:00 p.m.	168	69	8,590	3,380	--	53	--	73	--	98	--	--	--	SPWCM
July 18.....	6:30 p.m.	34	75	6,880	5,520	--	89	--	99	--	100	--	--	--	SPWCM
July 24.....	3:00 p.m.	110	81	13,800	7,940	39	58	74	91	98	99	100	--	--	BWCM
July 24.....	3:00 p.m.	110	81	13,800	7,830	1	2	5	72	--	98	100	--	--	BN
July 29.....	7:00 p.m.	624	--	8,440	9,910	--	53	--	74	--	99	--	--	--	SPWCM
July 31.....	5:00 p.m.	327	77	20,500	8,730	--	63	--	91	--	100	--	--	--	SPWCM
July 31.....	7:45 p.m.	287	--	18,000	10,400	--	64	--	90	--	100	--	--	--	SPWCM
Aug. 1.....	6:30 p.m.	87	78	8,920	3,920	--	76	--	95	--	100	--	--	--	SPWCM
Aug. 3.....	11:30 a.m.	68	75	4,880	3,260	--	79	--	97	--	100	--	--	--	SPWCM

a Mean daily discharge.

Sept. 6, 1951 . . .	12:30 p. m.	376	--	17,000	7,340	2	4	46	86	94	99	--	--	--	SPN
Sept. 6	12:30 p. m.	376	--	17,000	7,040	42	55	70	85	94	100	--	--	--	BWCM
Sept. 7	1:00 p. m.	614	65	13,600	6,320	--	84	--	98	--	100	--	--	--	SPWCM
Sept. 8	6:30 a. m.	164	63	13,600	5,870	--	74	--	94	--	100	--	--	--	SPWCM

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.

LOCATION.--At gaging station at bridge on State Highway 73, 5 miles downstream from Cottonwood Creek, 6 miles south of Kadoka, Jackson County, and 7 miles upstream from Pass Creek.

DRAINAGE AREA.--5,000 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: March 1949 to September 1951.

Water temperatures: April 1949 to September 1951.

Sediment records: April 1949 to September 1951.

EXTREMES, 1950-51.--Dissolved solids: Maximum, 844 ppm Nov. 12 to Dec. 18; minimum, 254 ppm Mar. 23.

Hardness: Maximum, 265 ppm Nov. 12 to Dec. 18; minimum, 15 ppm June 4-6.

Water specific conductance: Maximum daily, 1,640 micromhos Dec. 7-8; minimum daily, 338 micromhos Mar. 23.

Water temperatures: Maximum, 84°F July 28; minimum, freezing point on many days November to March.

Sediment concentrations: Maximum daily, 76,200 ppm June 2; minimum daily, not determined.

Sediment loads: Maximum daily, 1,200,000 tons June 7; minimum daily, less than 0.50 ton Jan. 23-26.

EXTREMES, 1949-51.--Dissolved solids: Maximum, 1,600 ppm Jan. 1-31, 1950; minimum, 245 ppm Mar. 3, 1949.

Hardness: Maximum, 464 ppm Jan. 1-31, 1950; minimum, 13 ppm Sept. 21-23, 24-30, 1950.

Water specific conductance: Maximum, 2,880 micromhos Feb. 5, 1950; minimum daily, 333 micromhos Mar. 3, 1949.

Water temperatures: Maximum, 84°F Aug. 11, 1949, July 28, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 176,200 ppm June 2, 1951; minimum daily, no flow Jan. 4-8, 13-19, 1950.

Sediment loads: Maximum daily, 1,200,000 tons June 7, 1951; minimum daily, 0 tons Jan. 4-8, 13-19, 1950.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of daily specific conductance available in regional office at Lincoln, Neb.

Flow affected by ice Nov. 7-16, Nov. 23 to Mar. 23. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent non-carbonate	Specific conductance (micro-mhos at 25° C)	pH		
														Parts per million	Tons per acre-foot	Calcium per magnesium	Non-carbonate					
Oct. 1-8, 1950.....	181	37	0.10	7.0	1.6	121	4.7	240	0	77	5.0	0.6	5.6	0.10	412	0.56	201	24	0	90	549	7.9
Oct. 9-Nov. 11.....	15.0	36	.20	25	3.3	137	5.8	286	0	133	7.5	.5	2.5	.10	512	.70	20.7	76	0	78	713	7.9
Nov. 12-Dec. 18.....	23.6	47	.04	86	12	170	8.4	461	0	233	15	.5	.5	.10	844	1.15	31.0	265	0	57	1,120	8.0
Dec. 19-31.....	28.0	43	.06	99	10	133	7.6	398	0	165	12	.0	.6	.20	652	.89	44.0	214	0	56	927	7.9
Jan. 1-31, 1951.....	16.9	48	.06	74	9.8	123	9.9	408	0	160	13	.1	.4	.22	644	.88	28.4	230	0	53	917	8.1
Feb. 1-28.....	23.8	41	.06	57	4.9	106	7.3	338	0	115	9.0	.1	.4	.22	518	.70	33.3	162	0	57	738	8.1
Mar. 1-6.....	20.8	34	.02	36	9.2	76	3.9	238	0	140	8.0	.4	.9	.11	370	.50	20.8	128	0	55	530	8.2
Mar. 7-16.....	28.8	38	.02	64	16	94	6.2	354	0	112	10	.4	1.0	.14	562	.76	43.7	226	0	47	775	8.2
Mar. 17-31.....	50	24	.40	30	6.1	88	5.0	284	0	75	6.0	.5	4.2	.11	398	.54	53.7	100	0	64	551	8.1
Mar. 18-22.....	166	26	.02	19	4.0	85	3.7	224	0	52	6.0	.3	3.2	.09	316	.43	142	64	0	73	457	8.2
Mar. 23.....	1,400	20	.12	14	1.2	68	3.8	196	0	20	2.0	--	2.6	.07	254	.35	960	40	0	77	338	8.0
Mar. 24-31.....	807	24	.05	10	1.2	78	3.0	190	0	35	2.0	.4	1.5	.13	296	.40	645	30	0	83	377	8.2
Apr. 1-18.....	91.1	25	.02	39	3.5	82	3.0	236	0	76	8.0	.3	1.4	.10	392	.53	96.4	112	0	61	550	8.1
Apr. 19.....	55.0	35	.16	--	--	103	5.5	278	6	135	8.0	.4	2.4	.15	484	.66	71.9	154	0	58	705	8.2
Apr. 20-May 9.....	77.9	32	.02	33	3.3	113	5.8	264	0	114	9.0	.4	1.6	.15	460	.63	96.8	96	0	70	650	8.2

May 10-15, 1951 ...	69.3	38	0.02	37	6.2	110	8.1	278	0	117	8.0	0.7	1.7	0.27	470	0.04	87.9	118	0	65	676	7.9
May 19-June 1.....	219	41	.02	17	1.8	128	5.4	276	0	110	6.0	.9	1.6	.28	438	.60	259	50	0	83	623	8.0
June 2-3.....	2,365	--	--	--	--	--	--	288	0	63	--	--	2.2	.34	--	--	--	--	--	--	537	8.1
June 4-6.....	703	49	--	5.8	1.1	100	6.2	250	0	35	3.0	1.0	2.0	.22	348	.47	661	15	0	90	470	8.2
June 7.....	12,600	--	--	8.6	1.1	90	2.8	--	--	--	--	--	--	--	--	--	--	22	--	88	386	8.2
June 8-17.....	228	37	.02	14	.7	120	4.9	220	0	108	4.0	.8	1.6	.32	412	.56	254	38	0	85	591	7.8
June 18-20.....	3,281	40	.40	7.0	.9	120	3.2	226	0	82	5.0	.8	1.1	.29	394	.54	3,490	21	0	91	544	8.0
June 21-23.....	1,333	43	--	9.0	.4	96	4.8	233	0	42	3.0	.8	1.4	--	356	.49	1,290	24	0	87	456	7.5
June 24.....	4,380	38	--	11	.9	123	5.8	274	0	74	--	.4	.7	--	424	.58	5,010	31	0	87	555	8.0
June 25-27.....	1,470	49	--	8.0	1.5	110	4.8	240	--	66	4.0	.8	1.3	.21	388	.53	1,540	26	0	86	523	8.3
June 28-July 11.....	350	38	.02	17	1.6	136	5.6	224	0	142	5.5	.6	2.9	.22	472	.64	446	49	0	84	569	7.9
July 12-15.....	849	38	--	8.0	.5	115	5.3	246	0	70	5.0	.8	1.6	.20	396	.54	912	32	0	80	500	8.2
July 16-31.....	132	40	.04	13	1.1	127	5.9	239	0	112	6.5	.8	2.6	.22	430	.58	153	37	0	86	601	8.0
Aug. 1-13.....	141	44	.04	19	1.3	120	6.0	295	0	129	5.5	.7	2.5	.16	456	.62	174	53	0	81	651	8.0
Aug. 14-16.....	1,127	37	.06	18	.6	111	4.0	248	0	60	4.0	.6	.9	.29	390	.53	1,190	22	0	90	522	7.9
Aug. 17-Sept. 1.....	1,804	40	.08	8.0	1.2	111	4.8	217	5	75	5.0	.7	2.2	.21	398	.54	97.1	25	0	89	530	8.4
Sept. 2-9.....	1,855	42	.08	6.0	.5	107	4.7	221	5	53	4.0	.8	1.8	.24	334	.45	1,490	17	0	91	477	8.4
Sept. 10-18.....	233	40	.08	8.5	.7	105	4.4	207	5	73	5.0	.8	2.3	.14	410	.56	258	24	0	89	508	8.4
Sept. 19-30.....	34.8	35	.01	23	2.1	105	4.4	222	0	112	7.0	.7	2.1	.12	410	.56	38.5	66	0	76	602	7.8
Weighted average b	266	39	0.08	12	1.1	108	4.5	c 240	--	69	4.4	0.7	1.7	0.22	379	0.52	272	35	0	84	517	--

a Sum

b Includes estimates where data are missing. Represents 98 percent of runoff for water year, October 1950 to September 1951.

c Includes carbonate as bicarbonate.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement generally between 7 a. m. and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	48	44	32	34	34	32	35	46	52	69	74	--
2	46	44	32	34	34	--	35	--	42	66	80	a 64
3	42	47	34	34	34	34	38	50	53	69	78	64
4	40	46	33	34	34	32	36	51	49	62	73	63
5	43	44	32	34	34	34	40	48	65	64	82	64
6	48	42	32	--	34	--	42	49	65	70	79	63
7	46	45	33	34	34	34	37	63	a 58	--	80	64
8	49	--	34	34	34	32	39	--	58	75	69	65
9	45	--	34	--	34	32	37	53	a 70	72	68	64
10	42	--	34	34	34	32	38	a 68	70	65	70	62
11	46	--	34	34	34	34	38	56	69	61	67	63
12	49	--	34	34	34	32	35	53	66	60	67	56
13	46	--	34	38	34	--	35	69	65	60	67	58
14	55	--	34	34	34	--	34	64	72	71	64	56
15	57	--	34	34	34	--	39	59	71	78	61	52
16	49	a 35	34	34	34	32	35	60	70	--	70	51
17	47	a 45	34	34	34	32	40	64	65	81	75	68
18	47	42	--	34	34	32	50	65	60	80	72	58
19	50	a 34	34	34	35	32	38	60	a 63	82	71	63
20	48	a 36	34	34	35	32	39	60	63	80	71	57
21	46	a 41	36	34	35	32	40	61	66	75	--	50
22	44	36	36	34	--	35	41	63	63	70	--	49
23	43	33	34	33	32	32	42	--	62	75	--	48
24	43	34	34	34	33	32	44	64	61	74	--	46
25	46	34	34	34	a 32	--	45	64	64	77	--	a 63
26	--	34	34	34	33	36	46	59	65	72	--	55
27	48	35	34	--	--	35	65	66	65	80	--	42
28	53	34	34	--	31	38	60	67	60	84	--	a 54
29	68	33	--	--	--	36	67	62	59	80	--	61
30	46	32	--	33	--	36	68	60	61	77	--	61
31	49	--	35	--	--	--	--	58	--	78	--	--
Average	48	--	34	34	34	--	43	59	62	73	--	58

a Reading obtained between 2 p. m. and 5 p. m.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	114	9,000	2,770	11	35	1	10	92	2
2-----	229	12,000	7,420	10			10		
3-----	254	16,900	11,600	10			10		
4-----	376	28,800	29,200	10			7		
5-----	222	21,300	12,800	10			5		
6-----	125	14,000	4,730	10	e 2	24	3	117	1
7-----	85	11,100	2,550	12			3		
8-----	45	8,800	1,070	14			3		
9-----	37	9,200	919	16			4		
10-----	36	6,600	642	18			5		
11-----	33	6,750	601	18	162	7	6	108	2
12-----	34	6,600	606	18			6		
13-----	30	3,500	284	18			5		
14-----	24	1,510	98	16			5		
15-----	22	300	18	18			5		
16-----	15	175	7	20	191	6	10	75	5
17-----	10	57	2	31			10		
18-----	9			42			15		
19-----	11			27			20		
20-----	8			30			20		
21-----	8	55	1	31	162	7	25	125	9
22-----	6			21			25		
23-----	8			15			30		
24-----	8			15			30		
25-----	9			15			25		
26-----	9	66	2	15	191	6	25	75	5
27-----	11			15			25		
28-----	13			15			25		
29-----	11			10			25		
30-----	10			10			25		
31-----	10	38	1	--	--	--	25		
Total-	1,822	--	75,341	521	--	202	447	--	111
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	25	72	4	5	138	3	20	143	8
2-----	25			8			20		
3-----	25			8			20		
4-----	20			10			20		
5-----	20			10			25		
6-----	20	41	2	10	88	3	20	68	4
7-----	20			10			20		
8-----	20			10			20		
9-----	20			10			25		
10-----	20			15			25		
11-----	20	32	2	20	150	12	30	57	5
12-----	20			20			30		
13-----	20			20			30		
14-----	25			30			33		
15-----	25			40			35		
16-----	25	14	(t)	40	159	13	40	2,100	227
17-----	20			40			50		
18-----	20			40			80		
19-----	15			40			100		
20-----	15			40			150		
21-----	15	32	1	35	e 12	271	200	4,000	2,160
22-----	15			30			300		
23-----	10			30			300		
24-----	10			30			1,400		
25-----	10			30			1,630		
26-----	10	32	1	30	e 12	271	1,520	17,300	71,000
27-----	10			30			1,040		
28-----	8			25			892		
29-----	5			--			579		
30-----	5			--			342		
31-----	5			--	--	--	243	5,500	5,080
Total-	523	--	69	666	--	271	9,147	--	320,341

e Estimated.

t Less than 0.50 ton.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	169	1,840	840	126	10,200	3,470	607	32,700	s 93,400
2-----	145	1,260	493	105	15,000	4,250	3,200	76,200	s 690,000
3-----	123	840	279	101	10,700	2,920	1,530	48,500	s 217,000
4-----	123	710	236	83	2,500	560	534	27,600	39,800
5-----	118	640	204	66	3,200	570	235	17,700	11,200
6-----	110	585	174	58	1,750	274	1,340	16,000	s 101,000
7-----	110	790	235	47	800	102	12,600	33,500	s 1,120,000
8-----	103	696	174	47	600	76	2,330	26,300	s 172,000
9-----	92	645	160	53	600	86	616	17,000	28,300
10-----	83	548	123	60	2,150	348	261	12,800	9,020
11-----	76	371	76	53	865	124	252	10,800	7,350
12-----	47	333	42	49	1,000	132	145	9,300	3,640
13-----	66	362	65	44	690	82	87	6,700	1,570
14-----	51	718	99	39	330	35	137	5,640	s 3,480
15-----	68	570	105	42	260	29	339	22,600	s 24,800
16-----	51	359	49	41	290	32	113	3,400	1,040
17-----	47	314	40	42	310	35	101	13,000	3,550
18-----	58	235	37	254	23,400	s 45,100	684	29,900	s 61,800
19-----	55	249	37	220	34,100	s 23,200	4,800	54,200	s 734,000
20-----	53	319	46	372	23,000	s 37,200	4,360	52,500	s 671,000
21-----	51	184	25	646	44,400	s 83,400	1,390	33,000	128,000
22-----	51	143	20	252	28,000	19,100	729	16,000	31,500
23-----	51	118	16	154	20,900	8,690	1,880	27,700	s 239,000
24-----	55	146	22	120	16,400	5,310	4,360	58,000	s 718,000
25-----	55	162	24	108	6,000	1,750	2,020	34,100	s 198,000
26-----	62	375	63	101	3,700	1,010	1,440	23,000	89,400
27-----	85	2,250	516	120	4,900	1,590	951	20,500	52,600
28-----	103	4,100	1,160	105	12,500	3,540	435	14,800	17,400
29-----	169	10,600	4,840	92	11,900	2,960	340	8,200	7,530
30-----	136	18,000	6,610	83	6,300	1,410	270	6,200	4,520
31-----	--	--	--	81	7,400	1,620	--	--	--
Total-	2,566	--	16,810	3,764	--	249,005	48,106	--	5,479,900
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	208	5,100	2,860	127	16,700	s 6,540	353	50,700	s 71,200
2-----	265	12,000	8,590	483	27,300	35,600	3,150	62,800	s 560,000
3-----	316	14,000	11,900	350	10,900	10,300	1,220	32,300	s 116,000
4-----	661	18,300	s 38,300	227	6,700	4,110	882	37,900	s 101,000
5-----	882	25,500	s 61,700	98	16,400	4,340	2,080	50,800	s 299,000
6-----	453	16,300	19,900	79	17,100	3,650	1,370	37,500	s 148,000
7-----	320	10,000	a 8,640	56	11,700	1,770	705	37,000	73,000
8-----	180	6,500	3,160	45	6,500	790	2,390	46,600	s 329,000
9-----	173	4,200	1,960	31	4,800	402	1,440	27,800	108,000
10-----	163	3,800	1,670	31	3,900	326	753	18,200	37,000
11-----	227	12,200	7,480	19	4,200	215	345	10,900	10,200
12-----	1,060	31,700	s102,000	21	11,900	675	316	14,200	12,100
13-----	1,580	46,600	s210,000	270	32,300	s 25,400	200	7,500	4,050
14-----	521	31,000	43,600	850	50,800	s141,000	154	6,600	2,740
15-----	235	19,600	12,400	1,610	59,200	s272,000	118	5,410	1,720
16-----	157	12,800	5,430	922	47,800	s132,000	85	4,100	941
17-----	123	9,900	3,290	163	23,400	10,300	68	3,160	580
18-----	139	7,100	2,660	133	18,300	6,570	56	2,410	364
19-----	160	4,900	2,120	62	12,100	2,030	47	2,300	292
20-----	110	2,800	832	298	16,800	s 14,000	44	1,160	138
21-----	118	3,500	1,120	163	18,200	8,010	37	620	62
22-----	110	3,800	1,130	92	12,600	3,130	37	321	32
23-----	79	2,400	512	49	9,800	1,300	37	181	18
24-----	64	4,800	829	18	9,900	481	39	185	19
25-----	56	1,700	257	10	9,100	246	45	311	38
26-----	70	1,000	189	8	9,300	201	41	565	63
27-----	163	6,750	2,970	11	8,700	258	33	350	31
28-----	128	10,400	3,590	8	5,000	108	23	321	20
29-----	118	9,800	3,120	6	2,600	42	16	160	7
30-----	413	31,300	s38,100	42	5,950	s1,480	18	84	4
31-----	103	17,500	4,870	31	16,400	1,370	--	--	--
Total-	9,355	--	605,179	6,313	--	688,644	16,102	--	1,875,619
Total discharge for year (cfs-days)									99,332
Total load for year (tons)									9,311,492

s Computed by subdividing day.

a Computed from estimated concentration graph.

WHITE RIVER BASIN--Continued
WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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
Oct. 2, 1950	5:15 p.m.	272	--	17,000	8,780	58	70	85	91	96	99	--	--	--	SPWCM
Oct. 2	5:15 p.m.	272	--	17,000	9,060	21	43	78	90	97	99	--	--	--	SPN
Oct. 6	1:00 p.m.	119	54	13,800	8,570	85	94	97	99	99	100	--	--	--	SPWCM
Oct. 6	1:00 p.m.	119	54	13,800	8,590	76	91	95	100	--	--	--	--	--	SPN
Oct. 13	6:45 a.m.	30	--	5,760	4,070	76	79	80	81	82	87	88	92	95	BWCM
Mar. 17, 1951	10:30 a.m.	a 50	--	2,760	2,230	78	87	88	92	93	94	95	97	98	BWCM
Mar. 18	11:30 a.m.	a 80	--	2,180	1,590	93	94	96	97	98	99	99	99	100	BWCM
Mar. 18	2:45 p.m.	a 80	33	2,330	3,650	--	93	--	99	--	100	--	--	--	SPWCM
Mar. 19	11:15 a.m.	a 100	33	2,430	4,050	73	80	86	90	94	95	--	--	--	SPWCM
Mar. 19	11:15 a.m.	a 100	33	2,430	4,020	38	70	84	90	91	94	--	--	--	SPN
Mar. 20	8:30 a.m.	a 150	--	4,650	3,610	--	92	--	94	--	96	--	--	--	SPWCM
Mar. 22	3:45 p.m.	a 300	34	5,860	5,440	--	87	--	82	--	98	--	--	--	SPWCM
Mar. 23	4:15 p.m.	a 1,400	35	8,520	10,800	--	55	--	72	--	97	--	--	--	SPWCM
Mar. 24	5:15 p.m.	1,420	--	16,800	11,400	40	44	50	60	74	91	97	99	100	SPWCM
Mar. 24	5:15 p.m.	1,420	--	16,800	11,300	5	10	49	56	72	91	96	99	100	SPN
Mar. 26	1:00 p.m.	1,020	--	15,300	5,200	--	52	--	70	--	94	--	--	--	SPWCM
Mar. 26	4:20 p.m.	954	--	14,600	10,800	2	4	50	70	82	93	--	--	--	SPN
Mar. 26	4:20 p.m.	954	--	14,600	11,300	38	49	58	69	82	94	99	100	--	BWCM
Mar. 30	2:30 p.m.	243	--	3,460	5,050	--	87	--	97	--	98	--	--	--	SPWCM
Apr. 5	4:40 p.m.	120	--	612	1,480	70	86	93	96	99	100	--	--	--	BWCM
Apr. 28	9:15 a.m.	101	--	6,280	3,800	--	88	--	96	--	100	--	--	--	SPWCM
Apr. 29	5:30 p.m.	173	--	18,400	6,470	--	92	--	99	--	100	--	--	--	SPWCM
May 2	6:00 p.m.	103	--	14,800	5,180	--	94	--	100	--	100	--	--	--	SPWCM
May 10	2:45 p.m.	60	68	2,910	5,030	--	92	--	98	--	100	--	--	--	SPWCM
May 18	5:45 p.m.	1,180	--	81,000	7,850	--	38	--	59	--	90	91	92	94	SPWCM
Mean daily discharge.															

a Mean daily discharge.

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951.--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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 21, 1951.....	9:00 a.m.	753	61	40,200	7,330	--	66	--	87	--	99	--	--	--	--	--	SPWCM
May 23.....	2:00 p.m.	145	--	21,200	5,700	--	92	--	99	--	100	--	--	--	--	--	SPWCM
June 1.....	3:00 p.m.	495	--	33,700	7,330	--	65	--	84	--	98	--	--	--	--	--	SPWCM
June 2.....	9:00 a.m.	4,120	42	79,800	7,040	--	46	--	69	--	98	--	--	--	--	--	SPWCM
June 2.....	5:00 p.m.	3,270	44	80,500	6,870	--	46	--	67	--	96	--	--	--	--	--	SPWCM
June 3.....	6:30 p.m.	418	--	23,300	6,580	--	87	--	95	--	99	--	--	--	--	--	SPWCM
June 7.....	11:30 a.m.	13,100	--	32,600	6,650	--	61	--	79	--	98	--	--	--	--	--	SPWCM
June 7.....	3:55 p.m.	6,570	--	36,800	5,880	--	55	--	72	--	97	--	--	--	--	--	SPWCM
June 8.....	10:00 a.m.	2,410	63	27,900	5,720	--	60	--	79	--	95	--	--	--	--	--	SPWCM
June 9.....	4:30 p.m.	502	70	15,300	13,700	--	89	--	98	--	100	--	--	--	--	--	SPWCM
June 9.....	8:00 a.m.	4,440	--	56,600	10,200	--	43	--	61	--	98	--	--	--	--	--	SPWCM
June 19.....	9:15 a.m.	5,820	--	60,800	6,130	--	44	--	61	--	97	--	--	--	--	--	SPWCM
June 19.....	1:30 p.m.	6,000	63	54,700	9,500	--	46	--	65	--	95	--	--	--	--	--	SPWCM
June 21.....	11:30 a.m.	1,390	66	33,800	5,840	--	68	--	88	--	98	--	--	--	--	--	SPWCM
June 23.....	5:30 p.m.	3,470	61	48,200	7,270	--	37	--	54	--	91	97	99	100	--	--	SPWCM
July 3.....	5:30 p.m.	270	68	12,700	7,800	--	81	--	97	--	100	--	--	--	--	--	SPWCM
July 12.....	8:00 p.m.	1,640	64	37,200	7,280	--	59	--	81	--	98	--	--	--	--	--	SPWCM
July 13.....	8:30 a.m.	1,920	62	50,400	9,830	--	55	--	76	--	98	--	--	--	--	--	SPWCM
July 15.....	9:30 a.m.	235	78	19,800	3,600	--	92	--	99	--	100	--	--	--	--	--	SPWCM
July 17.....	1:30 p.m.	118	80	9,660	4,020	--	99	--	99	--	100	--	--	--	--	--	SPWCM
Aug. 14.....	9:00 a.m.	340	64	59,200	5,510	--	46	--	69	--	97	--	--	--	--	--	SPWCM
Aug. 14.....	6:00 p.m.	1,060	64	63,800	6,280	--	42	--	62	--	97	--	--	--	--	--	SPWCM
Aug. 16.....	4:30 p.m.	645	64	41,400	7,410	--	60	--	85	--	98	--	--	--	--	--	SPWCM
Sept. 2.....	8:00 a.m.	5,280	--	76,400	7,520	--	38	--	59	--	97	--	--	--	--	--	SPWCM
Sept. 2.....	5:20 p.m.	3,140	64	51,600	5,290	--	53	--	73	--	98	--	--	--	--	--	SPWCM

Sept. 2, 1951 ...	8:20 p. m.	2,470	--	47,700	8,340	--	53	--	72	--	97	--	--	--	SPWCM
Sept. 4.....	4:30 p. m.	1,330	54	43,800	7,360	--	53	--	72	--	94	--	--	--	SPWCM
Sept. 4.....	5:00 p. m.	1,380	--	53,800	9,540	--	38	--	57	--	96	--	--	--	SPWCM
Sept. 5.....	2:00 p. m.	2,380	--	65,200	5,440	--	47	--	68	--	97	--	--	--	SPWCM
Sept. 6.....	6:00 p. m.	1,020	65	32,800	6,210	--	15	--	84	--	98	--	--	--	SPWCM
Sept. 12.....	10:30 a. m.	365	58	17,100	2,940	--	70	--	88	--	95	--	--	--	SPWCM
Sept. 16.....	10:20 a. m.	58	65	2,380	5,250	--	97	--	97	--	100	--	--	--	SPWCM

WHITE RIVER BASIN--Continued

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.

LOCATION.--At county highway bridge, 1 mile upstream from gaging station, 1 mile downstream from Pine Creek, and 3 miles north of White River, Mellette County.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.

Water temperatures: February to September 1951.

Sediment Records: December 1950 to September 1951.

EXTREMES, December 1950 to September 1951.--Water temperatures (February to September 1951): Maximum, 88°F July 29; minimum, freezing point on several days during February and March.

Sediment concentrations: Maximum daily, 19,300 ppm May 29; minimum daily, not determined.

Sediment loads: Maximum daily, 36,300 tons Aug. 1; minimum daily, not determined.

REMARKS.--No appreciable inflow between gaging station and sampling point except during periods of heavy local rains. Flow affected by ice Dec. 15 to Mar. 28. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-magnesium			
Dec. 15, 1950.....	10	48	0.04	44	5.6	35	35	205	6	26	1.5	0.4	1.7	0.10	288	0.39	133	0	37	389	8.2
Jan. 4, 1951.....	27	45	.20	47	5.5	36	36	228	0	25	2.0	.4	1.7	.10	294	.40	140	0	36	407	7.7
Jan. 10.....	a 90	48	.10	47	6.0	34	34	230	0	21	1.5	.5	2.3	.00	296	.40	142	0	34	396	7.5
Feb. 8.....	a 40	47	.10	41	5.7	40	40	228	0	21	1.5	.4	2.3	.00	276	.38	126	0	41	351	7.5
Mar. 7.....	a 120	42	.20	40	4.6	29	29	190	0	19	2.5	.3	2.0	.00	268	.36	119	0	34	333	7.4
Apr. 5.....	210	34	.06	34	4.6	26	26	183	0	19	3.0	.5	1.6	.09	220	.30	104	0	35	288	7.8
May 10.....	219	35	.02	35	5.1	32	32	184	0	24	1.5	.4	2.2	.03	260	.35	122	0	33	353	7.5
June 5.....	215	36	.02	48	5.1	32	32	183	0	26	1.5	.6	2.1	.10	293	.39	121	0	35	396	7.4
July 17.....	135	37	.02	42	5.8	32	32	192	0	26	1.5	.6	1.9	.06	288	.39	126	0	38	371	7.3
Aug. 1.....	637	27	.02	44	3.9	39	39	183	0	56	1.5	.4	2.0	.05	288	.40	126	0	40	397	7.3
Sept. 5.....	324	23	.02	41	2.8	43	43	176	0	55	1.5	.4	2.5	.06	294	.40	114	0	45	399	7.7

a Mean daily discharge.

WHITE RIVER BASIN--Continued

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Temperature (°F) of water, February to September 1951

/Once-daily temperature measurement, generally between 7 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				--	--	a 33	39	a 59	47	70	72	66
2				--	--	a 33	40	55	46	61	72	65
3				--	--	--	34	61	55	60	82	64
4				a 32	--	34	38	62	52	--	73	64
5				--	--	32	47	59	56	--	82	67
6				--	--	33	38	a 54	64	69	72	61
7				--	--	34	36	a 61	71	72	73	63
8				--	a 32	--	47	a 69	62	73	69	64
9				--	--	34	42	--	63	67	a 74	a 69
10				--	32	33	a 42	a 58	68	64	65	61
11				--	a 33	34	37	67	--	60	65	62
12				--	34	34	a 41	66	68	62	65	56
13				--	a 32	34	43	a 65	67	60	64	54
14				--	a 33	33	45	66	71	a 86	65	53
15				--	a 34	34	40	a 67	76	79	62	51
16				--	a 36	35	--	a 67	71	74	61	61
17				--	a 35	34	47	65	a 74	74	76	50
18				--	35	41	a 53	a 70	a 79	80	70	57
19				--	a 33	33	45	a 70	a 70	77	73	59
20				--	a 33	34	40	61	65	76	66	59
21				--	33	a 36	42	a 64	62	78	71	51
22				--	a 33	a 39	58	64	67	67	a 74	49
23				a 32	a 33	34	51	70	a 61	65	64	a 49
24				--	a 34	34	47	72	71	72	70	46
25				--	a 34	39	52	a 62	65	74	70	56
26				--	a 34	38	54	60	71	77	73	55
27				--	a 34	35	a 65	a 74	65	66	a 77	41
28				--	a 35	39	65	a 60	62	77	72	39
29				--	--	37	a 69	60	a 69	a 88	77	47
30				--	--	35	65	a 60	a 72	76	74	62
31				--	--	38	--	53	--	82	67	--
Average				--	--	35	47	63	65	73	71	57

a Reading obtained between 1 p. m. and 8 p. m.

WHITE RIVER BASIN--Continued

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Suspended sediment, December 1950 to September 1951									
Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----							--	--	--
2-----							--	--	--
3-----							--	--	--
4-----							--	--	--
5-----							--	--	--
6-----							--	--	--
7-----							--	--	--
8-----							--	--	--
9-----							--	--	--
10-----							--	--	--
11-----							--	--	--
12-----							--	--	--
13-----							--	--	--
14-----							--	--	--
15-----							90		
16-----							80	113	26
17-----							80		
18-----							80		
19-----							80		
20-----							90		
21-----							100	458	132
22-----							110		
23-----							110		
24-----							100		
25-----							90		
26-----							70	192	35
27-----							60		
28-----							50		
29-----							60		
30-----							80		
31-----							100		
Total-							1,430	--	849
	January			February			March		
1-----	100	226	58	30	137	19	100	244	63
2-----	90			40			90		
3-----	80			60			90		
4-----	70			70			100		
5-----	70			60			120		
6-----	70	188	38	55	102	13	120	98	30
7-----	80			40			120		
8-----	80			40			100		
9-----	85			50			90		
10-----	90			90			80		
11-----	90	149	36	100	96	21	80	47	11
12-----	90			90			80		
13-----	100			70			90		
14-----	110			60			100		
15-----	110			60			120		
16-----	110	273	79	100	110	31	120	106	32
17-----	110			100			150		
18-----	100			100			150		
19-----	100			100			140		
20-----	100			100			130		
21-----	90	254	69	120	224	83	140	332	127
22-----	90			120			160		
23-----	90			150			200		
24-----	90			150			250		
25-----	90			150			350		
26-----	80	177	13	150	--	--	400	1,380	700
27-----	60			120			330		
28-----	40			100			340		
29-----	30			--			154		
30-----	30			--			149		
31-----	30	--	--	168				3,240	1,370
Total-	2,555	--	1,417	2,495	--	988	4,811	--	18,221

WHITE RIVER BASIN--Continued

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Suspended sediment, December 1950 to September 1951--Continued

Day	April			May			June				
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment			
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		
1-----	245	9,630	6,370	186	2,630	1,320	154	756	314		
2-----	165			139	753	283	158				
3-----	142			112	580	175	165				
4-----	176			122	456	150	173				
5-----	165	2,060	901	116	400	125	186	1,020	469		
6-----	112			116	392	123	169				
7-----	131			112	358	108	336				
8-----	146			109	359	106	240				
9-----	146	1,140	412	116	483	151	238	18,100 10,100 1,050	sa 20,300 7,860 875		
10-----	136			150	4,350	s 2,210	292				
11-----	136			129	2,360	822	310			960	803
12-----	136			129	342	119	328				
13-----	131	139	364	137	269						
14-----	117	139	389	146	280						
15-----	125	605	214	132	385	137	322	704	552		
16-----	131			181	456	223	264			500	356
17-----	126			146	463	183	270			4,400	sa 5,070
18-----	126			339	6,080	sa 18,200	219			3,260	s 1,890
19-----	146	476	163	148	12,100	sa 6,070	457	12,100	sa 16,700		
20-----	146			129	2,180	s 852	307	5,820	s 5,440		
21-----	126			150	3,640	1,470	209	1,260	733		
22-----	126			139	1,650	619	222				
23-----	150	190	1,010	518	438	3,990	sa 6,590				
24-----	158	243	1,200	787	472	5,360	6,830				
25-----	162	532	252	232	1,260	789	218	1,320	777		
26-----	204			227	1,110	680	190	1,040	534		
27-----	218			213	878	505	238	1,400	900		
28-----	190			150	742	301	213	1,540	886		
29-----	177	432	206	153	19,300	sa 8,390	186	1,140	573		
30-----	143	3,760	sa 1,690	165	2,210	985	173	1,050	490		
31-----	--	--	--	165	891	397	--	--	--		
Total--	4,538	--	17,362	4,916	--	47,081	7,696	--	84,061		

Day	July			August			September				
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment			
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		
1-----	158	980	418	509	15,200	s 36,300	120	248	s 87		
2-----	225	3,370	s 2,310	159	6,490	s 3,930	186	4,950	sa 3,060		
3-----	264	2,070	1,480	139	536	201	161	6,660	s 3,840		
4-----	230	1,250	776	119	317	102	123	2,120	s 1,040		
5-----	190	968	497	101	286	78	145	3,520	s 1,500		
6-----	190	798	409	101	213	58	80	1,350	292		
7-----	204	780	430	101	231	63	62	380	64		
8-----	210	760	431	98	178	47	122	834	s 312		
9-----	218	779	459	112	205	62	125	3,000	sa 1,250		
10-----	209	777	438	123	244	81	154	1,550	644		
11-----	177	2,980	sa 1,930	132	214	76	142	580	222		
12-----	190			132	218	78	106	498	143		
13-----	213			159	1,940	sa 1,750	106	378	108		
14-----	232			227	8,990	sa 8,300	91	286	s 73		
15-----	238	727	428	232	9,600	s 5,940	80	286	57		
16-----	177			401	192	167	2,500	s 1,190	90	208	51
17-----	169			398	182	146	600	237	85	178	41
18-----	158			342	146	126	268	91	96	168	44
19-----	146	287	113	115	213	s 69	80	152	33		
20-----	129	288	100	122	220	72	85	161	37		
21-----	129	273	95	146	362	s 156	78	148	31		
22-----	135	310	113	150	272	110	73	154	30		
23-----	129	277	96	109	250	74	43	163	19		
24-----	116	3,570	s 1,220	128	226	s 80	82	221	s 51		
25-----	129	689	240	107	194	56	87	135	32		
26-----	106	315	s 92	109	144	42	82	117	26		
27-----	122	375	124	106	132	38	60	146	32		
28-----	112	254	77	109	150	44	82	128	28		
29-----	109	309	s 98	112	140	42	73	107	s 22		
30-----	132	331	s 125	120	193	s 66	87	84	20		
31-----	139	336	s 133	119	158	51	--	--	--		
Total--	5,285	--	14,436	4,435	--	59,484	3,006	--	13,188		

Total discharge for period Dec. 15, 1950, to Sept. 30, 1951 (cfs-days)..... 41,167

Total load for period Dec. 15, 1950, to Sept. 30, 1951 (tons)..... 257,088

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

WHITE RIVER BASIN--Continued
SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Particle-size analyses of suspended sediment, March to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Mar. 19, 1951.....	9:30 a. m.	a140	33	632	1,460	51	60	75	87	92	95	96	98		99	--	BWC
Mar. 22.....	12:25 p. m.	a160	35	2,180	5,000	--	41	--	57	--	86	--	--		--	--	SPWCM
Mar. 25.....	5:30 p. m.	a350	39	2,640	3,710	--	60	--	81	--	93	--	--		--	--	SPWCM
Mar. 26.....	9:00 a. m.	a400	38	1,460	1,680	54	66	74	80	84	87	88	93		97	--	BWC
Mar. 26.....	3:00 p. m.	a400	35	2,410	2,920	--	48	--	65	--	86	--	--		--	--	SPWCM
Mar. 27.....	1:30 p. m.	a312	40	5,060	2,330	--	18	--	27	--	38	50	77		99	100	SPWCM
Mar. 28.....	4:10 p. m.	a298	36	2,460	6,120	--	30	--	52	--	66	74	94		100	--	SPWCM
Mar. 29.....	7:00 p. m.	177	42	3,200	1,360	12	13	--	14	21	26	31	55		96	100	SPWCM
Mar. 29.....	7:00 p. m.	177	42	3,200	1,070	7	10	12	17	20	22	27	53		96	100	SPN
Apr. 5.....	11:45 a. m.	a165	47	829	1,980	--	25	--	43	--	53	58	81		98	100	SPWCM
Apr. 18.....	5:20 p. m.	132	53	458	1,360	26	35	40	45	49	51	56	65		90	--	BWC
Apr. 18.....	7:25 p. m.	135	54	868	2,810	17	18	22	25	28	29	38	71		92	--	BWC
May 8.....	3:00 p. m.	109	69	396	1,250	26	37	42	46	49	53	64	80		94	--	BWC
May 10.....	11:00 a. m.	135	55	524	1,230	--	40	44	53	55	59	64	80		95	--	BWC
May 10.....	1:45 p. m.	280	58	20,000	4,680	--	69	--	79	--	95	--	--		--	--	SPWCM
May 10.....	3:00 p. m.	243	60	15,900	9,730	--	0	50	89	93	95	--	--		--	--	SPN
May 10.....	3:00 p. m.	243	60	15,900	10,100	59	76	83	90	93	96	97	99		100	--	BWC
May 17.....	4:00 p. m.	142	67	452	1,520	30	34	41	45	49	53	60	87		100	--	BWC
May 24.....	11:00 a. m.	248	72	1,060	2,180	--	32	--	46	--	56	71	87		98	100	SPWCM
May 29.....	8:15 a. m.	146	60	42,700	8,470	--	39	--	62	--	95	--	--		--	--	SPWCM
June 7.....	6:30 p. m.	169	70	10,400	8,220	--	0	8	83	88	94	--	--		--	--	SPN
June 7.....	6:30 p. m.	169	70	10,400	9,130	50	66	75	83	89	96	99	100		--	--	BWC
June 7.....	9:00 p. m.	254	--	10,100	5,090	--	69	--	83	--	94	--	--		--	--	SPWCM
June 20.....	4:00 p. m.	227	68	3,650	5,140	--	69	--	76	--	83	--	--		--	--	SPWCM
June 24.....	6:30 p. m.	362	--	5,060	4,620	--	--	--	78	--	87	--	--		--	--	SPWCM
July 3.....	1:15 p. m.	238	64	1,930	2,080	--	26	--	31	--	34	41	76		98	100	SPWCM
July 11.....	1:15 p. m.	169	64	1,310	2,760	--	19	--	28	--	64	--	--		--	--	--

July 24, 1951.....	10:15 a. m.	119	--	12,000	7,540	3	7	32	50	75	96	--	SPN
July 24.....	10:15 a. m.	119	--	12,000	7,760	24	32	41	53	71	95	--	BWC
Aug. 1.....	7:45 a. m.	1,250	72	39,900	12,000	--	48	--	65	--	94	--	SPWCM
Aug. 1.....	11:00 a. m.	685	--	21,700	5,740	--	58	--	73	--	89	--	SPWCM
Aug. 15.....	8:30 a. m.	243	62	14,400	5,060	--	72	--	94	--	98	--	SPWCM
Aug. 15.....	2:30 p. m.	190	70	7,730	5,100	--	83	--	93	--	98	--	SPWCM
Aug. 16.....	10:00 a. m.	190	--	2,100	4,770	--	90	--	94	--	96	--	SPWCM
Sept. 5.....	11:15 a. m.	150	67	2,550	3,140	61	68	75	78	81	84	100	SPWCM
Sept. 5.....	11:15 a. m.	150	67	2,550	3,020	2	--	28	80	82	85	100	SPN
Sept. 18.....	3:10 p. m.	96	68	268	608	29	39	43	45	49	52	--	BWC

a Mean daily discharge.

WHITE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN WHITE RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate			
WHITE RIVER NEAR OACOMA																						
Feb. 28, 1951.....	100	26	0.20	37	4.3	45	--	142	--	73	9.5	0.6	0.8	0.00	278	0.38	--	110	0	47	389	7.3
Apr. 6,	505	--	--	--	--	68	--	249	--	109	5.3	--	--	--	--	--	--	--	--	46	615	7.5
June 23,	2,400	--	--	--	--	126	--	296	--	118	4.0	--	--	--	--	--	--	--	--	74	702	7.6
June 26,	8,100	24	.02	37	3.5	118	--	230	--	162	3.5	.4	.6	.17	484	66	--	107	0	71	707	7.5
June 27,	3,100	--	--	--	--	111	--	212	--	158	4.7	--	--	--	--	--	--	--	--	70	685	8.0
July 24,	505	--	--	--	--	103	--	240	--	87	4.7	--	--	--	--	--	--	--	--	76	574	7.7

PONCA CREEK BASIN

PONCA CREEK AT ANOKA, NEBR.

LOCATION.--At gaging station at bridge on U. S. Highway 281, half a mile southwest of Anoka, Boyd County, and half a mile upstream from Dry Creek.

DRAINAGE AREA.--410 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: February to September 1951.

EXTREMES, February to September 1951.--Sediment concentrations: Maximum daily, 12,200 ppm June 19; minimum daily, not determined.

Sediment loads: Maximum daily, 48,900 tons June 25; minimum daily, less than 0.50 ton on several days.

REMARKS.--Flow affected by ice Feb. 23 to Mar. 23, Apr. 3-5, 8-13. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Periodic determinations of suspended-sediment discharge, October 1950 to February 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Oct. 10, 1950.....	9.7	73	1.9
Oct. 25.....	6.1	42	.7
Nov. 8.....	7.4	32	.6
Dec. 7.....	1.9	27	.1
Jan. 18, 1951.....	2.6	15	.1
Feb. 1.....	.7	15	(t)

t Less than 0.05 ton.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IGWA

PONCA CREEK BASIN--Continued

PONCA CREEK AT ANOKA, NEBR.--Continued

Suspended sediment, February to September 1951

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----				--	--	--	32	50	4
2-----				--	--	--	33	210	19
3-----				--	--	--	20	180	a 10
4-----				--	--	--	11	90	3
5-----				--	--	--	8.8	30	1
6-----				--	--	--	8.6	80	2
7-----				--	--	--	7.8	50	1
8-----				--	--	--	7.1		
9-----				--	--	--	6.1	--	(t)
10-----				--	--	--	4.4	10	(t)
11-----				--	--	--	2.7		
12-----				--	--	--	3.0	--	(t)
13-----				--	--	--	3.6		
14-----				--	--	--	4.2		
15-----				--	--	--	4.5	70	1
16-----				--	--	--	180	--	e 150
17-----				--	--	--	500	--	e 550
18-----				--	--	--			
19-----				--	--	--			
20-----				--	--	--	450	--	e 220
21-----				--	--	--			
22-----				--	--	--	700	--	e 4,200
23-----				8.5	50	1	900	--	e 3,600
24-----				19	50	3	505	1,450	s 1,950
25-----				26	60	4	412	2,310	2,570
26-----				26	40	3	298	2,480	2,000
27-----				24	40	3	240	2,570	1,670
28-----				27	40	3	155	1,800	670
29-----				--	--	--	81	890	190
30-----				--	--	--	64	520	90
31-----				--	--	--	54	300	44
Total-----				130.5	--	17	6,045.8	--	18,607
Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	54	300	44	62	620	100	220	7,680	s 5,570
2-----	50	320	43	58	410	84	521	8,290	11,700
3-----	40	280	30	53	320	46	365	6,140	6,050
4-----	40	260	28	48	280	36	195	2,420	1,270
5-----	40	260	28	40	250	27	114	1,100	340
6-----	43	310	36	31	200	17	81	900	a 200
7-----	43	260	33	28	180	14	65	870	150
8-----	35	200	19	25	190	13	61	650	110
9-----	30	170	14	23	170	11	48	480	62
10-----	30	160	13	29	210	16	38	390	40
11-----	27	150	11	36	240	23	31	320	27
12-----	25	200	14	27	180	13	25	270	18
13-----	30	270	22	23	170	11	22	260	a 15
14-----	35	270	26	50	890	120	19	250	13
15-----	31	230	19	134	2,860	1,030	16	240	10
16-----	29	230	18	258	5,180	3,610	14	200	8
17-----	27	190	14	250	6,360	s 4,920	11	190	6
18-----	27	130	9	292	5,200	s 4,310	43	2,300	270
19-----	27	150	11	230	2,390	1,480	567	12,200	s 24,400
20-----	34	270	25	191	1,840	950	635	5,500	9,430
21-----	49	380	50	135	1,400	a 500	335	3,520	3,180
22-----	49	510	67	102	880	240	184	1,920	950
23-----	69	1,100	200	76	600	120	125	1,800	a 600
24-----	95	1,540	400	63	480	82	120	1,430	460
25-----	81	880	190	61	400	66	511	11,800	s 48,900
26-----	64	540	93	49	290	38	1,030	11,400	s 35,900
27-----	89	560	100	40	220	24	401	3,740	4,050
28-----	62	460	77	38	190	19	206	1,500	a 850
29-----	53	340	49	39	200	21	142	850	a 320
30-----	50	380	51	70	3,220	s 720	100	--	e 140
31-----	--	--	--	56	1,420	210	--	--	--
Total-----	1,338	--	1,734	2,617	--	18,851	6,245	--	155,039

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

PONCA CREEK BASIN--Continued

PONCA CREEK AT ANOKA, NEBR.--Continued

Suspended sediment, February to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	100	--	e 140	11	70	2	33	110	10
2-----	171	--	e 900	9.7	80	2	28	100	8
3-----	171	1,800	a 850	9.3	120	3	24	90	6
4-----	127	1,040	360	8.0	120	3	29	240	19
5-----	134	1,430	520	8.0	60	1	44	420	50
6-----	96	950	250	6.7	60	1	33	180	16
7-----	73	680	130	6.4	40	1	27	100	7
8-----	70	600	110	5.4	50	1	33	530	47
9-----				6.4	60	1	188	2,890	s 1,750
10-----				6.1	60	1	298	2,310	s 1,880
11-----	78	890	150	6.7	200	4	211	1,540	880
12-----				62	1,600	s 400	181	1,870	910
13-----				350	4,400	s 4,250	245	1,650	1,090
14-----	60	480	78	556	5,230	s 8,040	197	1,180	620
15-----				760	4,930	s 10,300	135	570	210
16-----				508	3,670	s 5,340	102	480	130
17-----	42	270	31	305	1,760	1,450	85	450	100
18-----				211	1,100	630	70	330	62
19-----				139	720	270	59	230	37
20-----	30	280	23	620	4,250	s 8,390	48	200	26
21-----	28	320	24	664	3,390	s 6,430	44	160	19
22-----	25	240	16	268	1,200	870	38	140	14
23-----	25	200	14	128	550	190	37	150	15
24-----	24	200	13	90	280	68	39	150	a 16
25-----	22	210	12	50	200	27	38	130	13
26-----	18	180	9	38	200	21	35	130	12
27-----	17	190	9	383	4,160	s 4,860	30	110	9
28-----	17	200	9	236	2,730	s 2,040	27	80	6
29-----	17	150	7	78	720	150	26	70	5
30-----	15	120	5	59	280	41	26	100	7
31-----	11	120	4	42	80	8	--	--	--
Total--	1,885	--	4,412	5,630.7	--	53,796	2,410	--	7,974
Total discharge for period Feb. 23 to Sept. 30 (cfs-days)									26,302.0
Total load for period Feb. 23 to Sept. 30 (tons)									260,430

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

PONCA CREEK BASIN--Continued
 PONCA CREEK AT ANOKA, NEBR.--Continued

Particle-size analyses of suspended sediment, December 1950 to September 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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	0.350		0.500	1.000
Dec. 7, 1950.....	3:20 p. m.	1.9	--	27	--	--	--	--	--	--	77	96	--	--	--	S
Apr. 30, 1951.....	10:10 a. m.	46	--	287	780	--	47	--	75	--	92	--	--	--	--	SPWCM
May 18.....	1:00 p. m.	272	65	3,690	5,720	--	45	--	72	--	78	80	84	97	100	SPWCM
June 2.....	7:15 p. m.	475	52	5,070	12,300	--	52	--	63	--	90	92	97	100	--	SPWCM
July 31.....	9:10 a. m.	11	--	130	--	--	--	--	--	--	94	98	100	--	--	S
Aug. 15.....	1:15 p. m.	652	70	3,160	9,870	--	57	--	76	--	84	87	95	99	--	SPWCM
Aug. 29.....	6:30 p. m.	71	77	534	1,110	--	75	--	89	--	90	91	95	100	--	SPWCM
Sept. 12.....	1:30 p. m.	195	60	1,840	1,630	53	59	72	80	90	90	93	98	100	--	SPWCM
Sept. 12.....	1:30 p. m.	195	60	1,840	1,730	17	24	58	78	81	90	93	98	100	--	SPNMM

NIOBRARA RIVER BASIN

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.

LOCATION.--At gaging station at bridge on State Highway 87, 4 miles upstream from Box Butte Creek, and 14 miles south of Hay Springs, Sheridan County. RECORDS AVAILABLE.--Water temperatures: February to September 1951.

Sediment Records: February to September 1951.

EXTREMES, February to September 1951.--Water temperatures: Maximum, 90°F July 18; minimum, freezing point on many days during February and March.

Sediment Concentrations: Maximum daily, 16,600 ppm Sept. 4; minimum daily, not determined.

Sediment Coasts: Maximum daily, 68,700 tons July 28; minimum daily, 1 ton on several days.

REMARKS.--Flow affected by ice Feb. 6 to Mar. 19. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, November 1950 to July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent non-carbonate	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium				Non-carbonate
Nov. 12, 1950	30	41	0.20	52	6.2	29	229			23	3.5	0.6	2.4	0.20	284	0.39	155	0	29	400	8.1	
Jan. 3, 1951	25	48	.10	58	5.7	35	254			27	3.5	.6	2.4	.20	312	.42	168	0	31	440	7.9	
Apr. 4	28	45	.06	55	7.4	30	246			20	4.5	.6	1.9	.06	302	.41	168	0	28	416	7.9	
July 7	5.5	37	--	--	--	--	224			--	--	--	--	--	--	--	--	136	0	--	402	7.8

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Temperature (°F) of water, February to September 1951

/Once-daily temperature measurement generally between 1 and 7 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1					--	34	47	55	44	--	81	70
2					--	32	55	56	a 53	a 65	72	76
3				34	--	a 32	59	63	55	a 73	a 72	72
4					--	--	53	71	a 66	a 62	80	--
5					--	34	53	a 60	72	80	a 82	--
6					32	33	42	--	a 63	79	80	65
7					32	a 35	a 48	63	a 68	89	80	69
8					32	--	48	66	a 63	a 69	76	74
9					32	32	47	53	a 75	73	73	a 59
10					a 33	--	39	63	73	59	a 66	64
11					34	--	46	76	68	56	a 72	74
12					32	--	49	67	76	73	a 67	59
13					34	32	51	a 60	a 67	84	a 68	64
14					32	33	a 49	67	a 65	85	a 63	62
15		37			35	45	46	60	a 78	86	76	a 52
16					33	38	56	65	80	73	a 66	a 55
17					a 34	a 32	62	64	85	76	a 72	73
18					a 35	32	--	68	a 68	90	a 70	71
19					33	32	59	a 63	70	82	a 74	66
20					34	33	41	a 58	69	76	68	55
21					33	51	44	58	--	63	a 66	53
22					32	42	60	79	--	78	a 60	a 56
23					32	46	50	a 73	--	a 74	80	50
24					a 35	a 40	45	68	--	a 63	a 75	62
25					35	51	60	73	--	81	a 69	61
26					32	57	48	63	--	a 79	84	57
27					32	49	65	a 56	a 71	a 72	78	58
28					32	43	a 64	80	a 58	--	74	54
29					--	45	65	70	68	83	a 72	63
30					--	43	55	a 59	a 75	a 79	74	56
31					--	a 45	--	53	--	76	78	--
Average					--	39	52	64	68	76	73	62

a Reading obtained between 8 a. m. and noon.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Suspended sediment, February to September 1951

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----								770	52
2-----									
3-----									
4-----									
5-----							25	380	26
6-----									
7-----							13	132	5
8-----							29	216	17
9-----							25	180	a 12
10-----									
11-----							20	161	9
12-----					132	11	18	100	a 5
13-----							23	72	4
14-----							28	200	15
15-----							20	240	a 13
16-----							20	253	14
17-----				30			18	242	12
18-----							13	374	13
19-----							13	1,380	48
20-----							18	468	23
21-----							25	317	21
22-----					179	14	27		
23-----							23		
24-----							22	211	14
25-----					277	22	25		
26-----							25		
27-----					900	b 70	29		
28-----							31		
29-----				--	--	--	29	153	12
30-----				--	--	--	31		
31-----				--	--	--	29		
Total-				690	--	368	729	--	549
Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	31			20			27		
2-----	33			16			29	50	4
3-----	29	278	23	13			25		
4-----	29			13	67	3	25	122	8
5-----	29			13			29	171	13
6-----	29			13			41	94	10
7-----	27			11			31		
8-----	25	86	6	9.7			22		
9-----	23			9.7			20	124	8
10-----	18			13			27		
11-----	25			13			25	132	9
12-----	13			9.7	88	3	25	585	39
13-----	15	80	3	13			22		
14-----	11			18			23	159	10
15-----	13			15			23		
16-----	16	144	6	23			33	252	22
17-----	13	72	3	27			35	190	18
18-----	13	54	2	25	258	18	60	710	sb 280
19-----	9.7	33	2	18			48	1,400	b 320
20-----	16	86	a 4	18	82	4	9.7	206	5
21-----	16	108	5	22	90	a 5	13	270	9
22-----	15	104	4	25	180	s 14	18	312	15
23-----	16	61	3	18	277	13	22	302	18
24-----	27	576	42	23	84	5	41	269	30
25-----	27	310	a 23	23	112	7	41	286	32
26-----	31			11	84	a 2	39	247	26
27-----	33			9.7	55	a 1	31	203	17
28-----	27	148	12	13			37	240	b 34
29-----	27			11	44	2	29	506	s 46
30-----	23	109	7	15			20	258	14
31-----	--	--	--	16			--	--	--
Total-	659.7	--	306	497.8	--	147	870.7	--	1,039

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Suspended sediment, February to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	15	146	6	78	162	34	123	835	s 318
2-----	15	102	4	54	139	20	66	408	73
3-----	13	75	3	50	153	21	206	4,840	s 2,100
4-----	11	45	1	54	186	27	874	16,600	s 48,200
5-----	13	60	2	78	568	120	91	1,140	280
6-----	8.4	54	1	33	256	23	47	1,150	146
7-----	6.3	45	1	54	288	42	81	677	148
8-----	3.8	60	1	54	157	23	78	415	87
9-----	5.5	90	1	15	196	8	47	324	41
10-----	9.7	129	3	33	575	51	33	288	26
11-----	35	210	20	56	434	66	37	238	24
12-----	41	423	47	66	768	137	45	216	26
13-----	29	600	47	84	324	73	37	238	24
14-----	27	483	35	183	523	258	29	228	18
15-----	23	261	16	63	203	35	41	149	16
16-----	18	408	20	76	240	49	37	161	16
17-----	20	261	14	54	103	15	25	87	5
18-----	20	175	9	54	125	18	24	24	2
19-----	23	435	27	190	73	37	23	38	2
20-----	20	201	11	108	62	18	22	46	3
21-----	27	162	12	45	39	5	25	66	4
22-----	20	156	8	27	29	2	25		
23-----	18	75	4	23	57	4	22		
24-----	13	66	2	35	65	6	20		
25-----	9.7	72	2	25	24	2	15	58	2
26-----	8.4	36	1	16	36	2	15		
27-----	68	1,440	s 307	15	26	1	13		
28-----	2,200	7,750	68,700	15	17	1	15		
29-----	450	2,550	3,100	18	14	1	11	8.4	--
30-----	220	648	385	35	19	2	8.4		
31-----	136	348	128	35	24	2	--		
Total-	3,526.8	--	72,918	1,726	--	1,103	2,135.4	--	51,583

Total discharge for period Feb. 6 to Sept. 30 (cfs-days)..... 10,835.4
 Total load for period Feb. 6 to Sept. 30 (tons)..... 128,013

s Computed by subdividing day.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.

LOCATION.--At bridge on State Highway 27, just upstream from gaging station, which is 4 miles downstream from Rush Creek, and 11 miles south of Gordon, Sheridan County.

DRAINAGE AREA.--2,595 square miles.

RECORDS AVAILABLE.--Sediment records: October 1947 to December 1950.

EXTREMES, October to December 1950.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, not determined; minimum daily, 10 tons Dec. 5.

EXTREMES, 1947-50.--Sediment concentrations: Maximum daily, 5,360 ppm Mar. 15, 1948; minimum daily, not determined.

Sediment loads: Maximum daily, 22,900 tons June 17, 1948; minimum daily, 2 tons Feb. 3, 1950.

REMARKS.--Flow affected by ice Nov. 21-28, Dec. 1-27. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, October to December 1950

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	135	230	84	121	150	49	108	430	130
2-----	138	240	89	128	480	170	101	420	110
3-----	131	190	67	125	420	140	84	340	77
4-----	121	210	69	128	260	90	75	380	77
5-----	111	190	57	125	360	120	64	60	10
6-----	102	150	41	125	350	120	68	70	13
7-----	102	250	69	128	120	41	69	70	13
8-----	102	260	72	125	340	110	82	170	38
9-----	108	200	58	131	280	99	88	130	31
10-----	111	140	42	96	240	62	114	130	40
11-----	108	170	50	114	400	120	122		
12-----	102	200	55	105	340	96	111		
13-----	96	230	60	88	600	140	117		
14-----	102	180	50	91	350	86	117	160	50
15-----	105	300	85	85	340	78	113		
16-----	111	330	a 99	94	280	71	108		
17-----	108	260	76	99	350	94	107		
18-----	108	320	93	111	470	140	105		
19-----	111	210	63	118	520	a 170	105		
20-----	114	180	55	111	460	140	110	770	230
21-----	114	170	52	110	610	180	118		
22-----	121	200	a 65	90	370	90	128		
23-----	121	230	75	80	240	a 52	138		
24-----	118	180	57	70	260	49	138		
25-----	114	260	80	80	380	82	125	1,000	320
26-----	111	490	150	90	640	160	100		
27-----	111	460	140	100	500	140	100		
28-----	111	280	84	120	850	280	121		
29-----	111	460	140	118	610	190	128		
30-----	111	200	60	118	500	160	128	520	180
31-----	118	160	51	--	--	--	131		
Total--	3,487	--	2,288	3,224	--	3,519	3,323	--	4,539

Total discharge for period Oct. 1 to Dec. 31 (cfs-days)..... 10,034

Total load for period Oct. 1 to Dec. 31 (tons)..... 10,346

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, January to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Jan. 3, 1951.....	142	53	20
Jan. 22.....	128	581	201
Jan. 24.....	153	250	103
Feb. 6.....	135	92	34
Feb. 11.....	178	246	118
Mar. 7.....	38	821	85
Mar. 21.....	142	503	193
Apr. 4.....	184	414	206
Apr. 7.....	128	738	255
Apr. 18.....	180	308	150
Apr. 22.....	138	435	162
May 4.....	114	364	112
May 8.....	111	218	65
May 22.....	142	396	152
May 24.....	111	180	54
June 5.....	135	761	277
June 13.....	111	254	76
June 27.....	105	314	89
June 29.....	131	388	137
July 7.....	77	930	193
July 18.....	96	217	56
July 24.....	99	245	65
July 28.....	4,100	9,040	100,000
Aug. 1.....	149	326	131
Aug. 2.....	147	483	182
Aug. 15.....	207	458	256
Sept. 2.....	288	1,380	1,070
Sept. 5.....	341	2,790	2,570
Sept. 19.....	96	279	72
Sept. 22.....	114	283	87

NIORARA RIVER BASIN--Continued

NIORARA RIVER NEAR CODY, NEBR.

LOCATION.--At county bridge, a quarter of a mile downstream from gaging station, which is 3 miles upstream from Medicine Creek, 5 miles downstream from Bear Creek, and 10 miles south of Cody, Cherry County.

RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1951.

Sediment records: April 1948 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 78°F July 18; minimum, freezing point Nov. 25.

Sediment concentrations: Maximum daily, 5,900 ppm Sept. 5; minimum daily, 430 ppm Feb. 9.

Sediment loads: Maximum daily, 29,000 tons Sept. 5; minimum daily, 220 tons Dec. 7.

EXTREMES, 1948-51.--Water temperatures: Maximum, 87°F June 24, 1950; minimum, freezing point on many days during winter months.

Sediment concentrations (1949-51): Maximum daily, 6,780 ppm Aug. 27, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 58,000 tons June 18, 1948; minimum daily, not determined.

REMARKS.--Investigations indicate that practically all the total sediment load is transported in suspension at this contracted section of the river. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Temperature (°F) of water, water year October 1950 to September 1951
(Once-daily temperature measurement at approximately 8 a. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	47	47	36	a33	33	33	37	55	47	60	70	66
2	43	43	--	33	33	33	35	47	41	61	74	65
3	40	33	a34	--	34	33	36	49	46	60	75	63
4	37	46	--	--	--	33	39	50	47	60	70	63
5	47	42	--	--	34	33	44	52	55	63	77	62
6	50	44	--	--	33	a35	45	47	59	68	69	59
7	57	45	a33	--	33	33	37	47	58	72	70	62
8	53	38	--	--	34	33	39	50	60	70	66	63
9	37	--	--	--	33	33	35	55	57	65	65	64
10	47	35	--	--	34	33	38	52	59	60	62	57
11	47	39	33	a33	37	33	35	49	61	55	61	59
12	47	35	a37	33	33	33	33	53	57	56	66	55
13	48	36	33	33	33	33	35	34	57	63	57	66
14	47	35	36	33	33	34	44	57	62	67	65	54
15	60	36	33	36	33	33	35	34	62	70	70	56
16	55	39	34	36	33	37	33	60	65	70	61	47
17	50	38	34	33	33	33	40	59	65	65	65	51
18	55	43	34	34	41	33	46	58	63	78	65	56
19	55	33	33	33	34	33	43	59	65	73	66	57
20	52	43	35	33	33	33	38	60	62	71	65	57
21	50	37	35	33	33	39	34	56	61	73	58	49
22	47	37	35	35	33	39	33	50	59	65	61	43
23	48	--	37	33	34	37	41	52	62	70	61	49
24	a55	a36	38	33	41	34	44	66	54	70	67	47
25	a53	32	40	34	34	36	42	60	65	70	70	47
26	46	37	--	33	33	40	45	54	63	73	64	53
27	--	39	a35	--	35	45	58	53	65	74	63	42
28	--	36	35	--	33	42	54	64	58	70	67	40
29	--	34	34	--	--	34	57	60	60	73	69	a62
30	--	33	34	--	--	36	58	57	59	72	70	49
31	48	--	35	a33	--	34	--	52	--	71	68	--
Average	49	38	--	--	34	35	41	55	59	67	66	55

a Reading obtained between 2 p. m. and 5 p. m.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	314	1,200	1,000	298	1,500	1,200	310	2,700	2,300
2-----	324	1,400	1,200	302	1,300	1,100	298	1,900	1,500
3-----	306	1,400	1,200	302	1,200	980	278	1,500	1,100
4-----	302	1,400	1,100	298	1,400	1,100	278	1,200	a 900
5-----	290	1,300	1,000	298	1,300	1,000	100	1,300	a 350
6-----	282	1,300	990	302	1,300	1,100	120	840	a 270
7-----	290	1,600	1,300	302	1,700	1,400	160	500	220
8-----	270	1,600	1,200	310	1,600	1,300	200	480	a 260
9-----	270	1,200	870	278	1,500	a 1,100	250	630	a 430
10-----	270	1,300	950	220	1,700	1,000	270	1,200	a 870
11-----	266	1,400	1,000	274	1,900	1,400	310	1,900	1,600
12-----	282	1,200	910	314	1,800	1,500	330	2,000	1,800
13-----	290	1,200	940	328	2,500	2,200	355	1,900	1,800
14-----	282	1,200	910	328	2,000	1,800	346	1,700	1,600
15-----	278	1,100	830	324	1,700	1,500	310	2,000	1,700
16-----	294	1,100	870	314	2,100	1,800	290	2,400	1,900
17-----	290	1,200	940	310	1,900	1,600	270	2,800	2,000
18-----	290	1,200	940	306	1,600	1,300	250	2,600	1,800
19-----	294	1,000	790	302	1,400	1,100	250	2,300	1,600
20-----	286	1,100	850	302	1,200	980	270	1,900	1,400
21-----	290	1,200	940	314	1,800	1,500	300	1,600	1,300
22-----	290	1,300	1,000	310	1,600	1,300	330	1,500	1,300
23-----	290	1,300	1,000	278	1,200	a 900	350	1,700	1,600
24-----	290	1,200	940	160	1,100	480	350	2,000	1,900
25-----	294	1,200	950	238	1,100	710	320	1,600	1,400
26-----	290	1,300	1,000	319	1,800	1,600	250	1,600	a 1,100
27-----	294	1,200	a 950	370	2,200	2,200	280	1,600	1,200
28-----	290	1,200	a 940	365	2,200	2,200	290	1,600	1,300
29-----	270	1,200	a 940	342	2,100	1,900	290	1,700	1,300
30-----	282	1,200	a 910	310	2,900	2,400	300	1,600	1,300
31-----	294	1,400	1,100	--	--	--	300	2,000	1,600
Total--	8,944	--	30,460	9,018	--	41,650	8,605	--	40,700
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	302	1,500	1,200	340	2,200	2,000	328	2,300	2,000
2-----	278	1,800	1,400	400	1,300	1,400	342	2,300	2,100
3-----	274	1,900	1,400	450	930	1,100	250	2,100	s 1,500
4-----	274	1,700	1,300	332	780	700	260	1,900	1,300
5-----	282	1,500	1,100	319	770	660	346	2,400	s 2,400
6-----	270	1,500	1,100	310	830	690	400	3,200	3,500
7-----	266	1,500	1,100	300	510	410	370	2,400	2,000
8-----	258	1,800	1,300	310	540	450	280	2,100	600
9-----	258	2,500	1,700	328	430	380	150	2,000	810
10-----	270	2,400	1,700	355	1,400	1,300	250	2,000	1,400
11-----	266	1,800	1,300	350	2,100	2,000	282	1,900	1,400
12-----	258	1,700	1,200	370	1,600	1,600	282	1,800	1,400
13-----	278	1,600	1,200	350	980	930	319	1,900	1,600
14-----	274	1,900	1,400	350	760	720	346	2,100	2,000
15-----	290	2,100	1,600	350	1,100	1,000	430	2,400	2,800
16-----	314	1,900	1,600	385	1,400	1,500	405	3,000	3,300
17-----	306	2,300	1,900	400	1,600	1,700	365	2,200	2,200
18-----	306	2,200	1,800	385	1,600	1,700	332	2,200	2,000
19-----	310	2,100	1,800	380	1,400	1,400	324	2,400	2,100
20-----	282	2,100	1,600	380	1,300	1,300	324	1,900	1,700
21-----	258	1,800	1,300	390	1,200	1,300	324	1,800	1,600
22-----	282	1,800	1,400	380	1,200	1,200	342	2,100	1,900
23-----	306	1,800	1,500	337	1,400	1,300	355	2,400	2,300
24-----	306	1,600	1,300	360	1,800	1,700	365	2,400	2,400
25-----	319	1,600	1,400	400	1,900	2,100	370	2,200	2,200
26-----	342	2,000	1,800	355	1,900	1,800	346	2,100	2,000
27-----	200	2,100	a 1,100	365	1,900	1,900	375	2,200	2,200
28-----	220	1,600	a 950	360	2,100	2,000	365	2,100	2,100
29-----	250	1,100	a 740	--	--	--	350	2,000	1,900
30-----	300	1,400	a 1,100	--	--	--	355	2,200	2,100
31-----	320	2,200	1,900	--	--	--	346	2,400	2,200
Total--	8,719	--	43,190	10,091	--	36,240	10,278	--	62,410

s Computed by subdividing day.

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Suspended sediment water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	342	2,100	1,900	380	2,000	1,900	332	1,700	1,500
2-----	332	2,000	1,800	319	1,600	1,400	355	1,900	1,800
3-----	332	2,200	2,000	302	1,400	1,100	342	1,800	1,700
4-----	328	2,000	1,800	302	1,400	1,100	332	1,600	1,400
5-----	332	2,000	1,800	302	1,600	1,300	332	1,600	1,400
6-----	342	2,000	1,800	310	2,100	1,800	346	1,700	1,600
7-----	342	2,200	2,000	298	1,700	1,400	400	2,200	2,400
8-----	332	2,100	1,900	294	1,400	1,100	360	2,100	2,000
9-----	328	1,900	1,700	319	1,600	1,400	337	1,700	1,500
10-----	324	2,000	1,700	302	1,800	1,500	328	1,600	1,400
11-----	328	2,300	1,900	302	1,300	1,100	360	1,800	1,700
12-----	319	2,300	1,900	294	1,300	1,000	337	1,700	1,500
13-----	310	1,800	1,600	302	1,300	1,100	324	1,500	1,300
14-----	310	2,000	1,700	302	1,200	980	319	1,800	1,600
15-----	302	2,100	1,700	319	1,300	1,100	306	1,300	1,100
16-----	306	2,300	1,900	328	1,400	1,200	314	1,200	1,000
17-----	306	2,100	1,700	355	1,500	1,400	346	2,000	s 2,100
18-----	306	2,100	1,700	460	1,600	2,000	346	2,200	2,100
19-----	314	1,900	1,600	425	1,900	2,200	360	1,800	1,700
20-----	346	1,900	1,800	435	1,800	2,100	480	3,000	s 4,100
21-----	355	2,400	2,300	475	2,000	2,600	365	2,700	2,700
22-----	346	2,200	2,100	430	2,600	3,000	380	2,300	2,400
23-----	342	2,000	1,800	405	2,600	2,800	415	2,200	2,500
24-----	355	2,100	2,000	400	2,200	2,400	405	2,100	2,300
25-----	390	2,200	2,300	385	2,000	2,100	380	1,900	1,900
26-----	425	2,400	2,800	350	1,900	1,800	380	1,900	1,900
27-----	430	2,300	2,700	324	1,800	1,600	370	2,000	2,000
28-----	400	2,400	2,600	314	1,500	1,300	350	1,800	1,700
29-----	385	1,900	2,000	314	1,500	1,300	346	1,700	1,600
30-----	370	1,600	1,600	306	1,500	1,200	314	1,600	1,400
31-----	--	--	--	306	1,800	1,500	--	--	--
Total--	10,279	--	58,100	10,639	--	49,780	10,661	--	55,300
	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	342	1,600	1,500	355	1,800	1,700	404	1,900	s 3,000
2-----	328	1,800	1,400	328	1,500	1,300	584	3,500	5,500
3-----	332	1,700	1,500	302	1,500	1,200	520	2,700	3,800
4-----	294	1,600	1,300	282	1,200	910	1,100	4,300	s 12,000
5-----	298	1,300	1,000	270	1,200	870	1,740	5,900	s 29,000
6-----	302	1,100	900	258	1,100	770	807	4,800	10,000
7-----	302	990	810	262	940	660	500	3,000	4,000
8-----	290	1,000	780	258	900	630	420	2,400	2,700
9-----	298	1,100	890	270	870	630	395	2,500	2,700
10-----	306	1,100	910	274	1,000	740	385	2,400	2,500
11-----	319	1,300	1,100	400	1,600	s 2,100	365	2,000	2,000
12-----	355	1,400	1,300	413	2,300	2,800	370	1,800	1,800
13-----	355	1,800	1,700	332	1,900	1,700	360	1,700	1,700
14-----	346	1,600	1,500	365	1,800	1,600	346	1,700	1,600
15-----	337	1,700	1,500	324	1,800	1,600	337	1,600	1,500
16-----	310	1,300	1,100	332	1,500	1,300	324	1,500	1,300
17-----	298	1,500	1,200	319	1,400	1,200	324	1,500	1,300
18-----	286	1,200	930	314	1,400	1,200	328	1,600	1,400
19-----	270	920	670	324	1,700	1,500	324	1,700	1,500
20-----	258	860	600	425	3,100	3,600	332	1,500	1,300
21-----	270	840	610	328	2,200	1,900	319	1,600	1,400
22-----	274	820	610	290	1,600	1,300	319	1,300	1,100
23-----	274	760	560	270	1,600	1,300	314	1,400	1,200
24-----	270	810	590	270	1,300	950	319	1,400	1,200
25-----	254	650	450	266	1,100	790	310	1,500	1,300
26-----	242	540	350	266	1,200	860	306	1,800	1,500
27-----	238	700	450	258	1,200	840	306	1,600	1,300
28-----	286	1,200	930	258	1,100	a 770	294	1,400	1,100
29-----	2,130	4,500	s 28,000	258	940	650	280	1,300	1,000
30-----	695	3,000	5,600	270	1,000	730	298	1,500	1,200
31-----	430	2,600	3,000	274	1,100	810	--	--	--
Total--	11,589	--	63,740	9,415	--	38,910	13,340	--	102,900
Total discharge for year (cfs-days).....									121,578
Total load for year (tons).....									623,380

s Computed by subdividing day.

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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. 6, 1950.....	9:40 a. m.	298	--	1,020	--	--	--	--	--	--	12	27	60	89	96	100	S
Nov. 2.....	12:45 p. m.	310	43	1,480	--	--	--	--	--	--	10	22	63	94	99	100	S
Mar. 15, 1951...	10:20 a. m.	440	35	1,780	--	--	--	--	--	--	15	36	77	96	99	100	S
Apr. 27.....	8:40 a. m.	455	--	1,900	--	--	--	--	--	--	12	32	69	97	100	---	S
May 10.....	10:50 a. m.	310	--	1,580	--	--	--	--	--	--	7	23	65	97	100	---	S
May 24.....	8:35 a. m.	430	--	2,060	--	--	--	--	--	--	20	38	94	97	100	---	S
June 15.....	9:40 a. m.	342	68	1,340	--	--	--	--	--	--	10	27	100	--	--	--	S
July 18.....	9:40 a. m.	310	75	1,200	--	--	--	--	--	--	8	22	67	96	100	--	S
July 29.....	7:50 a. m.	3,630	--	4,160	--	29	--	45	--	--	71	87	100	--	--	--	SPWCM
Aug. 2.....	6:20 p. m.	342	74	1,840	--	--	--	--	--	--	21	34	66	96	98	99	S
Sept. 5.....	10:05 a. m.	2,440	66	5,760	5,010	20	--	32	--	--	57	76	96	100	--	--	SPWCM
Sept. 5.....	6:35 p. m.	1,740	66	6,840	7,180	37	--	51	--	--	68	81	94	100	--	--	SPWCM
Sept. 6.....	1:20 p. m.	1,722	--	4,750	2,370	24	--	32	--	--	41	51	73	99	99	100	SPWCM

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR SPARKS, NEBR.

LOCATION.--At gaging station at bridge on State Highway 7, 2½ miles downstream from Big Beaver Creek, 5½ miles downstream from Minnechaduza Creek, and 6½ miles southwest of Sparks, Cherry County.

DRAINAGE AREA.--6,406 square miles.

RECORDS AVAILABLE.--Sediment records: May 1947 to December 1950.

EXTREMES, October to December 1950.--Sediment concentrations: Maximum daily, not determined; minimum daily, 140 ppm Dec. 6.

Sediment loads: Maximum daily, 5,300 tons Dec. 1; minimum daily, 94 tons Dec. 6.

EXTREMES, 1947-50.--Sediment concentrations: Maximum daily 6,300 ppm May 30, 1949; minimum daily, not determined.

Sediment loads: Maximum daily, 38,000 tons May 30, 1949; minimum daily, not determined. REMARKS.--Flow affected by ice Nov. 23-28, Dec. 2-12, 26-27. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, October to December 1950

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	874	910	a2,100	782	1,300	2,700	885	2,200	5,300
2-----	921	1,400	3,500	793	1,000	a2,100	720	--	e3,000
3-----	921	1,800	4,500	828	800	1,800	450	1,000	1,200
4-----	816	1,800	4,000	770	1,200	2,500	520	--	e1,700
5-----	862	1,600	3,700	793			300	--	e320
6-----	850	1,300	3,000	782			250	140	94
7-----	828	1,500	3,400	782			400	--	e360
8-----	793	1,900	a4,100	804			500	520	700
9-----	793	2,000	4,300	628			650	820	1,400
10-----	793	980	2,100	628			850	520	1,200
11-----	793	1,500	3,200	739	--	e2,300	1,050	820	2,300
12-----	782	1,200	2,500	969			1,100	1,000	3,000
13-----	839	1,500	3,400	909			1,100	810	2,400
14-----	804	1,600	3,500	909			1,020	920	2,500
15-----	816	1,500	a3,300	862			957	750	1,900
16-----	828	1,400	a3,100	816			897	1,100	2,700
17-----	816	1,700	3,700	816	920	2,000	969	1,000	2,600
18-----	850	1,500	3,400	804			921	1,000	2,500
19-----	850	1,400	3,200	782	--	e2,300	945	1,000	2,600
20-----	828	1,100	2,500	828			957	900	2,300
21-----	850	1,200	2,800	828	1,200	2,700	969	1,000	2,600
22-----	862	1,300	a3,000	816			981	1,200	3,200
23-----	862	980	2,300	400			957	1,200	3,100
24-----	793	1,100	2,400	380			897	1,300	3,100
25-----	804	1,300	2,800	520	--	e1,900	921	1,300	a3,200
26-----	770	1,400	2,900	750			700	870	a1,600
27-----	793	1,400	3,000	900			700	660	1,200
28-----	782	1,100	2,300	1,000	1,500	4,000	793	660	1,400
29-----	770	1,200	a2,500	957	1,600	4,100	897	1,100	2,700
30-----	760	1,500	3,100	885	1,600	3,800	828	1,300	2,900
31-----	804	1,400	a3,000	--	--	--	862	1,300	3,000
Total-	25,507	--	96,600	23,460	--	71,600	24,946	--	66,074

Total discharge for period Oct. 1 to Dec. 31 (cfs-days)..... 73,913

Total load for period Oct. 1 to Dec. 31 (tons)..... 236,274

e Estimated.

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR SPARKS, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, January to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Jan. 10, 1951	a 729	237	466
Jan. 26	a 759	140	287
Feb. 22	a 980	293	775
Mar. 9	517	520	726
Mar. 27	897	1,900	4,600
Apr. 9	885	560	1,340
Apr. 30	897	558	1,350
May 7	770	580	1,210
May 9	961	1,240	3,280
May 23	961	1,010	2,680
May 26	933	528	1,330
June 8	885	1,490	3,560
June 22	1,020	697	1,920
June 28	885	608	1,450
July 6	839	510	1,160
July 17	885	608	1,450
July 20	676	654	1,190
July 29	4,890	3,960	52,300
Aug. 7	760	726	1,490
Aug. 27	782	621	1,310
Aug. 30	993	996	2,670
Sept. 17	828	592	1,320

a Mean daily discharge.

NIOBRARA RIVER BASIN--Continued
 NIOBRARA RIVER NEAR SPARKS, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951.
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500	1.000		
Oct. 23, 1950...	1:40 p.m.	793	52	700	--	--	--	--	--	--	12	53	95		100	--	S	
Nov. 3.....	11:40 a.m.	816	39	760	--	--	--	--	--	--	--	8	38	96		100	--	S
Nov. 21.....	2:30 p.m.	804	39	1,240	--	--	--	--	--	--	--	8	30	82		100	--	S
Nov. 28.....	2:25 p.m.	817	34	1,530	--	--	--	--	--	--	--	8	27	76		99	100	S
Dec. 6.....	11:35 a.m.	a 250	32	140	--	--	--	--	--	--	25	43	90		100	--	S	
Dec. 11.....	12:20 p.m.	a 1,050	34	1,490	--	--	--	--	--	--	9	32	83		99	100	S	
Dec. 14.....	2:40 p.m.	957	32	1,060	--	--	--	--	--	--	8	27	79		100	--	S	
Dec. 20.....	12:35 p.m.	957	32	1,020	--	--	--	--	--	--	5	18	75		100	--	S	
Jan. 10, 1951...	1:35 p.m.	a 729	33	237	--	--	--	--	--	--	12	34	89		100	--	S	
Feb. 22.....	2:45 p.m.	a 980	33	293	--	--	--	--	--	--	25	49	84		--	--	S	
Mar. 27.....	1:30 p.m.	897	49	1,900	--	--	--	--	--	--	23	59	90		--	--	S	
May 9.....	7:10 p.m.	981	--	1,240	--	--	--	--	--	--	14	31	88		100	--	S	
May 23.....	5:00 p.m.	981	72	1,010	--	--	--	--	--	--	14	35	85		100	--	S	
June 28.....	6:00 p.m.	885	74	608	--	--	--	--	--	--	18	42	94		--	--	S	
July 6.....	12:30 p.m.	539	74	510	--	--	--	--	--	--	16	44	96		--	--	S	
July 17.....	4:30 p.m.	885	85	608	--	--	--	--	--	--	10	47	92		--	--	S	
July 20.....	1:40 p.m.	676	80	634	--	--	--	--	--	--	14	46	89		100	--	S	
July 29.....	8:25 p.m.	4,580	73	3,960	--	--	--	14	--	--	58	70	95		100	--	SPWCM	
Aug. 7.....	9:05 a.m.	993	82	726	--	--	--	--	--	--	17	55	96		100	--	S	
Aug. 30.....	2:00 p.m.	993	82	996	--	--	--	15	--	--	29	57	94		100	--	SPWCM	
Sept. 17.....	1:35 p.m.	828	60	592	--	--	--	--	--	--	18	35	92		100	--	S	

a Mean daily discharge.

a Mean daily discharge.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR SPARKS, NEBR.--Continued

Particle-size analyses of bed material, November 1950 to August 1951

(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 of collection	Number of sampling points	Instantaneous discharge (cfs)	Bed material										Methods of analysis	
			Percent finer than indicated size, in millimeters											
					0.062	0.125	0.250	0.500	1.000	2.000	4.000			
Nov. 21, 1950	3	862			0	13	81	100	--	--	--	--		S
Nov. 28	3	a 1,000			4	35	68	100	--	--	--	--		S
Dec. 8	3	a 500			1	20	79	99	100	--	--	--		S
Dec. 14	3	957			2	11	75	99	100	--	--	--		S
Dec. 20	3	957			2	5	43	88	97	99	100	--		S
Jan. 26, 1951	2	a 759			--	0	14	72	90	94	97	--		S
May 9	2	981			0	5	72	99	100	--	--	--		S
May 23	3	981			1	3	37	85	94	96	98	--		S
June 28	3	885			0	2	42	98	100	--	--	--		S
July 6	3	839			0	2	36	92	98	99	99	--		S
July 17	3	885			0	3	39	95	100	--	--	--		S
Aug. 30	3	1,020			1	4	70	100	--	--	--	--		S
a Mean daily discharge.														

a Mean daily discharge.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER AT MEADVILLE, NEBR.

LOCATION.--At bridge on State Highway 7, 500 feet upstream from gaging station, which is half a mile downstream from Plum Creek, and half a mile south of Meadville, Kearney County.

RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1951.

Sediment records: October 1950 to September 1951.

EXTREMES, 1930-51.--Water temperatures: Maximum, 87°F July 20, 24, 29, Aug. 5; minimum, freezing point on several days during December to March.

Sediment concentrations: Maximum daily, 5,000 ppm Nov. 22; minimum daily, not determined.

Sediment loads: Maximum daily, 40,300 tons Jul. 30; minimum daily, 240 tons Dec. 6.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Temperature (°F) of water, water year October 1950 to September 1951
 /Twice-daily temperature measurements between 7 and 10 a.m. and between 4 and 7 p.m./

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
1	--	--	44	53	--	--	32	34	--	--	33	37	34	45	54	67	50	51	--	--	68	84	65	70
2	--	--	43	44	--	33	33	--	34	--	--	--	36	55	50	67	44	54	61	65	73	78	63	
3	--	--	38	46	--	33	34	--	34	--	--	--	37	59	50	69	47	60	61	--	77	82	68	
4	--	--	35	52	--	32	32	--	33	--	33	34	34	--	54	67	50	60	--	--	69	--	62	
5	--	--	39	54	--	32	32	--	35	33	34	36	42	35	54	61	55	65	62	67	72	87	74	
6	--	--	37	49	--	32	33	--	33	37	32	33	45	52	--	59	61	65	82	--	86	70	--	
7	--	--	39	52	--	33	38	--	33	34	32	38	45	42	68	60	73	--	--	86	72	86	66	
8	--	--	36	37	--	33	34	--	32	33	--	38	50	51	71	62	74	--	--	62	74	64	78	
9	--	--	--	--	--	33	33	--	33	32	33	33	38	57	54	52	61	75	65	73	65	78	64	
10	--	--	35	--	32	33	35	33	--	--	--	39	46	50	68	63	72	62	60	76	64	76	59	
11	--	--	--	--	38	35	33	34	33	--	--	--	38	50	72	62	75	57	60	67	73	64	--	
12	--	--	--	--	--	33	35	--	--	--	--	--	44	48	70	62	--	57	62	65	76	57		
13	--	--	36	--	33	34	35	--	35	--	33	34	58	63	64	74	59	80	--	--	75	54	--	
14	--	--	34	40	33	--	32	35	32	35	33	33	43	45	58	67	63	77	--	83	66	77	--	
15	--	--	--	40	34	--	35	37	--	35	34	36	40	34	58	66	--	71	86	58	75	--	--	
16	--	--	--	--	35	33	34	35	33	33	34	38	35	53	58	74	--	--	72	83	60	79	52	
17	--	--	--	--	33	34	35	33	33	38	33	34	43	64	60	64	--	--	70	83	64	82	--	
18	--	--	61	37	42	--	--	34	33	37	34	--	45	55	61	70	--	--	71	86	65	83	--	
19	--	50	--	--	--	34	32	33	36	33	--	--	43	55	62	71	68	87	74	--	--	60	72	
20	--	50	65	--	--	34	36	--	--	34	40	--	33	--	61	63	55	68	77	87	66	72	56	
21	--	48	48	--	33	--	36	--	--	34	38	33	39	--	57	62	--	67	74	73	80	77	55	
22	--	44	49	--	33	35	--	34	34	33	37	37	38	55	57	67	61	67	63	70	77	52	44	
23	--	40	--	--	35	--	32	34	42	36	37	42	54	57	73	65	67	65	65	73	81	70	48	
24	--	45	--	--	34	--	33	34	38	41	34	35	45	49	64	72	58	74	70	82	67	82	55	
25	--	38	52	--	36	34	33	35	34	36	34	36	46	58	62	67	65	--	70	85	75	80	46	
26	--	45	--	--	32	--	32	33	33	35	34	39	43	56	54	69	65	79	72	81	69	77	--	
27	--	45	--	34	32	33	--	--	34	33	39	49	52	68	56	75	69	70	72	83	65	80	--	
28	--	44	58	--	34	33	34	--	--	33	33	46	--	74	57	70	75	--	75	84	68	80	--	
29	--	50	--	35	--	33	--	--	32	--	--	34	43	61	69	50	73	60	67	74	87	72	--	
30	--	47	62	--	36	--	32	--	--	--	--	36	47	60	66	--	73	66	--	77	75	82	51	
31	--	46	--	38	33	32	32	--	--	--	36	47	--	55	59	52	38	--	70	82	63	78	--	
Average	--	--	--	--	--	--	--	--	--	35	--	42	53	55	68	80	--	68	79	67	--	--	--	

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER AT MEADVILLE, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	980	1,740	4,600	1,050	3,950	11,200
2-----	--	--	--	1,000	2,070	5,590	1,050	3,600	a 10,000
3-----	--	--	--	970	2,010	5,260	1,000	2,300	6,210
4-----	--	--	--	1,050	1,470	4,170	850	1,060	2,430
5-----	--	--	--	920	2,290	5,690	600	--	e 500
6-----	--	--	--	900	1,500	3,640	450	--	e 240
7-----	--	--	--	900	2,490	6,050	500	--	e 700
8-----	--	--	--	920	1,700	4,220	600	850	a 1,400
9-----	--	--	--	940	--	(e 4,800)	750	1,150	2,330
10-----	--	--	--	750	--	e 4,000	900	375	911
11-----	--	--	--	720	--	e 4,000	1,050	210	595
12-----	--	--	--	900	--	e 5,600	1,100	1,420	4,220
13-----	--	--	--	1,250	2,520	8,510	1,200	2,950	9,560
14-----	--	--	--	1,150	2,100	6,520	1,450	1,060	3,580
15-----	--	--	--	1,150	1,480	4,600	1,200	670	2,170
16-----	--	--	--	1,070	1,400	a 4,000	1,150	800	2,480
17-----	930	870	2,180	1,000	2,000	a 5,400	1,150	590	1,830
18-----	970	1,100	2,880	950	2,250	5,770	1,130	800	2,440
19-----	1,000	1,620	4,370	940	--	e 5,600	1,100	1,230	3,650
20-----	1,030	1,720	4,780	930	--	e 5,500	1,150	1,360	4,220
21-----	1,000	1,670	4,510	980	3,900	10,300	1,190	1,280	4,110
22-----	1,030	1,940	5,400	960	5,000	13,000	1,220	1,740	5,730
23-----	1,020	1,380	3,800	940	--	e 7,600	1,200	3,020	9,780
24-----	1,000	1,360	3,670	450	--	e 360	1,150	2,820	8,760
25-----	950	1,650	4,230	550	--	e 750	1,100	2,760	8,200
26-----	1,000	1,440	3,890	670	--	e 1,300	1,100	2,370	7,040
27-----	940	1,260	3,200	1,040	1,520	4,270	900	1,780	4,330
28-----	960	1,700	4,410	1,200	1,650	5,350	850	1,280	2,940
29-----	970	1,330	3,480	1,160	1,850	5,790	950	--	e 5,200
30-----	950	1,630	4,180	1,100	2,950	8,760	1,030	2,990	8,320
31-----	950	2,050	5,280	--	--	--	1,050	2,640	7,480
Total-----	14,700	--	60,240	28,440	--	161,000	30,640	--	142,556
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,100	2,900	8,610	950	360	a 900	1,350	1,420	5,180
2-----	1,070	1,600	4,620	1,120	--	--	1,250	--	e 4,700
3-----	1,030	--	--	1,270	--	--	1,100	--	e 4,200
4-----	980	--	--	1,300	--	--	900	1,370	3,330
5-----	980	--	--	1,230	--	--	1,050	1,700	4,820
6-----	900	--	e 2,400	1,120	--	e 2,200	1,230	1,610	5,350
7-----	820	--	--	1,080	--	--	1,180	2,440	7,770
8-----	850	--	--	1,150	--	--	1,050	2,300	a 6,500
9-----	900	--	--	1,390	--	--	550	1,130	1,680
10-----	950	--	--	1,320	--	--	650	--	e 1,600
11-----	930	--	--	1,270	--	--	840	--	e 2,000
12-----	960	--	--	1,300	--	--	750	--	e 1,400
13-----	900	--	e 6,300	1,260	--	--	850	630	1,450
14-----	1,000	--	--	1,330	--	--	1,100	1,080	3,210
15-----	1,030	--	--	1,310	--	e 2,500	1,180	1,210	3,660
16-----	1,080	--	--	1,310	--	--	1,300	2,350	8,250
17-----	1,100	--	--	1,300	--	--	1,480	2,320	9,270
18-----	1,200	--	--	1,320	--	--	1,300	--	e 7,400
19-----	1,050	--	--	1,310	--	--	1,100	--	e 5,900
20-----	970	--	--	1,300	890	3,120	900	1,750	4,250
21-----	670	--	--	1,310	1,210	4,280	1,410	1,810	6,890
22-----	730	--	e 2,200	1,340	1,910	6,910	2,390	3,420	22,100
23-----	800	--	--	1,300	1,900	6,670	2,470	4,210	28,100
24-----	850	--	--	1,290	2,230	7,770	1,980	3,120	16,700
25-----	880	--	--	1,550	4,320	18,100	1,950	2,350	12,400
26-----	800	--	--	1,500	1,700	6,890	2,080	3,410	19,200
27-----	620	--	--	1,500	1,480	5,990	1,430	3,920	15,100
28-----	500	1,100	a 1,500	1,450	1,550	6,070	1,210	3,600	11,600
29-----	410	1,370	1,520	--	--	--	1,250	3,590	12,100
30-----	390	650	680	--	--	--	1,250	3,480	11,700
31-----	730	360	710	--	--	--	1,250	3,160	10,700
Total-----	27,180	--	102,740	36,180	--	109,000	39,780	--	258,910

e Estimated.

a Computed from estimated concentration graph.

NIOBARA RIVER BASIN--Continued

NIOBARA RIVER AT MEADVILLE, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,230	2,740	9,100	1,320	1,080	3,850	1,500	2,300	9,320
2-----	1,250	2,350	7,930	1,300	1,280	4,490	1,750	1,800	8,500
3-----	1,250	1,750	5,910	1,200	1,520	4,920	1,550	1,860	7,780
4-----	1,150	1,510	4,690	1,120	1,330	4,020	1,400	1,890	7,140
5-----	1,210	1,730	5,650	1,070	1,360	3,930	1,320	1,310	4,670
6-----	1,170	2,170	6,860	1,080	1,700	a 5,000	1,300	1,110	3,900
7-----	1,200	2,420	7,840	1,020	2,010	5,540	1,470	1,210	4,800
8-----	1,220	2,390	7,870	980	1,600	4,230	1,650	2,500	s 11,000
9-----	1,120	1,840	5,560	930	1,780	4,420	1,500	1,680	6,000
10-----	1,050	1,530	4,340	1,070	2,240	6,470	1,500	1,170	4,740
11-----	1,030	1,630	4,530	1,170	1,650	5,210	1,520	1,110	4,560
12-----	1,030	1,400	4,730	1,270	1,920	6,580	1,400	2,220	8,390
13-----	1,030	1,200	3,340	1,110	1,780	5,330	1,300	1,670	5,660
14-----	1,020	1,620	4,460	1,320	2,500	8,910	1,250	1,700	5,740
15-----	1,050	970	2,750	1,210	2,030	6,630	1,320	1,710	6,090
16-----	1,040	1,720	4,830	1,320	1,370	4,880	1,250	1,700	a 5,700
17-----	1,050	700	1,980	1,300	1,630	5,720	1,280	1,700	a 5,900
18-----	1,120	370	1,120	1,320	1,760	6,270	1,500	1,900	a 7,700
19-----	1,150	440	1,370	1,480	1,980	7,830	2,000	1,560	8,420
20-----	1,200	460	a 1,500	1,550	1,920	8,040	1,600	1,100	4,750
21-----	1,170	550	a 1,700	1,400	1,550	5,860	1,600	1,330	5,750
22-----	1,220	820	2,700	1,500	1,280	5,180	1,500	1,300	5,270
23-----	1,260	1,710	5,620	1,600	950	4,100	1,550	1,420	5,940
24-----	1,300	640	2,250	1,550	1,290	5,400	1,650	1,720	7,660
25-----	1,250	1,190	4,020	1,450	860	3,370	1,600	1,400	6,050
26-----	1,350	1,170	4,260	1,320	1,000	3,560	1,380	1,240	4,620
27-----	1,450	1,020	3,990	1,130	1,250	3,810	1,460	1,780	7,020
28-----	1,400	1,480	5,590	1,090	1,250	3,680	1,500	1,780	7,210
29-----	1,340	1,210	4,050	1,080	990	2,890	1,400	1,300	4,910
30-----	1,350	920	3,850	1,200	1,310	4,240	1,430	1,230	4,750
31-----	--	--	--	1,300	1,760	6,180	--	--	--
Total--	35,560	--	134,090	38,760	--	160,540	44,430	--	190,940
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,330	1,430	5,140	2,820	4,600	s 34,100	1,230	1,280	4,250
2-----	1,500	1,360	5,510	1,340	2,440	8,830	1,580	880	s 4,150
3-----	1,480	1,570	6,270	1,230	1,640	5,450	2,120	1,230	7,040
4-----	1,380	1,160	4,320	1,050	1,330	3,770	2,150	1,150	6,680
5-----	1,300	1,400	4,910	1,020	1,750	4,820	2,310	2,080	s 13,800
6-----	1,230	1,150	3,620	1,000	2,330	6,290	2,840	3,700	s 29,800
7-----	1,150	1,000	3,110	980	2,030	5,370	2,000	2,930	15,800
8-----	1,120	930	2,810	960	1,400	3,630	1,680	1,820	8,260
9-----	1,100	980	2,910	1,030	1,430	3,980	1,700	1,250	5,740
10-----	1,150	1,750	5,430	980	1,460	3,860	1,550	1,000	4,190
11-----	1,200	1,420	4,600	1,110	1,700	5,090	1,430	710	2,740
12-----	1,280	1,500	5,180	1,250	2,050	6,920	1,380	570	2,120
13-----	1,320	1,930	6,880	1,430	2,150	8,300	1,300	990	3,470
14-----	1,420	1,870	6,020	2,120	1,180	6,750	1,270	1,000	a 3,400
15-----	1,400	900	3,400	2,280	900	5,540	1,200	700	a 2,300
16-----	1,300	1,090	3,830	2,050	880	4,870	1,140	550	1,690
17-----	1,320	1,100	3,920	1,850	800	4,000	1,120	500	a 1,500
18-----	1,250	650	2,190	1,620	1,060	4,640	1,120	530	1,600
19-----	1,150	800	2,480	1,340	1,200	a 4,300	1,140	910	2,800
20-----	1,080	950	2,770	1,680	1,580	7,170	1,150	1,390	4,320
21-----	1,050	1,050	2,980	1,410	1,930	7,350	1,140	1,580	4,860
22-----	1,100	610	1,810	1,200	1,820	5,900	1,220	1,400	4,610
23-----	1,170	930	2,940	1,050	1,820	5,160	1,180	750	2,390
24-----	1,060	630	1,800	1,020	1,560	4,350	1,050	630	1,790
25-----	1,000	560	1,510	1,000	1,260	3,400	1,070	650	1,880
26-----	1,050	720	2,040	1,020	1,300	3,280	1,000	700	a 1,900
27-----	1,080	1,470	4,290	1,190	970	3,120	1,030	850	a 2,400
28-----	1,100	2,050	6,090	1,070	1,070	3,090	1,150	1,000	a 3,100
29-----	1,680	1,060	4,810	1,030	1,320	3,670	930	1,170	2,940
30-----	3,230	4,200	s 40,300	1,150	1,500	4,660	910	1,330	3,270
31-----	1,980	2,930	15,700	1,110	1,380	4,140	--	--	--
Total--	40,960	--	169,770	41,390	--	185,800	42,090	--	154,790
Total discharge for period Oct. 17 to Sept. 30 (cfs-days)									420,310
Total load for period Oct. 17 to Sept. 30 (tons)									1,830,376

s Computed by subdividing day.

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued
NIOBRARA RIVER AT MEADVILLE, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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	0.350		0.500	1.000	
Oct. 17, 1950	3:40 p. m.	1,020	64	884	--	--	--	--	--	--	--	30	67	94		100	--	S
Oct. 17	6:10 p. m.	980	60	1,000	--	--	--	--	--	--	--	25	59	94		100	--	S
Oct. 18	1:15 p. m.	1,080	--	1,080	--	--	--	--	--	--	--	30	64	93		99	100	S
Oct. 21, 1951	3:25 p. m.	a1,310	--	1,100	--	--	--	--	--	--	--	10	24	75		100	--	S
Mar. 15	7:00 p. m.	a1,180	33	1,500	--	--	--	--	--	--	--	6	18	70		99	100	S
Mar. 28	3:00 p. m.	1,410	43	2,100	2,580	--	--	--	15	--	--	34	57	90		100	--	SPWCM
Apr. 29	11:30 a. m.	1,110	64	1,040	--	--	--	--	--	--	--	21	54	92		99	100	S
May 8	12:30 p. m.	910	66	856	--	--	--	--	--	--	--	20	48	89		100	--	S
May 25	11:18 a. m.	1,500	65	1,120	--	--	--	--	--	--	--	28	60	94		100	--	S
June 6	4:00 p. m.	1,360	61	1,290	--	--	--	--	--	--	--	31	76	96		100	--	S
June 29	12:50 p. m.	1,410	73	1,120	--	--	--	--	--	--	--	23	52	92		100	--	S
July 30	9:25 a. m.	4,060	--	4,160	9,520	--	--	--	21	--	--	50	76	96		100	--	SPWCM
July 30	12:20 p. m.	2,960	74	4,760	10,300	--	13	--	38	--	--	56	72	93		100	--	SPWCM
Aug. 8	11:20 a. m.	892	--	870	--	--	--	--	--	--	--	24	52	89		100	--	S
Aug. 28	1:30 p. m.	785	--	732	--	--	--	--	--	--	--	26	55	92		100	--	S
Sept. 7	12:05 p. m.	2,050	--	2,980	1,970	30	38	46	50	53	61	76	96		100	--	SPWCM	
Sept. 7	12:05 p. m.	2,050	--	2,980	1,820	32	38	46	50	54	64	78	97		100	--	SPN	
Sept. 29	12:40 p. m.	945	--	1,120	--	--	--	--	--	--	--	21	50	93		100	--	S

a Mean daily discharge.

NIOBRARA RIVER BASIN--Continued
NIOBRARA RIVER AT MEADVILLE, NEBR.--Continued

Particle-size analyses of bed material, water year October 1950 to September 1951
(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 of collection	Number of sampling points	Mean discharge (cfs)	Bed material										Methods of analysis	
			Percent finer than indicated size, in millimeters											
						0.062	0.125	0.250	0.500	1.000	2.000	4.000		
Oct. 18, 1950.....	5	970				1	3	36	93	99	99	99	99	S
Apr. 29, 1951.....	2	1,240				0	4	54	98	100	--	--	--	S
May 8.....	2	980				0	2	46	96	100	--	--	--	S
May 25.....	3	1,450				0	4	48	92	98	99	99	99	S
June 29.....	3	1,400				0	5	66	98	100	--	--	--	S
July 30.....	3	3,230				1	2	41	87	94	97	99	99	S
Sept. 7.....	3	2,000				0	5	59	98	100	--	--	--	S

NIOBRARA RIVER BASIN--Continued

LONG PINE CREEK NEAR RIVERVIEW, NEBR.

LOCATION.--At gaging station at county highway bridge, 1 mile downstream from Bone Creek, and 5½ miles southwest of Riverview, Keyapaha County.

DRAINAGE AREA.--390 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: April 1948 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 12,600 ppm Aug. 20; minimum daily, not determined.

Sediment loads: Maximum daily, 56,100 tons Aug. 20; minimum daily, 42 tons Feb. 4.

EXTREMES, 1948-51.--Sediment concentrations: Maximum daily, 12,600 ppm Aug. 20, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 56,100 tons Aug. 20, 1951; minimum daily, 14 tons June 10, 1948.

REMARKS.--Flow affected by ice Dec. 7, Jan. 28 to Feb. 3. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	112	1,040	310	126	480	a 160	116	440	140
2-----	116	670	210	126	460	a 160	112	380	110
3-----	112	660	200	126	500	a 170	107	870	250
4-----	116	530	170	126	470	160	112	630	190
5-----	114	480	150	126	360	120	98	550	a 150
6-----	112	550	170	122	390	130	112	500	a 150
7-----	118	670	210	122	310	100	110	410	120
8-----	118	630	200	122	320	110	112	530	160
9-----	114	570	180				116	530	170
10-----	118	530	170				118	530	170
11-----	118	470	150	120	590	190	124	580	190
12-----	116	500	160				118	520	170
13-----	118	480	150				116	380	120
14-----	116	440	140				112	400	120
15-----	114	710	220				105	420	120
16-----	116	770	240				109	330	97
17-----	116	460	140	115	440	140	103	490	140
18-----	118	500	160				103	480	130
19-----	118	550	180				101	580	160
20-----	120	490	160				103	510	140
21-----	124	480	160	114	430	130	107	480	140
22-----	122	530	170	114	590	180	107	460	130
23-----	124	460	150	101	600	a 160	105	550	160
24-----	120	800	260	110	640	190	109	480	140
25-----	122	430	140	109	520	150	110	510	150
26-----	124			109	370	110	105	480	140
27-----	124			110	480	140	110	850	250
28-----	120	490	160	110	530	160	114	480	150
29-----	126			109	550	180	116	790	250
30-----	126			110	590	180	116	750	230
31-----	124			--	--	--	116	530	170
Total-	3, 676	--	5, 510	3, 502	--	4, 650	3, 422	--	4, 907

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	114	430	130	90	--	e 50	109	450	130
2-----	112	450	140				114	680	200
3-----	114	680	200				96	540	140
4-----	110	390	120				100	420	110
5-----	112	430	130				107	390	110
6-----	103	460	130	94	270	69	107	540	160
7-----	105	500	140	100	260	70	107	470	140
8-----	105	400	110	94	310	79	96	540	140
9-----	107	450	130	94	210	53	103	500	140
10-----	109	450	130	105	240	68	101	300	82
11-----	110	390	120	107	290	84	94	360	91
12-----	110	440	130	96	280	73	96	640	170
13-----	110	560	170	98	380	a 95	98	800	210
14-----	110	510	150	98	370	88	100	410	110
15-----	114	510	160	94	260	66	107	370	110
16-----	114	530	160	96	250	65	110	440	130
17-----	114	480	150	96	250	65	112	410	120
18-----	112	580	180	94	240	61	107	310	90
19-----	110	530	160	96	290	75	101	430	120
20-----	101	320	87	94	270	69	105	380	110
21-----	109	630	190	94	280	71	107	340	98
22-----	109	610	180	98	290	77	110	380	110
23-----	107	500	a 140	98	410	110	110	490	150
24-----	105	470	130	98	400	110	107	400	120
25-----	105	--	e 120	98	510	130	110	560	170
26-----	103	--	e 100	98	430	110	112	480	150
27-----	96	--	e 70	101	350	95	118	450	140
28-----	90	--	e 50	114	570	180	110	390	120
29-----	90	--	e 50	--	--	--	105	300	85
30-----	95	--	e 65	--	--	--	105	320	91
31-----	95	--	e 65	--	--	--	107	380	110
Total--	3,300	--	3,987	2,701	--	2,215	3,271	--	3,957
Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	109	360	110	140	410	150	604	9,720	15,900
2-----	112	320	97	132	400	140	795	7,270	15,600
3-----	114	210	65	130	350	120	604	4,260	6,950
4-----	114	440	140	130	380	130	314	1,790	1,520
5-----	118	320	100	128	280	97	218	1,270	750
6-----	140	560	210	128	200	69	173	800	370
7-----	140	760	290	126	300	100	177	790	380
8-----	130	520	180	128	330	110	200	840	450
9-----	120	490	160	130	310	110	198	1,050	560
10-----	118	460	150	138	350	130	177	770	370
11-----	116	490	150	138	270	100	175	510	240
12-----	112	450	140	132	260	93	166	700	310
13-----	114	330	100	142	420	160	164	700	310
14-----	118	330	110	216	1,380	790	166	670	300
15-----	110	230	68	431	3,900	4,540	168	670	300
16-----	105	450	130	503	3,760	5,110	164	770	340
17-----	110	510	150	691	4,810	8,970	182	1,300	sb 700
18-----	109	400	a 120	384	3,350	3,470	793	10,400	s 24,300
19-----	107	310	90	233	1,800	1,130	623	10,000	16,800
20-----	118	430	140	202	1,500	820	585	7,100	11,200
21-----	118	310	99	276	2,170	1,620	506	4,270	5,830
22-----	118	270	86	304	2,040	1,670	462	1,350	1,680
23-----	140	630	240	216	1,880	1,100	479	2,200	sb 3,100
24-----	233	2,160	1,360	166	870	390	479	3,700	4,790
25-----	265	3,650	2,610	149	910	370	616	4,040	s 11,900
26-----	212	1,890	1,080	140	810	310	954	9,900	s 30,800
27-----	195	1,280	670	134	820	300	619	6,510	10,900
28-----	202	1,430	780	126	690	230	416	3,190	3,560
29-----	159	1,060	460	120	670	220	351	2,120	2,010
30-----	147	730	290	138	900	340	338	1,560	1,420
31-----	--	--	--	498	8,990	12,100	--	--	--
Total--	4,123	--	10,375	6,649	--	44,989	11,866	--	173,660

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	306	1,090	900	317	6,300	s 6,520	126	1,180	400
2-----	303	1,060	870	268	3,300	2,390	126	1,730	590
3-----	303	900	740	229	3,060	1,890	128	1,430	490
4-----	274	970	720	166	1,300	580	158	2,570	1,100
5-----	278	960	720	122	680	220	176	2,750	1,310
6-----	259	720	500	115	570	180	184	2,160	1,070
7-----	247	580	390	117	550	170	181	2,420	1,180
8-----	303	1,040	850	106	490	140	181	2,200	1,080
9-----	312	1,720	1,450	117	360	110	187	2,110	1,070
10-----	299	660	530	136	490	180	223	860	520
11-----	278	1,070	800	140	380	140	268	900	650
12-----	256	1,300	900	150	440	180	265	1,170	840
13-----	238	1,660	1,070	143	700	270	271	690	500
14-----	218	1,430	840	179	1,560	750	256	660	460
15-----	184	1,090	540	220	1,250	740	215	300	170
16-----	138	880	330	215	1,490	860	181	260	130
17-----	122	580	190	200	900	490	150	780	320
18-----	122	620	200	179	600	290	136	1,000	a 360
19-----	133	570	200	168	700	320	126	970	330
20-----	115	410	130	1,650	12,600	56,100	128	870	300
21-----	136	550	200	569	7,020	10,800	140	1,270	480
22-----	150	450	180	438	2,050	2,420	148	1,300	a 500
23-----	153	1,460	600	265	610	440	158	1,200	a 500
24-----	153	1,720	710	173	800	370	163	1,030	450
25-----	153	1,160	480	145	1,770	690	168	1,030	470
26-----	138	360	130	140	2,140	810	173	1,170	550
27-----	140	650	250	128	2,010	690	166	1,320	590
28-----	145	880	340	131	1,100	390	160	1,160	560
29-----	143	460	180	128	1,010	350	160	600	260
30-----	136	290	110	126	1,220	420	153	490	200
31-----	133	800	290	122	1,550	510	--	--	--
Total-	6,268	--	16,340	7,304	--	90,410	5,255	--	17,370
Total discharge for year (cfs-days).....									61,337
Total load for year (tons).....									378,370

s Computed by subdividing day.

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued
 LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Particle-size analyses of suspended sediment, November 1950 to September 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Nov. 21, 1950...	12:40 p. m.	114	42	438	--	--	--	--	--	--	12	33	85		99	100	SWM
Dec. 12.....	1:35 p. m.	118	--	596	1,240	--	8	--	10	--	34	50	86				SPWCM
Jan. 2, 1951...	2:40 p. m.	103	39	385	--	--	--	--	--	--	20	45	92				SWM
Jan. 24.....	3:45 p. m.	109	38	470	--	--	--	--	--	--	16	35	84				SWM
Mar. 16.....	9:20 a. m.	110	40	450	--	--	--	--	--	--	17	39	86				SWM
Apr. 29.....	3:45 p. m.	157	64	944	--	--	--	--	--	--	23	51	96				SWM
May 15.....	4:45 p. m.	428	62	3,530	2,280	--	12	--	19	--	48	73	97				SPWCM
May 25.....	3:15 p. m.	155	68	744	--	--	--	--	--	--	30	54	94				SWM
June 18.....	2:50 p. m.	661	--	6,780	13,500	--	16	--	25	--	52	77	98				SPWCM
June 26.....	1:20 a. m.	3,450	70	14,500	9,520	--	39	--	55	--	80	92	99				SPWCM
July 16.....	5:50 p. m.	150	78	717	--	--	--	--	--	--	30	62	97				SWM
July 31.....	10:45 a. m.	119	67	470	--	--	--	--	--	--	24	60	97				SWM
Aug. 20.....	12:10 p. m.	1,410	65	16,600	6,540	10	13	16	20	27	52	82	98				SPWCM ¹
Aug. 20.....	12:10 p. m.	1,410	65	16,600	7,090	7	12	15	19	25	51	82	98				SPN ²
Aug. 28.....	11:10 a. m.	133	70	1,070	--	--	--	--	--	--	19	50	92				SW ₈₆
Sept. 9.....	3:05 p. m.	198	66	1,660	--	--	--	--	--	--	36	69	97				SWM
Sept. 25.....	4:00 p. m.	168	58	1,020	--	--	--	--	--	--	16	43	94				SWM

NIOBRARA RIVER BASIN--Continued

LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Particle-size analyses of bed material, March to August 1951

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 of collection	Number of sampling points	Mean discharge (cfs)	Bed material										Methods of analysis
			Percent finer than indicated size, in millimeters										
					0.062	0.125	0.250	0.500	1.000	2.000	4.000		
Mar. 16, 1951.....	3	110			0	1	11	34	45	53	64	S	
Apr. 29.....	3	159			0	1	15	42	54	63	73	S	
May 25.....	3	149			0	1	29	77	87	92	95	S	
July 16.....	3	136			0	2	31	75	87	93	96	S	
Aug. 28.....	3	131			1	2	36	80	93	96	98	S	

NIOBRARA RIVER BASIN--Continued
 MISCELLANEOUS ANALYSES OF STREAMS IN NIOBRARA RIVER BASIN

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate			
SNAKE RIVER NEAR BURGE, NEBR.																					
July 11, 1951.....	286	49	0.02	22	2.4	8.7	92	6.0	0.5	0.3	1.2	0.05	153	0.21	65	0	23	169	7.2		
Sept. 26	247	54	.02	21	3.5	10	97	7.6	.5	.4	.9	.03	166	.23	67	0	25	172	7.9		

NIOBRARA RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN NIOBRARA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951			
Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
BEAR CREEK NEAR ELI, NEBR.			
Jan. 22, 1951.....	5.8	640	10
Mar. 21.....	10.2	184	5.1
Apr. 7.....	17.2	44	2.0
May 1.....	20.8	66	3.7
May 12.....	6.8	24	.4
May 19.....	53.9	272	40
May 20.....	145.4	1,300	510
June 7.....	39.3	182	19
June 29.....	22.0	86	5.1
July 17.....	14.5	64	2.5
July 28.....	11.6	66	2.1
Aug. 25.....	9.7	22	.6
Sept. 18.....	8.5	43	1.0

SNAKE RIVER NEAR BURGE, NEBR.

Oct. 29, 1950.....	244	525	346
Nov. 14.....	253	825	564
Nov. 29.....	253	1,140	779
Dec. 25.....	263	805	572
Jan. 12, 1951.....	247	871	581
Feb. 3.....	230	811	504
Feb. 23.....	266	800	575
Mar. 6.....	286	950	734
Mar. 20.....	260	1,060	744
Apr. 5.....	266	812	583
Apr. 18.....	256	554	383
Apr. 28.....	310	879	568
May 10.....	272	532	391
May 24.....	296	589	471
June 18.....	296	611	488
July 3.....	263	386	274
July 19.....	236	437	278
Aug. 1.....	230	284	176
Aug. 17.....	244	332	219
Aug. 27.....	221	412	246
Sept. 8.....	344	358	333

KEYAPAH RIVER NEAR HIDDEN TIMBER, S. DAK.

Oct. 4, 1950.....	23	34	2.1
Oct. 24.....	15	49	2.0

KEYAPAH RIVER AT WEWELA, S. DAK.

Oct. 5, 1950.....	92	248	62
Oct. 24.....	54	96	14
Nov. 15.....	73	197	39
Dec. 13.....	40	22	2.4
Jan. 10, 1951.....	33	32	2.9
Feb. 8.....	19	219	11
Mar. 22.....	75	59	12
Mar. 29.....	144	535	208
Apr. 11.....	82	184	41
Apr. 19.....	72	136	26
May 17.....	168	454	206
June 22.....	144	358	139
July 11.....	132	407	145
July 24.....	62	250	42
Sept. 26.....	58	92	14
Apr. 3, 1952.....	1,720	4,260	19,800

NIOBRARA RIVER BASIN--Continued
 MISCELLANEOUS ANALYSES OF STREAMS IN NIOBRARA RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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
BEAR CREEK NEAR ELI, NEBR.																	
Apr. 7, 1951 ...	4:40 p. m.	17.2		44							38	59	96			S	
May 19, July 17,	4:00 p. m. 6:45 p. m.	53.9 14.5		272 64	307	19		20			33 33	70 51	98 --	100		SPWCM S	
SNAKE RIVER NEAR BURGE, NEBR.																	
Nov. 14, 1950 .. Jan. 12, 1951 .. Feb. 3, Apr. 28, May 10,	2:45 p. m. 12:00 p. m. 2:15 p. m. 9:45 a. m. 12:40 p. m.	253 247 230 310 272		825 871 811 679 532							10 9 17 13 16	33 26 40 44 41	74 99 87 100 89	100 99 100 100 100		S S S S S	
June 18, July 19, Aug. 1, Aug. 17, Aug. 27,	1:35 p. m. 11:45 a. m. 2:00 p. m. 1:20 p. m. 6:15 p. m.	296 236 230 244 221		611 437 284 332 412	851	12		17			40 26 16 12 6	77 34 32 39 24	96 90 88 88 81	100 100 100 100 100		SPWCM S S S S	
KEYAPAPA RIVER AT WEWELA, S. DAK.																	
Apr. 3, 1952 ...	11:40 a. m.	1,720	36	4,260							17	26	42	60	89	97	S

NIOBRARA RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN NIOBRARA RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1950 to September 1951
(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 of collection	Number of sampling points	Mean discharge (cfs)	Bed material										Methods of analysis	
			Percent finer than indicated size, in millimeters											
						0.062	0.125	0.250	0.500	1.000	2.000	4.000		
SNAKE RIVER NEAR BURGE, NEBR.														
Sept. 15, 1949.....	3	238				0	4	65	96	100	--	--		S
Oct. 14.....	1	280				0	2	35	97	100	--	--		S
Apr. 28, 1951.....	2	300				0	2	34	94	100	--	--		S
July 19.....	2	238				0	1	15	76	98	98	100		S
Aug. 27.....	2	227				0	1	24	89	98	99	100		S
KEYAPAPA RIVER AT WEWELA, S. DAK.														
Apr. 3, 1952.....	2	a.1,720				2	8	58	99	100				S

a Instantaneous discharge.

MISSOURI RIVER MAIN STEM

MISSOURI RIVER AT YANKTON, S. DAK.

LOCATION.--At gaging station at Meridian Highway Bridge on U. S. Highway 81 in Yankton, Yankton County, 5.8 miles upstream from James River.
 DRAINAGE AREA.--279,500 square miles, approximately.
 RECORDS AVAILABLE.--October 1950 to September 1951.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH	
														Parts per million		Tons per acre-foot	Calcium, magnesium					Non-carbonate
														Residue at 180° C	Bo-iron (B)		Calcium, mg.	Non-carbonate				
Oct. 2, 1950, sta. 250	39,800	15	0.04	55	16	61	6.1	162	179	10	0.6	4.0	0.20	432	0.59	204	71	634	7.8			
Oct. 2, sta. 400	39,800	15	.04	55	16	60	6.0	162	177	9.0	.6	4.5	.20	428	.58	203	70	628	7.8			
Oct. 2, sta. 550	39,800	15	.04	55	16	59	5.2	160	172	8.0	.6	4.1	.20	426	.58	202	71	630	7.8			
Oct. 2, sta. 750	39,800	12	.04	55	16	57	6.2	161	174	10	.6	3.8	.20	432	.59	202	70	627	7.8			
Nov. 9, sta. 250	36,200	11	.10	57	21	56	3.8	183	180	9.5	.5	1.4	.30	434	.59	226	76	677	8.0			
Nov. 9, sta. 400	36,200	11	.02	56	21	56	4.2	182	176	9.0	.4	1.1	.30	436	.59	227	76	667	8.0			
Nov. 9, sta. 550	36,200	14	.10	57	21	56	3.8	183	174	9.5	.1	.7	.30	442	.58	227	77	665	8.0			
Nov. 9, sta. 750	36,200	11	.02	57	21	57	3.8	183	178	9.0	.4	1.2	.30	432	.59	226	76	671	8.0			
Jan. 10, 1951, sta. 200	19,100	9.8	.04	72	26	72	3.8	224	230	13	.6	2.5	—	552	.75	288	104	834	8.0			
Jan. 10, sta. 450	19,100	11	.02	72	25	69	4.2	226	223	13	.6	2.9	.18	544	.74	284	99	830	8.0			
Jan. 10, sta. 800	19,100	9.6	.02	72	26	70	4.0	226	230	13	.6	2.9	—	544	.74	287	102	834	8.0			
Feb. 9, sta. 360	14,500	—	—	—	—	—	—	—	—	—	—	2.9	—	—	—	—	—	795	—			
Feb. 9, sta. 460	14,500	15	.04	73	23	69	3.9	227	204	12	.6	3.0	—	534	.73	277	91	801	8.0			
Feb. 9, sta. 660	14,500	—	—	—	—	—	—	—	—	—	—	2.4	—	—	—	—	—	821	—			
Apr. 5, sta. 900	46,100	10	.04	52	15	58	3.4	140	188	7.5	.2	2.3	—	424	.58	190	75	643	7.5			
May 3, sta. 205	28,400	—	—	—	—	—	—	—	—	—	—	1.8	—	—	—	—	—	620	—			
May 3, sta. 315	28,400	—	—	—	—	—	—	—	—	—	—	2.3	—	—	—	—	—	620	—			
May 3, sta. 410	28,400	12	.02	51	17	57	5.2	166	172	9.0	.4	2.1	—	434	.59	198	62	617	8.1			
May 3, sta. 900	28,400	—	—	—	—	—	—	—	—	—	—	2.2	—	—	—	—	—	617	—			
June 12 a	55,400	—	—	—	—	—	—	—	—	—	—	5.6	—	—	—	—	—	624	—			
June 12 a	55,400	—	—	—	—	—	—	—	—	—	—	5.5	—	—	—	—	—	620	—			
June 12 a	55,400	15	.03	51	12	65	5.5	145	183	7.5	.5	3.4	—	444	.80	177	58	617	7.9			
June 12 a	55,400	—	—	—	—	—	—	—	—	—	—	5.0	—	—	—	—	—	616	—			
July 12, sta. 215	37,500	—	—	—	—	—	—	—	—	—	—	1.9	—	—	—	—	—	482	—			
July 12, sta. 325	37,500	—	—	—	—	—	—	—	—	—	—	1.9	—	—	—	—	—	485	—			
July 12, sta. 450	37,500	15	.02	43	12	43	4.6	129	139	5.0	.4	2.5	—	326	.44	156	50	482	8.1			
July 12, sta. 780	37,500	—	—	—	—	—	—	—	—	—	—	2.9	—	—	—	—	—	482	—			

a Sample represents one-quarter of cross section. Station number unknown.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT YANKTON, S. DAK.--Continued

Nitrogen, phosphorus, and related physical measurements, water year October 1950 to September 1951
 /Analytical results in parts per million except as indicated/

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Oct. 2, 1950, sta. 250	39,800	53	1,300	0.03	0.001	0.9	0.23	1.2	0.01	0.03
Oct. 2, sta. 400...	39,800	53	1,300	.03	.001	1.0	.17	1.2	.01	.07
Oct. 2, sta. 550...	39,800	53	1,400	.00	.001	.9	.19	1.1	.006	.08
Oct. 2, sta. 750...	39,800	53	1,300	.01	.001	.9	.15	1.1	.006	.01
Nov. 9, sta. 250...	36,200	38	500	.03	.000	.3	.67	1.0	.04	1.2
Nov. 9, sta. 400...	36,200	38	500	.02	.000	.2	.63	.9	.02	1.5
Nov. 9, sta. 550...	36,200	38	550	.03	.000	.2	.50	.7	.02	1.9
Nov. 9, sta. 750...	36,200	38	600	.02	.000	.3	.70	1.0	.03	1.5
Jan. 10, 1951, sta. 200	19,100	33	80	.07	.005	.6	.20	.9	.01	.13
Jan. 10, sta. 450...	19,100	33	120	.05	.005	.6	.26	.9	.01	.12
Jan. 10, sta. 900...	19,100	33	95	.06	.005	.7	.22	1.0	.01	.09
Feb. 9, sta. 360...	14,500	32	50	.04	.003	.7	.10	.8	.04	.06
Feb. 9, sta. 460...	14,500	32	55	.01	.003	.7	.15	.9	.04	.06
Feb. 9, sta. 660...	14,500	32	55	.02	.003	.5	.15	.7	.05	.06
Apr. 5 a.....	46,100	--	2,700	.02	.002	1.1	.75	1.9	.02	2.3
Apr. 5 a.....	46,100	--	2,500	.01	.002	.8	.94	1.8	.03	2.0
Apr. 5 a.....	46,100	--	2,700	.01	.002	.7	.69	1.4	.04	2.3
Apr. 5 a.....	46,100	--	2,500	.03	.002	.9	.69	1.6	.05	2.7
May 3, sta. 205...	28,400	62	1,100	.00	.01	.4	1.3	1.7	.02	.16
May 3, sta. 315...	28,400	62	1,000	.00	.02	.5	1.5	2.0	.01	.19
May 3, sta. 410...	28,400	62	1,200	.00	.01	.4	1.5	1.9	.03	.37
May 3, sta. 900...	28,400	62	1,100	.00	.02	.5	.96	1.5	.02	.29
June 12 a.....	55,400	68	8,500	.02	.008	1.3	2.4	3.7	.09	5.6
June 12 a.....	55,400	68	8,300	.01	.007	1.2	2.7	3.9	.08	5.5
June 12 a.....	55,400	68	9,000	.01	.007	1.6	2.9	4.5	.06	5.8
June 12 a.....	55,400	68	9,000	.01	.008	1.1	2.2	3.3	.07	5.4
July 12, sta. 215...	37,500	--	1,000	.02	.002	.4	.79	1.2	.01	.94
July 12, sta. 325...	37,500	--	1,400	.01	.002	.4	.72	1.1	.009	.96
July 12, sta. 450...	37,500	--	1,400	.00	.002	.6	.76	1.4	.02	1.3
July 12, sta. 780...	37,500	--	1,000	.01	.002	.7	.80	1.5	.01	1.0
Aug. 1, sta. 215...	34,200	--	500	.04	.004	.7	.72	1.5	.01	.61
Aug. 1, sta. 275...	34,200	--	500	.08	.006	.8	1.0	1.9	.06	.61
Aug. 1, sta. 355...	34,200	--	500	.04	.004	.7	.80	1.5	.004	.56
Aug. 1, sta. 650...	34,200	--	500	.05	.006	.5	.80	1.4	.01	.63
Sept. 6, sta. 210...	47,400	70	900	.00	.000	.5	1.2	1.7	.02	1.1
Sept. 6, sta. 315...	47,400	70	900	.00	.000	.5	1.3	1.8	.02	1.1
Sept. 6, sta. 375...	47,400	70	900	.00	.000	.5	1.3	1.8	.02	1.0
Sept. 6, sta. 485...	47,400	70	700	.00	.000	.5	1.3	1.8	.02	1.0

a Sample represents one-quarter of cross section. Station number unknown.

JAMES RIVER BASIN

JAMES RIVER AT JAMESTOWN, N. DAK.

LOCATION.--At gaging station at Asylum bridge at southeast corner of Jamestown, Stutsman County, 2.5 miles downstream from Pipestem Creek. DRAINAGE AREA.--2,840 square miles, approximately (revised), of which 500 square miles is probably non-contributing. RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1951. REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million		Tons per acre-foot	Calcium, magnesium	Non-carbonate			
															Residue at 180°C	Sum						
Nov. 13, 1950	5.1	26	0.02	102	38	137		460		253	47	0.2	3.8	--		864	1.18	412	35	42	1,230	7.7
Dec. 6, 1950	5.0	24	.02	93	41	169		448		300	60	.2	3.2	--		938	1.28	400	33	48	1,310	8.1
Jan. 2, 1951	4.0	24	.08	83	42	214		366		308	155	.2	0.98	0.98		1,030	1.40	380	80	55	1,590	7.9
Feb. 13, 1951	2.0	28	.02	102	37	132		470		240	38	.2	5.9	.49		890	1.13	406	21	41	1,160	7.7
Mar. 24, 1951	7.8	21	.10	110	32	123		412		261	45	.1	2.0	.33		802	1.09	408	70	40	1,190	7.6
Apr. 11, 1951	564	25	.04	40	21	41		209		82	8.8	.4	4.7	.24		342	.47	185	14	33	509	7.4
May 14, 1951	111	--	--	--	--	--		251		--	--	--	--	--		221	--	221	15	--	620	7.3
June 28, 1951	22	--	--	--	--	--		346		--	--	--	--	--		--	--	295	11	--	834	7.6
July 21, 1951	3.3	--	--	--	--	--		408		--	--	--	--	--		--	--	338	3	--	1,120	7.4
Aug. 17, 1951	2.1	--	--	--	--	--		419		--	--	--	--	--		--	--	344	0	--	1,090	7.6
Sept. 10, 1951	2.6	--	--	--	--	--		419		--	--	--	--	--		--	--	342	0	--	1,090	7.5

JAMES RIVER BASIN--Continued

JAMES RIVER AT HURON, S. DAK.

LOCATION.--At gaging station at city dam, 150 feet downstream from Chicago & Northwestern Railway bridge, 150 feet upstream from bridge on U. S. Highway 14, at Huron, Beadle County.
 DRAINAGE AREA.--16,800 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: April 1950 to September 1951.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1209.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
																			Residue at 180°C				Sum
Oct. 3, 1980	43	15	0.04	80	37	89	15	351	0	186	48	0.4	0.7	0.20	668	--	0.91	353	65	34	985	7.8	
Nov. 8	85	17	.02	88	44	98	14	387	0	215	53	.1	.4	.40	742	--	1.01	399	82	34	1,120	8.0	
Jan. 2, 1981	8.8	28	.04	137	69	200	17	562	0	430	106	.3	.8	.45	1,350	1,270	1.84	626	165	40	1,920	8.1	
Jan. 29	13.8	26	.02	177	75	206	19	696	0	495	118	.6	1.0	.20	1,470	1,460	2.00	748	177	37	2,090	8.0	
Mar. 19	13	18	.04	123	58	186	14	456	6	410	107	.3	1.5	--	1,180	1,150	1.60	544	170	42	1,680	8.2	
Apr. 16	472	12	.02	54	24	63	11	201	0	161	33	.1	4.3	--	492	--	.67	234	69	36	734	7.4	
May 31	734	10	.03	50	21	46	9.2	231	0	99	24	.3	1.8	--	384	--	.52	210	21	31	605	7.8	
June 12	570	9.1	.04	56	24	52	9.3	297	0	110	26	.3	1.3	--	442	--	.60	238	27	31	687	7.9	
Aug. 2	67	12	.03	76	41	113	15	334	14	228	61	.3	3.2	--	748	--	1.02	360	63	39	1,120	8.4	
Aug. 23	a 0	16	.02	64	38	113	14	310	0	220	62	.3	5.6	--	708	--	.96	316	62	43	1,080	7.7	
Sept. 21	a 0	11	.02	63	37	112	15	301	0	213	56	.2	3.4	--	672	--	.91	309	62	43	1,030	8.0	

a. Practically no flow.

JAMES RIVER BASIN--Continued

JAMES RIVER AT HURON, S. DAK.--Continued

Nitrogen, phosphorus, and related physical measurements, water year October 1950 to September 1951
 /Analytical results in parts per million except as indicated/

	Date of collection	Instantaneous dis- charge (cfs)	Tem- pera- ture (" F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phos- phorus (P)	Total phos- phorus (P)
					Ammonia	Nitrite	Nitrate	Organic	Total		
	Oct. 3, 1950.....	43	47	10	0.42	0.04	0.2	0.49	1.2	0.14	0.22
	Nov. 8	85	41	3	.20	.001	.1	.62	.9	.15	.25
	Jan. 2, 1951.....	8.8	--	8	.96	.02	.2	.59	1.8	.38	.45
	Jan. 29	8	33	10	.08	.001	.2	.96	1.2	.20	.33
	Mar. 19	13	38	30	.03	.01	.3	.39	.7	.05	.15
	Apr. 16	472	40	50	.07	.02	.7	.80	1.6	.24	.38
	May 31	734	60	40	.03	.003	.2	1.1	1.3	.11	.20
	June 12	570	--	30	.01	.005	.2	.91	1.1	.11	.22
	Aug. 2	67	77	35	.10	.003	.9	1.1	2.1	.11	.23
	Aug. 23	0	69	60	.08	.001	.2	.91	1.2	.15	.44
	Sept. 21	0	60	25	.15	.01	.2	.68	1.0	.08	.47

JAMES RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN JAMES RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
																					Residue at 180°C	Sum
JAMES RIVER AT COLUMBIA																						
Mar. 17, 1951.....	14	40	0.10	258	50	230	906	444	97	0.5	8.0	0.74	1,670	1,570	2.27	848	106	37	2,230	7.8		
Apr. 12.....	494	16	.02	88	46	115	436	213	53	.2	5.8	.24	762		1.04	409	51	38	1,180	7.2		
June 14.....	228	--	--	--	--	--	329	--	--	--	--	--	--	--	--	267	0	--	747	7.6		

LITTLE SIOUX RIVER BASIN

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA

LOCATION--At gaging station at bridge on U. S. Highway 20, 0.2 mile upstream from Bacon Creek, 0.5 mile west of Correctionville, Woodbury County, and 0.8 mile downstream from Pierson Creek.

DRAINAGE AREA.--2,450 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: May to September 1951.

Sediment records: May 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures (May to September): Maximum, 79°F July 27.

Sediment concentrations: Maximum daily, 5,080 ppm June 19; minimum daily, not determined.

Sediment loads: Maximum daily, 62,100 tons Aug. 14; minimum daily, not determined.

EXTREMES, May 1950 to September 1951.--Sediment concentrations: Maximum daily, 12,200 ppm July 12, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 190,000 tons June 18, 1950; minimum daily, not determined.

REMARKS.--Flow affected by ice Dec. 6 to Feb. 26; Mar. 5-7, 9-16, 26. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, May to September 1951
/Once-daily temperature measurement between 6 a. m. and 7 a. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	67	67	77	71
2								--	65	67	75	68
3								--	--	68	76	67
4								--	58	67	--	65
5								--	57	66	--	64
6								--	58	67	--	67
7								--	60	71	--	63
8								--	59	71	--	65
9								a 58	68	72	--	66
10								55	64	70	--	63
11								57	64	67	73	65
12								58	66	66	72	63
13								59	67	65	69	62
14								59	69	68	65	61
15								60	69	71	68	60
16								62	69	74	68	58
17								64	72	75	65	57
18								64	72	76	67	59
19								65	70	76	69	61
20								65	66	76	70	61
21								66	68	77	69	62
22								66	67	77	68	57
23								65	65	77	68	58
24								66	68	77	68	55
25								66	69	77	68	54
26								68	71	77	68	55
27								61	73	79	68	52
28								61	70	78	70	49
29								64	71	78	74	51
30								67	68	77	75	53
31								67	--	76	75	--
Average								--	66	72	--	60

a Observations made at 3:10 p. m.

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LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	178	143	69	98	80	21	67	--	
2-----	336	257	233	97	45	12	68	67	
3-----	268	225	163	102	34	9	67	--	
4-----	219	111	66	97	30	8	66	--	
5-----	226	85	52	96	32	8	66	--	
6-----	253	130	89	95	38	10	64	--	e 9
7-----	253	162	111	94	45	11	62	--	
8-----	236	125	80	95	48	12	62	--	
9-----	215	103	60	90	27	7	60	36	
10-----	201	120	65	81	--	--	60	--	
11-----	183	113	56	77	--	--	58	--	
12-----	166	98	44	79	--	--	58	--	
13-----	158	89	38	92	--	--	56	--	
14-----	148	88	35	94	52	--	56	--	
15-----	140	97	37	103	59	--	54	--	e 6
16-----	134	100	36	100	--	e 13	54	44	
17-----	130	100	35	94	55	--	52	--	
18-----	127	102	35	96	55	--	52	--	
19-----	121	108	35	99	--	--	50	--	
20-----	117	95	30	79	--	--	50	--	
21-----	115	82	25	77	--	--	50	--	
22-----	112	78	24	94	--	--	50	--	
23-----	111	43	13	75	--	--	50	49	
24-----	109	33	10	85	--	--	50	--	
25-----	109	39	11	67	--	--	50	--	
26-----	109	47	14	66	--	e 12	48	--	e 7
27-----	109	66	19	69	--	--	48	--	
28-----	105	64	18	68	--	--	46	--	
29-----	104	59	16	67	--	--	46	--	
30-----	102	54	15	67	--	--	45	45	
31-----	102	79	22	--	--	--	45	--	
Total-	4,996	--	1,556	2,593	--	363	1,710	--	227
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	44	--		28	--		800	--	e 2,200
2-----	44	--		27	--		580	--	e 950
3-----	42	--		27	59		445	--	e 420
4-----	42	--		27	--		347	280	262
5-----	40	--		27	--		300	150	122
6-----	40	40	e 4	27	113		578	--	e 600
7-----	38	--		27	--		400	--	e 320
8-----	38	--		27	--		264	--	e 100
9-----	38	--		27	--		240	--	
10-----	37	--		27	56		210	--	
11-----	37	--		30	--	e 5	200	--	
12-----	37	85		35	--		190	--	e 30
13-----	37	69		40	--		180	--	
14-----	37	--		35	--		170	--	
15-----	37	--		32	--		165	--	
16-----	37	--	e 7	30	--		160	--	
17-----	37	--		28	10		157	--	
18-----	37	--		27	--		157	--	
19-----	37	--		30	--		160	--	
20-----	37	55		35	--		145	--	e 50
21-----	36	--		40	--		130	--	
22-----	34	--		50	--	e 6	128	--	
23-----	34	--		60	--	e 7	197	--	e 80
24-----	32	--		70	--	e 8	371	--	e 300
25-----	32	--		100	36	10	340	--	e 280
26-----	30	52	e 7	200	--	e 200	2,500	2,410	s 33,900
27-----	30	--		395	--	e 800	6,990	2,540	47,900
28-----	30	--		1,200	2,000	s 7,380	7,680	1,260	26,100
29-----	28	--		--	--	--	7,680	920	19,100
30-----	28	--		--	--	--	7,250	770	15,100
31-----	28	--		--	--	--	7,120	580	11,100
Total-	1,115	--	154	2,708	--	8,516	46,234	--	159,374

e Estimated.

s Computed by subdividing day.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	6,480	530	9,270	4,920	3,460	46,000	1,400	1,160	4,380
2-----	5,600	770	11,600	5,100	1,200	18,500	2,350	1,660	10,500
3-----	5,200	1,160	16,300	5,400	650	9,480	2,700	--	e 10,000
4-----	6,360	980	16,800	5,400	520	7,580	2,850	850	6,540
5-----	8,540	1,020	23,500	5,400	470	6,850	3,000	620	5,020
6-----	12,400	830	27,800	5,700	360	5,540	3,100	530	4,440
7-----	17,000	580	26,600	5,200	330	4,630	3,370	740	6,730
8-----	16,600	430	19,300	4,360	475	5,590	3,550	760	7,280
9-----	12,800	370	12,800	3,850	2,300	s 24,800	3,000	660	5,350
10-----	10,200	270	7,440	3,790	1,070	10,900	2,400	500	3,240
11-----	8,160	310	6,830	3,490	710	6,690	2,080	420	2,360
12-----	7,120	340	6,540	3,050	600	4,940	1,900	410	2,100
13-----	6,360	360	6,180	2,800	530	4,010	1,720	380	1,760
14-----	5,800	420	6,580	2,700	480	3,500	1,540	380	1,580
15-----	5,200	530	7,440	2,450	470	3,110	1,490	410	1,650
16-----	4,680	640	8,090	2,160	1,020	5,950	1,400	400	1,510
17-----	4,060	800	8,770	2,120	1,830	10,500	1,400	390	1,470
18-----	3,670	830	8,220	1,800	600	2,920	1,670	1,420	s 6,730
19-----	3,310	780	6,970	1,760	460	2,180	2,320	5,080	s 40,200
20-----	2,900	750	5,870	1,720	410	1,900	2,300	2,550	s 17,200
21-----	2,850	740	5,690	1,720	410	1,900	1,900	750	3,850
22-----	2,750	710	5,270	1,760	480	2,280	1,900	580	2,980
23-----	2,600	660	4,630	1,720	390	1,810	1,940	1,130	s 6,380
24-----	2,550	620	4,270	1,580	370	1,580	2,120	2,140	12,200
25-----	2,600	620	4,350	1,440	350	1,360	2,030	1,620	8,880
26-----	2,600	550	3,860	1,360	340	1,250	2,300	2,520	15,600
27-----	2,550	610	4,200	1,240	320	1,070	2,650	1,660	11,900
28-----	2,500	570	3,850	1,120	300	907	2,850	1,220	9,390
29-----	2,600	630	4,420	1,080	280	816	2,750	720	5,350
30-----	3,460	2,320	s 28,000	1,000	270	729	2,750	590	4,380
31-----	--	--	--	1,080	880	2,570	--	--	--
Total--	179,500	--	311,440	88,270	--	199,842	68,730	--	220,950
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,850	560	4,310	1,120	570	1,720	1,760	500	2,380
2-----	3,000	610	4,940	1,670	3,630	s 18,600	1,540	420	1,750
3-----	3,430	650	6,020	1,440	1,600	6,220	1,400	350	1,320
4-----	3,790	1,350	13,800	1,280	--	e 2,200	1,320	280	998
5-----	4,440	960	11,500	1,280	--	e 1,900	1,240	310	1,040
6-----	5,100	500	6,880	1,200	--	e 1,800	1,160	320	1,000
7-----	3,990	510	5,490	1,120	--	e 2,600	1,080	300	875
8-----	3,610	500	4,870	1,120	--	e 2,100	1,040	300	842
9-----	3,490	500	4,710	1,080	--	e 2,600	1,400	2,240	s 9,550
10-----	3,490	700	6,600	1,120	1,500	4,540	1,670	1,240	5,590
11-----	2,750	640	4,750	1,040	590	1,660	2,850	1,370	10,500
12-----	2,500	600	4,050	1,040	650	1,820	4,520	2,760	33,700
13-----	3,000	670	5,430	1,850	2,480	12,400	4,360	1,130	13,300
14-----	3,100	550	4,600	5,400	4,260	62,100	4,520	620	7,570
15-----	3,050	480	3,950	5,800	840	13,200	4,130	600	6,690
16-----	2,950	490	3,900	4,600	860	10,700	3,790	530	5,420
17-----	3,000	570	4,620	5,600	2,130	s 34,700	3,850	480	4,990
18-----	3,100	570	4,770	3,790	670	6,860	3,920	470	4,970
19-----	2,850	570	4,390	3,250	660	5,790	3,920	470	4,970
20-----	2,650	770	5,510	3,490	1,490	s 14,600	3,430	600	5,560
21-----	2,750	1,900	14,100	2,750	790	5,860	2,450	550	3,640
22-----	2,900	1,480	11,600	2,210	640	3,820	2,030	475	2,600
23-----	2,850	1,160	6,930	1,940	590	3,090	1,800	360	1,750
24-----	2,650	720	5,150	1,720	580	2,690	1,720	320	1,490
25-----	2,650	640	4,580	1,620	670	2,930	1,670	300	1,350
26-----	2,550	590	4,060	1,490	550	2,210	1,670	280	1,260
27-----	1,980	620	3,310	2,030	2,940	s 17,200	1,580	270	1,150
28-----	1,580	770	3,280	2,800	3,510	26,500	1,580	250	1,070
29-----	1,440	750	2,920	2,500	1,140	7,700	1,490	220	885
30-----	1,320	680	2,420	2,300	760	4,720	1,400	220	832
31-----	1,240	600	2,010	2,030	590	3,230	--	--	--
Total--	90,050	--	177,450	71,680	--	288,060	70,290	--	139,042
Total discharge for year (cfs-days).....									627,876
Total load for year (tons).....									1,506,974

e Estimated.

s Computed by subdividing day.

LITTLE SIOUX RIVER BASIN--Continued
LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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. 11, 1950	9:50 a. m.	188	60	115	728		59	--	67	--	93	100	--	--	--	SPWCM	
Nov. 14	12:55 p. m.	90	34	56	402		--	--	56	60	64	73	88	98	100	BWCM	
Dec. 2	3:45 p. m.	68	32	67	506		20	22	25	27	39	69	97	100	--	BWCM	
Jan. 12, 1951	9:45 a. m.	37	32	85	--		--	--	--	--	16	56	100	--	--	SW	
Apr. 4	3:15 p. m.	6,640	39	870	2,510		49	--	67	--	85	89	97	100	--	SPWCM	
Apr. 6	6:50 p. m.	13,200	39	797	829	22	35	44	63	74	81	85	91	97	99	100	BN
Apr. 6	6:50 p. m.	13,200	39	797	1,690		58	--	71	--	90	100	--	--	--	SPWCM	
Apr. 7	9:20 a. m.	16,600	39	563	1,500		53	--	74	--	90	100	--	--	--	SPWCM	
Apr. 17	1:40 p. m.	3,980	--	794	2,200		37	--	59	--	94	97	99	100	--	SPWCM	
June 20	6:45 a. m.	2,500	66	3,480	5,190		44	--	70	--	96	100	--	--	--	SPWCM	
July 3	3:15 p. m.	3,380	67	502	--		--	--	--	--	78	86	93	99	100	SW	
July 23	6:50 a. m.	2,980	77	1,310	2,200		55	--	75	--	98	99	99	100	--	SPWCM	
Aug. 2	4:40 p. m.	2,210	77	4,680	11,700		38	--	62	--	98	100	--	--	--	SPWCM	
Aug. 10	6:35 a. m.	1,180	--	1,840	2,260		34	--	64	--	99	100	--	--	--	SPWCM	
Aug. 14	12:45 p. m.	6,300	68	5,010	7,640		49	--	62	--	97	99	100	--	--	SPWCM	
Aug. 27	5:15 p. m.	1,850	74	1,430	2,000		43	--	68	--	96	99	100	--	--	SPWCM	
Sept. 5	8:00 a. m.	1,240	65	338	882		34	--	61	--	98	100	--	--	--	SPWCM	
Sept. 11	9:00 a. m.	2,770	66	1,510	1,960		28	--	45	--	94	98	100	--	--	SPWCM	
Sept. 12	4:00 a. m.	3,670	65	2,960	4,020		40	--	62	--	97	99	99	100	--	SPWCM	
Sept. 15	6:55 p. m.	3,160	60	781	1,520		34	--	51	--	89	94	100	--	--	SPWCM	
Sept. 20	6:35 p. m.	3,160	64	725	1,290		31	--	48	--	85	91	100	--	--	SPWCM	

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Particle-size analyses of bed material, April 1951
 (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 of collection	Time	Number of sampling points	Deposited 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	0.062	0.125	0.250	0.500	1.000		2.000	4.000		
Apr. 7, 1951	11:30 a. m.	1																S
Apr. 17	4:00 p. m.	2								2	2	4	16	78	94	98	100	S

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA

LOCATION.--At gaging station at bridge on county road A, 1.3 miles south of Kennebec, Mono-na County, 5.5 miles northeast of Onawa, and 6.5 miles upstream from Maple River.

DRAINAGE AREA.--2,730 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: May to September 1951.

Sediment records: May 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures (May to September): Maximum, 80°F July 19.

Sediment concentrations: Maximum daily, 24,100 ppm May 1; minimum daily, not determined.

Sediment loads: Maximum daily, 331,000 tons May 1; minimum daily, not determined.

EXTREMES, May 1950 to September 1951.--Sediment concentrations: Maximum daily, 40,800 ppm

June 18, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 520,000 tons June 18, 1950; minimum daily, not determined.

REMARKS.--Flow affected by ice Nov. 23 to Feb. 26, Mar. 8-25. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, May to September 1951
/Once-daily temperature measurement between 8 a.m. and 8 a.m. 7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	70	66	78	71
2								--	65	69	a 79	68
3								--	60	67	75	67
4								--	60	66	72	65
5								--	59	67	72	64
6								--	58	66	76	68
7								--	60	69	76	63
8								--	60	--	75	64
9								a 59	63	--	75	66
10								55	65	--	74	64
11								56	64	--	72	65
12								58	67	--	72	65
13								59	68	--	70	61
14								a 60	68	--	74	66
15								61	69	75	67	59
16								62	69	74	a 69	69
17								64	72	75	67	59
18								64	70	76	67	59
19								64	71	80	69	61
20								67	68	77	69	61
21								67	67	78	68	61
22								66	68	75	67	55
23								65	68	76	67	59
24								67	65	72	68	55
25								a 67	68	77	68	54
26								64	71	77	69	57
27								a 64	72	79	69	51
28								a 67	72	77	70	50
29								a 70	69	79	72	51
30								a 72	--	77	73	55
31								a 76	--	75	74	--
Aver- age								--	66	--	71	61

a Observations made between 4 p.m. and 6 p.m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951									
Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	228	360	222	127	117	40	93	--	
2-----	650	9,270	s 18,400	127	75	26	92	120	
3-----	415	3,560	s 4,220	129	65	23	90	--	e 30
4-----	304	790	648	133	73	26	88	--	
5-----	271	430	315	134	85	31	86	--	
6-----	282	430	327	131	88	31	84	--	
7-----	304	410	a 336	129	86	30	82	--	
8-----	304	360	295	129	93	32	80	--	
9-----	282	300	228	126	93	32	80	37	
10-----	260	260	182	113	94	29	78	--	
11-----	247	246	164	120	125	40	76	--	
12-----	230	210	130	124	200	67	76	--	
13-----	215	127	74	113	145	44	74	--	e 8
14-----	203	154	84	120	150	49	72	--	
15-----	199	170	91	130	133	47	70	--	
16-----	188	170	86	130	111	39	70	--	
17-----	180	157	76	131	140	50	70	--	
18-----	173	204	95	127	135	46	68	39	
19-----	164	174	77	127	122	a 42	68	--	
20-----	158	125	53	125	198	67	68	--	
21-----	155	120	50	134	170	62	66	--	
22-----	149	115	46	122	149	49	66	--	
23-----	149	100	40	120			66	--	
24-----	147	97	38	115			64	--	
25-----	144	95	37	110			64	64	
26-----	141	105	40	105	--	e 40	64	--	e 11
27-----	141	110	42	105			62	--	
28-----	137	119	44	100			62	--	
29-----	136	112	41	96			62	--	
30-----	133	102	37	94			62	--	
31-----	130	101	35	--	--	--	60	64	
Total--	6,819	--	26,553	3,626	--	1,222	2,263	--	391
January			February			March			
1-----	60	--	40	--		1,890	9,580	s 59,400	
2-----	60	--	40	--		864	2,650	6,900	
3-----	60	--	40	--		685	1,300	a 2,330	
4-----	60	--	40	--		592	1,100	1,760	
5-----	60	--	38	--		680	1,900	3,490	
6-----	60	92	38	50		1,390	--	e 44,000	
7-----	60	--	38	88		834	2,350	s 5,640	
8-----	60	--	38	--		550	--	e 1,600	
9-----	58	--	38	--	e 6	450	--	e 850	
10-----	58	--	38	--		400	--	e 600	
11-----	57	59	40	--		350	--	e 380	
12-----	57	--	45	--		300	--	e 240	
13-----	56	--	50	42		270	--	e 170	
14-----	56	42	45	--		250	--	e 130	
15-----	56	--	40	--		230	--	e 100	
16-----	55	--	39	--		210	--	e 75	
17-----	55	--	38	--		200	--	e 65	
18-----	55	--	38	302	31	190	--	e 55	
19-----	54	--	38	--	e 30	180	--	e 45	
20-----	54	--	40	--	e 32	175	--	e 45	
21-----	54	64	48	--	e 38	175	91	43	
22-----	54	--	54	--	e 60	170	--	e 40	
23-----	52	--	60	--	e 80	250	--	e 300	
24-----	52	--	80	--	e 130	500	--	e 2,200	
25-----	52	--	100	--	e 260	1,000	--	e 13,000	
26-----	51	--	500	--	e 3,500	3,590	--		
27-----	50	--	802	4,500	5,410	8,000	11,800	255,000	
28-----	48	--	1,890	21,400	s 150,000	7,600	6,050	124,000	
29-----	46	--	--	--	--	6,550	3,900	69,000	
30-----	45	54	--	--	--	6,820	2,640	48,600	
31-----	43	--	--	--	--	6,910	2,310	43,100	
Total--	1,698	--	288	4,335	--	159,673	52,335	--	803,158

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	6,550	1,940	34,300	5,090	24,100	331,000	1,380	2,420	9,020
2-----	5,920	2,130	34,000	5,170	3,910	54,600	2,150	2,660	15,400
3-----	5,410	2,440	35,600	5,250	2,150	30,500	3,220	2,500	21,700
4-----	5,090	2,700	37,100	5,250	1,820	25,800	3,480	1,630	15,300
5-----	6,190	2,590	43,300	5,010	1,420	19,200	3,600	1,370	13,300
6-----	7,900	2,880	61,400	5,090	1,420	19,500	3,740	1,100	11,100
7-----	9,340	2,600	85,600	5,090	1,080	14,800	3,940	1,760	18,700
8-----	11,000	2,440	72,500	4,780	1,030	13,300	4,570	1,870	23,100
9-----	11,900	1,910	61,400	4,290	2,030	23,500	4,150	1,250	14,000
10-----	11,600	1,510	47,300	4,290	4,080	47,200	3,340	940	8,480
11-----	12,000	1,420	46,000	4,010	1,430	15,500	2,760	810	6,040
12-----	11,600	1,160	36,300	3,740	1,170	11,800	2,400	640	4,150
13-----	10,300	1,100	30,600	3,280	1,090	9,650	2,100	570	3,230
14-----	8,440	1,320	30,100	3,100	1,040	8,700	1,840	580	2,880
15-----	7,100	1,420	27,200	3,040	930	7,630	1,720	620	2,880
16-----	6,280	1,310	22,200	2,660	830	5,960	1,560	1,090	4,590
17-----	5,650	1,300	19,800	2,660	1,860	13,400	1,770	--	e 37,000
18-----	5,090	1,470	20,200	2,350	1,410	8,950	2,220	13,800	s 92,000
19-----	4,710	1,380	17,500	2,150	780	4,530	2,990	17,100	s 161,000
20-----	4,290	1,270	14,700	2,100	780	4,420	3,540	12,800	s 128,000
21-----	3,940	1,370	14,600	2,010	680	3,690	2,350	3,900	24,700
22-----	3,800	1,200	12,300	2,100	700	3,970	2,010	2,070	11,200
23-----	3,600	1,200	11,700	2,010	650	3,530	2,200	--	e 52,000
24-----	3,340	1,090	9,830	1,960	575	3,040	2,880	19,400	s 169,000
25-----	3,340	1,110	10,000	1,800	585	2,840	2,150	4,300	25,000
26-----	3,340	1,020	9,200	1,640	580	2,570	2,880	15,300	s 124,000
27-----	3,280	1,010	8,940	1,480	570	2,280	2,400	4,400	28,500
28-----	3,150	980	8,330	1,340	480	1,740	2,710	3,370	24,600
29-----	3,150	--	e 32,000	1,240	460	1,540	2,710	2,000	14,600
30-----	3,740	--	e 200,000	1,170	420	1,330	2,600	--	e 11,000
31-----	--	--	--	1,200	--	e 15,000	--	--	--
Total--	191,040	--	1,074,000	96,350	--	711,470	81,360	--	1,076,470
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2,660	1,470	10,600	1,280	920	3,180	2,200	1,240	7,360
2-----	2,880	1,680	13,100	1,240	1,440	s 5,240	1,800	1,030	5,000
3-----	5,170	16,200	s 287,000	2,060	4,980	27,700	1,640	860	3,810
4-----	3,940	2,700	28,700	1,480	2,450	9,790	1,520	700	2,870
5-----	4,080	2,450	27,000	1,380	1,260	4,690	1,450	660	2,580
6-----	4,500	1,850	22,500	1,380	1,080	4,020	1,380	675	2,520
7-----	4,570	1,450	17,900	1,240	880	2,950	1,310	580	2,050
8-----	3,800	1,290	13,200	1,240	910	3,050	1,200	560	1,810
9-----	3,670	1,040	10,300	1,140	1,460	4,490	1,800	15,700	s 88,300
10-----	3,600	1,030	10,000	1,170	3,710	11,700	1,720	5,460	s 27,200
11-----	3,280	1,170	10,400	1,110	1,700	5,090	2,300	3,750	23,300
12-----	2,600	1,100	7,720	1,080	2,210	s 7,230	5,330	8,510	s 133,000
13-----	2,820	1,030	7,840	1,480	11,000	44,000	6,100	3,400	56,000
14-----	3,150	1,090	9,270	3,700	12,600	s 140,000	5,920	1,940	31,000
15-----	3,100	920	7,700	6,000	9,250	150,000	5,170	1,600	22,300
16-----	3,040	950	7,800	5,700	1,850	28,500	4,640	1,370	17,200
17-----	3,040	950	7,800	6,500	8,540	s 158,000	4,430	1,230	14,700
18-----	3,150	1,770	15,000	6,550	2,120	37,500	4,430	1,080	12,900
19-----	2,980	930	7,480	4,430	1,860	22,200	4,430	1,030	12,300
20-----	2,820	960	7,310	4,500	5,540	67,300	4,290	970	11,200
21-----	2,600	1,270	8,920	4,430	2,460	29,400	3,480	960	9,020
22-----	2,710	1,900	13,900	3,150	1,370	11,600	2,710	870	6,360
23-----	2,930	2,000	15,800	2,600	1,150	8,070	2,250	740	4,500
24-----	2,760	1,410	10,500	2,200	1,120	6,650	2,010	640	3,470
25-----	2,710	1,070	7,830	1,960	950	5,030	1,880	570	2,890
26-----	2,710	1,010	7,390	1,800	960	4,660	1,880	520	2,640
27-----	2,500	990	6,680	2,710	11,100	s 95,600	1,720	520	2,410
28-----	1,920	1,070	5,550	3,340	10,400	s 97,200	1,640	455	2,010
29-----	1,720	1,070	4,970	3,280	3,700	32,800	1,480	420	1,680
30-----	1,520	1,070	4,390	2,880	2,000	15,600	1,340	400	1,450
31-----	1,420	1,020	3,910	2,500	1,520	10,300	--	--	--
Total--	94,350	--	598,460	85,510	--	1,053,540	83,450	--	513,830
Total discharge for year (cfs-days)									703,136
Total load for year (tons)									6,019,055

e Estimated.

s Computed by subdividing day.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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	0.350	0.500	1.000	
Oct. 2, 1950	10:05 a. m.	834	--	10,800	8,750	25	--	45	--	98	100	--	--	--	--	SPWCM	
Oct. 2	12:30 p. m.	930	--	10,800	7,710	29	--	52	--	99	100	--	--	--	--	SPWCM	
Oct. 2	2:35 p. m.	930	--	16,300	11,800	31	--	61	--	98	100	--	--	--	--	SPWCM	
Oct. 10	8:40 a. m.	260	55	260	8,520	31	--	--	--	94	100	--	--	--	--	SPWCM	
Dec. 2	11:35 a. m.	92	32	120	320	--	--	--	--	35	72	89	--	--	100	SW	
Mar. 21, 1951	12:20 p. m.	175	32	70	479	79	--	90	--	98	100	--	--	--	--	SPWCM	
Apr. 3	2:00 p. m.	5,250	39	2,340	5,960	27	--	41	--	90	97	100	--	--	--	SPWCM	
Apr. 7	6:20 p. m.	9,700	38	2,480	7,040	28	--	37	--	73	81	--	--	--	--	SPWCM	
Apr. 8	12:00 m.	10,800	37	2,240	1,610	9	14	20	29	39	85	95	95	98	99	BN	
Apr. 8	12:00 m.	10,800	37	2,240	2,940	27	--	38	--	69	76	--	--	--	--	SPWCM	
Apr. 9	6:00 p. m.	11,900	40	1,530	3,510	25	--	36	--	67	74	92	--	--	100	SPWCM	
May 9	4:15 p. m.	4,150	59	1,200	3,300	28	--	43	--	87	100	--	--	--	--	SPWCM	
July 2	2:35 p. m.	2,780	70	1,360	--	--	--	--	--	78	88	97	--	--	100	SW	
Aug. 7	6:20 a. m.	1,280	76	915	1,350	37	--	55	--	93	95	98	97	--	100	SPWCM	
Aug. 15	3:10 p. m.	6,000	69	3,920	5,560	30	--	46	--	95	97	99	99	--	100	SPWCM	
Aug. 15	7:35 p. m.	5,800	68	2,800	10,780	29	--	44	--	94	98	99	99	--	100	SPWCM	
Aug. 25	12:10 p. m.	2,010	71	939	1,400	27	--	36	--	93	97	100	--	--	100	SPWCM	
Sept. 6	10:15 a. m.	1,380	69	764	2,440	25	--	48	--	82	87	94	--	--	100	SPWCM	
Sept. 11	6:20 a. m.	1,880	65	3,600	5,200	16	--	28	--	94	98	99	99	--	100	SPWCM	
Sept. 11	9:30 p. m.	3,100	67	4,140	6,010	20	--	34	--	92	98	98	98	--	100	SPWCM	
Sept. 12	5:05 p. m.	6,460	65	11,900	17,900	20	27	34	47	71	96	98	99	--	100	SPWCM	
Sept. 19	11:55 a. m.	4,430	64	941	1,420	12	--	28	--	72	82	94	--	--	100	SPWCM	

PLATTE RIVER BASIN

ALCOVA RESERVOIR, WYO.

LOCATION.--At dam on North Platte River, a quarter of a mile southwest of Alcova, Natrona County.

DRAINAGE AREA.--10,800 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to August 1951.

REMARKS.--Records of reservoir storage for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, October 1950 to August 1951

Date of collection	Reser- voir storage (acre-feet)	Tem- pera- ture (°F)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Per- cent dis- solved	Specific conduct- ance (micro- mhos at 25°C)	pH
															Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium, mg- per liter	Non- carbon- ate			
Oct. 9, 1950	173,000		9.8	0.04	49	15	31	3.6	143	132	10	0.4	0.5	0.30	312	0.42	184	87	26	481	7.8	
Nov. 2	172,000		8.4	.02	49	16	31	3.2	145	120	8.0	.3	.7	.30	324	.44	188	69	26	505	7.9	
Dec. 1	171,200		6.8	.04	52	14	31	5.0	148	123	9.0	.2	.3	.30	328	.45	186	65	26	509	7.8	
Jan. 4, 1951	170,800		4.0	.02	50	16	34	3.6	150	130	9.5	.2	.4	--	328	.45	191	68	27	526	7.9	
Feb. 6	170,000		6.2	.03	53	15	33	2.9	150	129	9.0	.4	.2	.20	332	.45	183	70	27	516	7.5	
Feb. 28	169,900		6.2	.04	52	16	31	3.4	151	132	9.5	.3	.1	--	328	.45	184	70	25	518	7.8	
Apr. 6	169,800		6.2	.04	52	16	32	2.5	150	127	9.6	.2	1.3	--	334	.45	186	73	26	474	7.8	
May 2	152,100		5.3	.02	53	16	32	2.7	150	128	10	.2	.4	--	336	.46	188	75	26	511	8.1	
June 6	179,800		9.1	.02	51	15	31	2.6	148	120	9.5	.3	.3	--	338	.46	189	68	26	502	8.1	
July 18	182,300		7.4	.05	48	16	32	3.3	150	124	9.5	.3	.9	--	324	.44	187	64	27	491	8.3	
Aug. 12	183,100		8.9	.02	49	16	36	3.8	150	120	10	.4	1.7	--	332	.45	187	64	29	501	8.1	
Aug. 22	182,800		15	.03	49	16	32	3.8	150	120	10	.3	1.4	--	344	.47	188	65	26	504	7.7	

PLATTE RIVER BASIN--Continued

ALCOVA RESERVOIR, WYO.--Continued

Nitrogen, phosphorus, and related physical measurements, period October 1950 to August 1951
(Analytical results in parts per million except as indicated)

Date of collection	Reservoir storage (acre-feet)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Oct. 9, 1950	173,000	56	10	0.04	0.000	0.1	0.28	0.4	0.007	0.06
Nov. 2	172,000	51	7	.00	.000	.2	.15	.4	.008	.07
Dec. 1	171,200	42	15	.06	.000	.1	.33	.5	.008	.08
Jan. 4, 1951	170,600	36	4	.06	.003	.1	.26	.4	.01	.05
Feb. 6	170,000	32	4	.03	.006	.0	.19	.2	.008	.03
Feb. 28	169,900	35	2	.01	.000	.0	.23	.2	.008	.03
Apr. 6	169,800	39	3	.00	.008	.3	.17	.5	.02	.06
May 2	152,100	42	6	.01	.001	.3	.21	.5	.03	.06
June 6	179,800	54	3	.00	.002	.5	.34	.8	.01	.05
July 18	182,300	63	10	.00	.002	.3	.19	.5	.004	.09
Aug. 22	182,800	65	4	.01	.001	.2	.23	.4	.02	.09

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.

LOCATION.-- At cableway 100 feet upstream from gaging station, 100 feet west of State Highway 220, 2½ miles downstream from Poison Spring Creek, 4 miles south-west of Goose Egg, Natrona County, and 13 miles southwest of Casper.

DRAINAGE AREA.-- 11,500 square miles, approximately.

RECORDS AVAILABLE.-- Chemical analyses: October 1950 to August 1951.

Water temperatures: June 1950 to September 1951.

Sediment loads: June 1950 to September 1951.

Water temperatures: June 1950 to September 1951.

Water temperatures: June 1950 to September 1951.

Water temperatures: June 1950 to September 1951.

Water temperatures: June 1950 to September 1951.

Water temperatures: June 1950 to September 1951.

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Water temperatures: June 1950 to September 1951.

Water temperatures: June 1950 to September 1951.

Chemical analyses, in parts per million, October 1950 to August 1951

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	
															Parts per million		Calcium, mg-nesium	Non-carbonate				
															Residual (180°C)	Sum						
																			Tons per acre-foot			
Oct. 9, 1950	57		15	0.10	162	40	105	7.7	208	560	29	0.4	0.9	0.30	1,080	1,020	1.47	568	397	28	1,360	8.0
Nov. 2	46		15	.02	182	51	116	7.1	206	665	34	.4	1.4	0.30	1,260	1,170	1.71	662	483	27	1,510	7.9
Dec. 1	43		15	.04	187	45	111	7.8	226	635	30	.4	.8	.18	1,210	1,140	1.65	650	465	27	1,540	8.0
Jan. 4, 1951	43		20	.06	202	57	121	7.4	254	728	33	.5	2.1	.18	1,380	1,300	1.88	740	532	26	1,720	8.0
Feb. 6	33		19	.04	228	49	126	7.6	272	743	39	.6	3.0	.20	1,420	1,350	1.93	772	549	26	1,770	7.8
Feb. 28	38		17	.04	180	46	105	7.3	238	645	25	.4	2.8	--	1,180	1,150	1.60	638	443	26	1,500	7.8
Apr. 6	82		16	.04	137	30	66	5.0	192	413	17	.4	2.8	--	820	--	1.12	466	309	23	1,110	7.6
May 2	898		6.7	.02	55	17	34	3.0	153	133	11	.2	.6	--	356	--	.48	206	81	26	535	8.0
June 6	1,980		7.2	.03	53	15	32	2.4	150	119	10	.3	.7	--	346	--	.47	192	69	26	513	8.1
July 18	4,980		7.8	.02	50	16	32	2.9	150	117	9.0	.4	.7	--	320	--	.44	190	67	26	496	8.0
Aug. 22	4,330		8.0	.02	50	16	31	3.4	151	121	10	.3	1.0	--	330	--	.45	190	66	26	504	8.0

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.--Continued

Nitrogen, phosphorus, and related physical measurements, October 1950 to August 1951
(Analytical results in parts per million except as indicated)

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Oct. 9, 1950.....	a 57	--	15	0.05	0.003	0.2	0.19	0.4	0.02	0.04
Nov. 2.....	46	41	2	.01	.006	.3	.14	.5	.005	.04
Dec. 1.....	43	34	10	.01	.003	.2	.24	.5	.007	.05
Jan. 4, 1951.....	43	33	4	.02	.004	.5	.28	.8	.01	.06
Feb. 6.....	33	32	7	.03	.009	.7	.14	.9	.006	.03
Feb. 28.....	38	34	25	.03	.01	.6	.27	.9	.001	.04
Apr. 6.....	82	47	55	.01	.009	.6	.31	.9	.03	.05
May 2.....	898	41	60	.00	.002	.4	.27	.7	.01	.08
June 6.....	1,980	56	15	.00	.001	.3	.34	.6	.004	.07
July 18.....	4,980	60	2	.00	.002	.3	.19	.5	.01	.10
Aug. 22.....	4,330	66	8	.01	.001	.2	.20	.4	.02	.08

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 1 p. m. and 8 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--			--		--	a 42	43	a 62	65	--
2	--	a 41			--		--	46	47	--	65	64
3	a 46	--			--		--	51	59	65	64	62
4	--	--		a 32	--		--	53	51	--	--	--
5	56	--			--		--	56	56	--	68	--
6	--	--			32		a 47	48	a 54	--	68	64
7	51	--			--		--	50	58	--	67	--
8	55	--			--		--	47	58	--	--	--
9	52	--			--		--	50	58	60	66	--
10	--	--			--		--	49	57	55	64	--
11	--	--			--		--	52	58	55	65	59
12	60	--			--		--	50	a 53	60	65	--
13	59	--			--		--	48	59	a 55	--	--
14	--	--	a 32		--	41	--	48	58	--	63	--
15	--	--			--		--	47	61	--	65	--
16	--	--			--		--	48	59	--	66	--
17	54	--			--		53	50	a 55	--	67	--
18	51	38			--		--	52	a 58	65	67	--
19	50	35			--		--	53	a 59	65	64	--
20	53	36			--		--	53	57	65	64	--
21	54	36			--		--	51	53	a 62	66	--
22	50	34			--		--	56	a 53	64	66	--
23	51	34			--		--	59	a 52	64	--	--
24	53	35			--		42	59	--	65	67	--
25	49	38			--		a 42	58	--	62	--	--
26	46	38			--		46	60	--	64	--	--
27	48	38			--		48	57	--	63	--	--
28	50	38			34		51	59	68	a 59	--	--
29	49	38			--		48	a 54	--	65	65	--
30	47	--			--		45	57	64	65	--	--
31	47	--			--		--	52	--	--	--	--
Average	--	--			--		--	52	56	--	--	--

a Reading obtained between 6 a. m. and 12 m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	80	--	e 10	29	--	e 1	37	6	1
2-----	90	--	e 10	32	9	1	37		
3-----	82	48	11	30			25		
4-----	76	--	e 10	29			20		
5-----	70	63	12	29			17		
6-----	66	--	e 10	29			33		
7-----	63			29			48		
8-----	60	54	9	24			47	--	e 2
9-----	57			20			46		
10-----	53	--	e 6	23	--	e 1	45		
11-----	50	--	e 6	26			46		
12-----	48	30	4	30			46		
13-----	46	22	3	32			46		
14-----	45			30			39	29	3
15-----	45	--	e 2	30			45		
16-----	43			20			42		
17-----	42	17	2	29			42		
18-----	42			35			37		
19-----	40			30			37		
20-----	39	19	2	31			40	--	e 3
21-----	37			32			40		
22-----	37			33			28		
23-----	36			25			28		
24-----	33	--	e 1	37	20	2	39		
25-----	42			39			40		
26-----	37			39			39		
27-----	33			37			35		
28-----	30	17	2	37			30		
29-----	30			37			28	--	e 2
30-----	28			37			33		
31-----	30			--	--	--	35		
Total-	1,510	--	144	920	--	43	1,150	--	73
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	25			17			38		
2-----	30	--	e 2	21			31		
3-----	33			25	--	e 1	25		
4-----	40	15	2	30			30		
5-----	35			32			35		
6-----	32			33	15	1	40		
7-----	30			34			41	--	e 4
8-----	29			38			37		
9-----	28			38			45		
10-----	27			40			40		
11-----	26			42			35		
12-----	30			30			37		
13-----	28			25			50		
14-----	27			32			39	44	5
15-----	26			37			32		
16-----	27			37			30		
17-----	29			37	--	e 2	27		
18-----	30	--	e 1	35			29		
19-----	25			30			30		
20-----	23			38			32		
21-----	25			36			29	--	e 4
22-----	32			30			27		
23-----	35			35			24		
24-----	33			40			26		
25-----	32			45			24		
26-----	35			35			24		
27-----	30			30			26	--	e 5
28-----	25			38	37	4	46		
29-----	20			--	--	--	46		
30-----	17			--	--	--	35	--	e 10
31-----	15			--	--	--	32		
Total-	879	--	35	940	--	52	1,044	--	150

e Estimated.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	27			924	86	215	1,240	51	171
2-----	26			892	94	226	1,990	35	188
3-----	28		e 5	873	70	165	1,990	32	172
4-----	33			867	76	178	1,990	36	193
5-----	76	--	e 30	849	78	179	1,990	38	204
6-----	72	134	26	855	77	178	1,990	39	210
7-----	55	--	e 20	950	65	167	1,990	35	188
8-----	37			918	53	131	1,990	33	177
9-----	30			1,250	412	s 1,920	2,000	30	162
10-----	30		e 8	2,180	545	3,210	1,990	25	134
11-----	26			2,250	360	2,190	2,280	75	s 530
12-----	21			2,380	298	1,910	2,940	105	833
13-----	18			3,210	520	4,510	2,960	79	631
14-----	17		e 2	3,430	400	3,700	2,970	70	561
15-----	16			3,690	356	3,550	2,970	57	457
16-----	15			3,640	430	4,230	3,260	152	s 1,680
17-----	14	30	1	3,150	144	1,220	4,540	312	3,820
18-----	14			2,530	72	492	4,540	215	2,640
19-----	15			2,010	52	282	4,560	170	2,090
20-----	15			1,600	44	190	4,360	128	1,510
21-----	18		e 1	1,500	50	202	4,040	100	1,090
22-----	16			1,110	400	1,200	3,810	80	823
23-----	15			1,080	62	181	3,460	218	2,040
24-----	758	560	sa 1,200	1,070	43	124	3,420	140	b 1,300
25-----	976	355	935	1,070	32	92	1,710	70	b 320
26-----	989	371	991	1,070	30	87	532	40	b 55
27-----	970	222	581	1,070	25	72	496	25	b 35
28-----	950	146	374	1,070	32	92	487	15	20
29-----	944	113	288	1,130	50	153	478	15	b 20
30-----	937	92	233	1,110	44	132	470	20	25
31-----	--	--	--	1,090	38	112	--	--	--
Total-	7,158	--	4,741	50,818	--	31,290	73,443	--	22,279
	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	465	13	16	4,610	90	1,120	4,640	--	e 480
2-----	461	10	b 10	4,490	55	667	4,400	26	309
3-----	582	30	a 45	4,180	41	462	3,700	30	300
4-----	2,720	95	a 700	3,780	30	b 310	2,950	--	e 180
5-----	3,400			3,400	29	266	2,560	--	e 150
6-----	3,800			2,630	21	149	2,200	100	a 590
7-----	4,630	--	e 1,600	2,610	15	106	2,280	--	e 9,000
8-----	5,150			2,600	10	b 70	1,690	--	e 500
9-----	5,500	183	2,720	2,630	12	85	1,620	--	e 85
10-----	5,520	150	2,240	4,670	88	1,110	1,590	--	e 85
11-----	5,570	158	2,380	5,150	85	1,180	1,570	20	85
12-----	5,540	128	1,910	5,450	80	1,180	1,810		
13-----	5,540	146	2,180	5,450	65	b 960	2,540		
14-----	5,520	108	1,610	5,280	49	699	2,310		
15-----	5,510	100	1,490	4,780	40	516	2,530		
16-----	5,340	83	1,200	4,360	40	471	3,060		
17-----	4,970	79	1,060	4,400	52	618	2,990		
18-----	4,880	68	896	4,490	42	509	2,830		
19-----	4,680	62	783	4,430	22	263	3,420	--	e 210
20-----	4,810	58	753	4,430	37	443	2,770		
21-----	5,090	790	a 11,000	4,340	64	750	2,130		
22-----	5,120	1,390	19,200	4,460	40	482	1,890		
23-----	4,980	255	3,430	5,360	45	651	1,360		
24-----	4,970	108	1,450	5,160	72	1,000	1,140		
25-----	4,970	73	980	4,850			409	--	e 15
26-----	5,000	100	1,350	4,850			308	--	e 10
27-----	5,180	94	1,310	4,850	--	e 800	191	15	8
28-----	5,180	94	1,310	4,810			116		
29-----	5,180	71	993	4,810			94	--	e 4
30-----	5,040	310	a 4,200	4,900	50	662	82	--	--
31-----	4,680	950	b 12,000	4,770	--	e 640	--	--	--
Total-	139,978	--	83,616	136,980	--	19,369	61,180	--	14,539
Total discharge for year (cfs-days).....									476,000
Total load for year (tons).....									176,331

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued
CASPER CREEK AT CASPER, WYO.

LOCATION.--At gaging station at west edge of Casper, Natrona County, 500 feet upstream from bridge on U. S. Highway 20, and a quarter of a mile upstream from mouth.
DRAINAGE AREA.--662 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1949 to July 1951.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, October 1950 to July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million		Tons per acre-foot	Calcium	Non-carbonate				
															Residue at 180° C	Sum							
Oct. 4, 1950	6.5	13	0.02	163	63	390	228			1,210	44	0.4	2.9	0.30	2,120	2,000	2.88	664	477	56	2,780	7.6	
Nov. 19	a. 9	11	.04	168	84	593	300	300		1,670	48	1.0	.7	--	2,760	2,720	3.75	765	519	63	3,370	7.9	
Dec. 1	a. 8	15	.04	168	72	592	248	248		1,660	49	.6	.6	.30	2,770	2,680	3.77	716	513	64	3,630	7.9	
Jan. 4, 1951	a. 6	9.4	.04	186	72	549	303	303		1,570	47	.6	.7	.20	2,730	2,580	3.71	758	510	61	3,480	7.8	
Feb. 6	a. 8	9.8	.04	182	88	588	331	331		1,680	49	.7	1.1	.00	2,860	2,760	3.89	814	543	61	3,580	7.8	
Mar. 1	1.1	10.8	.08	219	89	683	382	382		1,920	59	.6	.4	.45	3,280	3,150	4.46	912	589	61	4,000	7.8	
Apr. 6	.7	8.6	.04	163	81	625	297	297		1,710	50	.7	.7	.32	2,860	2,790	3.89	738	494	65	3,540	7.6	
May 10	.6	--	--	--	--	604	286	286		1,710	52	--	--	--	--	--	--	--	--	--	63	3,580	7.5
June 12	.7	--	--	--	--	600	294	294		1,660	51	--	--	--	--	--	--	--	--	--	64	3,520	7.6
July 18	3.5	--	--	--	--	235	226	226		660	29	--	--	--	--	--	--	--	--	--	56	1,690	7.8

^a Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW CASPER, WYO.

LOCATION.--At cableway 500 feet upstream from gaging station, half a mile north of U. S. Highways 20 and 87, 6½ miles east of Casper, Natrona County, and 7½ miles downstream from Casper Creek.

DRAINAGE AREA.--12,600 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to July 1951.

Water temperatures: June 1949 to September 1951.

Sediment records: April 1947 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 76°F July 3; minimum, freezing point on many days during December to February.

Sediment concentrations: Maximum daily, 2,400 ppm July 22; minimum daily, not determined.

Sediment loads: Maximum daily, 34,000 tons July 22; minimum daily, not determined.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum, 76°F July 3, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 26,200 ppm June 7, 1949; minimum daily, 1 ppm Oct. 3, Nov. 5, 1948.

Sediment loads: Maximum daily, 269,000 tons July 11, 1949; minimum daily, less than 1 ton on many days during 1947-50.

REMARKS.--Flow affected by ice Nov. 9, 10, Dec. 4-8, Dec. 31 to Jan. 5, Jan. 14, 17, 18, 20, 21, Jan. 27 to Feb. 6, Mar. 3-5. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, October 1950 to July 1951

Date of collection	Instantaneous discharge (cfs)	Silicon (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million		Tons per acre-foot	Calcium, magnesium	Non-carbonate				
														Residual	Sum							
Oct. 9, 1950	112	11	0.02	129	42	130		214	498	58	0.4	0.8		1,080	974	1.44	495	320	36	1,420	7.4	0.109
Nov. 2	75	10	.04	132	47	144		216	553	56	.5	.7		1,130	1,050	1.54	521	344	37	1,490	7.2	1.68
Nov. 30	75	11	.10	145	46	152		220	590	59	.6	.6		1,160	1,110	1.58	550	370	37	1,540	7.1	1.287
Jan. 4, 1951	a 68	15	.30	158	46	179		265	630	71	.4	.3		1,270	1,230	1.73	584	367	40	1,730	7.3	1.30
Feb. 7	66	16	.20	164	48	186		275	610	73	.4	.5		1,280	1,210	1.74	605	379	37	1,700	7.4	.562
Feb. 28	59	13	.06	143	40	156		233	558	61	.6	.5		1,120	1,090	1.52	520	329	40	1,540	7.2	.933
Apr. 17	45	12	.07	116	44	166		215	538	66	.5	.7		1,100	1,050	1.50	470	294	43	1,530	7.7	.366
May 1	834	5.8	.02	58	19	49		161	164	18	.4	1.2		422	--	.57	224	92	32	633	7.6	.090
June 5	1,960	5.4	.03	54	15	39		130	137	11	.3	1.4		348	--	.47	198	75	30	533	7.8	.002
July 18	5,100	6.0	.04	51	15	36		152	122	10	.6	.5		332	--	.45	190	65	29	512	7.6	.000

a. Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 2 p.m. and 8 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	36	48	41	33	31	44	a 50	46	45	64	70	63
2	33	57	41	--	33	38	52	47	44	68	68	64
3	46	--	39	--	31	39	52	55	52	76	65	68
4	56	--	37	a 33	32	46	53	58	59	a 64	70	64
5	58	--	--	--	32	42	53	60	60	--	71	67
6	54	--	--	--	33	47	54	53	59	69	71	64
7	54	--	--	--	41	46	55	56	60	65	71	67
8	63	--	35	--	42	45	50	52	61	66	68	66
9	56	--	37	--	46	48	44	53	63	61	69	64
10	58	--	38	--	48	46	44	53	62	56	68	65
11	60	--	a 36	31	49	47	48	58	61	54	67	56
12	62	--	42	31	47	48	47	56	58	62	--	56
13	60	--	41	32	47	46	48	51	60	64	--	63
14	62	--	a 36	33	49	49	46	49	62	62	--	61
15	62	--	37	32	49	48	--	47	65	a 62	--	63
16	62	--	41	33	49	a 48	48	48	64	65	--	65
17	62	--	42	--	51	48	51	52	60	64	--	65
18	57	39	43	33	43	--	61	55	62	67	--	62
19	62	--	38	--	42	47	51	a 50	62	67	--	64
20	62	43	34	--	44	49	49	58	51	59	--	54
21	62	46	39	38	46	51	43	54	53	a 63	--	46
22	62	41	42	31	41	50	55	61	58	63	67	56
23	55	a 33	41	31	43	49	55	63	58	66	--	56
24	56	41	42	31	44	51	45	a 58	62	69	67	56
25	55	47	a 43	43	46	52	48	60	61	66	67	58
26	57	48	37	32	48	52	48	62	61	68	68	56
27	51	48	41	--	44	--	53	63	63	63	68	53
28	55	47	38	31	41	52	59	--	67	--	68	59
29	57	45	39	33	--	52	53	--	62	69	64	61
30	57	44	37	--	--	55	49	62	61	69	66	--
31	49	--	31	31	--	49	--	54	--	69	66	--
Average	56	--	b 38	b 33	43	48	50	55	59	65	--	61

a Observations made between 7 a.m. and 11 a.m.

b Includes estimated temperature, 32°F, on missing days.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	159	11	5	75	5	1	73	6	1
2-----	167			75	5	1	70	6	1
3-----	152			78			50	16	2
4-----	149			78			56	16	2
5-----	146			75			45		
6-----	134	6	2	78			70		
7-----	122			75			78		
8-----	118			80			76	17	3
9-----	115			60			75		
10-----	112			67	--	e 1	73		
11-----	108	9	2	75			75		
12-----	105			88			75		
13-----	102			82			70		
14-----	100			80			61		
15-----	98			78			73		
16-----	98	4	1	57			68	6	1
17-----	98			88			70		
18-----	95			78	5	1	68		
19-----	90			73	--	e 1	66		
20-----	90			73			66		
21-----	88	11	3	80			66		
22-----	88			73			64		
23-----	88			66			61		
24-----	85			52			64		
25-----	82			82			64		
26-----	85	13	3	75	8	2	64	7	1
27-----	82			75			61		
28-----	78			73			50		
29-----	75			73			48		
30-----	75			73			59		
31-----	75			--	--	--	62		
Total--	3,259	--	83	2,235	--	41	2,021	--	45
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	52	12	2	51			48		
2-----	60			55			57		
3-----	65			58	63	10	52		
4-----	68			60			60		
5-----	62			63			67		
6-----	68	11	2	60			61	8	1
7-----	66			64			70		
8-----	66			70	25	5	52		
9-----	64			68			59		
10-----	68			78			68		
11-----	59	18	2	82			50		
12-----	70			73			57		
13-----	64			59			61		
14-----	60			64			64		
15-----	57			64			61		
16-----	64	11	2	61	7	1	54	5	1
17-----	68			59			52		
18-----	72			59			45		
19-----	64			70			48		
20-----	50			50			48		
21-----	45	18	2	61			52		
22-----	48			64			52		
23-----	61			54			48		
24-----	57			68	9	1	47		
25-----	57			52			47		
26-----	59	11	2	50			47	7	1
27-----	50			70			47		
28-----	45			57			50		
29-----	49			--	--	--	52		
30-----	45			--	--	--	64		
31-----	50			--	--	--	59		
Total--	1,833	--	62	1,744	--	93	1,699	--	31

e Estimated.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	52	8	1	934	95	240	1,120	78	236
2-----	50			907	75	184	1,660	160	717
3-----	50			889	90	216	1,960	88	466
4-----	52			889	72	173	1,960	70	370
5-----	57			889	68	163	1,960	60	318
6-----	80	20	3	871	70	165	1,960	68	360
7-----	88			916	70	173	1,940	60	314
8-----	80			970	65	170	1,940	50	262
9-----	73			961	130	337	1,960	45	238
10-----	70			1,800	783	3,810	1,960	37	196
11-----	64	8	1	2,140	475	2,740	1,970	41	218
12-----	59			2,210	360	2,150	2,800	180	1,360
13-----	50			2,770	707	5,290	2,910	182	1,430
14-----	48			3,110	570	4,790	2,930	160	1,270
15-----	47			3,320	480	4,300	2,940	163	1,290
16-----	47	8	1	3,680	550	5,480	2,980	114	917
17-----	45			3,250	370	3,250	4,403	585	7,070
18-----	45			2,900	165	1,290	4,580	500	6,160
19-----	45			2,110	90	513	4,580	262	3,240
20-----	47			1,860	80	402	4,560	285	3,260
21-----	47	297	s 444	1,580	65	277	4,140	192	2,150
22-----	48			1,250	52	176	4,080	192	2,120
23-----	50			1,110	155	464	3,650	228	2,250
24-----	168			1,080	60	175	3,520	201	1,910
25-----	817			1,070	44	127	2,750	89	661
26-----	925	410	1,020	1,060	37	106	952	30	77
27-----	952	350	900	1,070	32	92	628	18	31
28-----	934	225	567	1,070	40	116	580	16	25
29-----	925	195	487	1,070	48	139	548	15	22
30-----	934	125	315	1,170	69	218	540	12	17
31-----	--	--	--	1,080	38	111	--	--	--
Total--	6,949	--	5,288	49,986	--	37,817	74,438	--	38,955
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	526	12	17	4,840	360	4,700	4,920	43	571
2-----	519	10	14	4,780	138	1,780	4,860	33	433
3-----	512	5	7	4,480	72	871	4,260	58	667
4-----	1,680	150	sa 880	4,140	70	782	3,430	230	2,130
5-----	3,320	188	1,690	3,800	54	554	2,860	32	247
6-----	3,500	163	1,540	3,040	38	312	2,390	28	181
7-----	4,500	278	3,380	2,740	32	237	2,390	1,600	a 10,000
8-----	5,000	312	4,210	2,690	34	247	1,930	450	2,340
9-----	5,470	350	5,170	2,680	30	217	1,650	78	347
10-----	5,530	290	4,330	4,010	102	1,100	1,610	41	178
11-----	5,630	299	4,550	5,080	139	1,910	1,570	34	144
12-----	5,590	286	4,320	5,490	e 1,900	e 890	1,580	32	137
13-----	5,590	220	3,320	5,550			2,420	132	863
14-----	5,590	180	2,720	5,550			2,420	55	359
15-----	5,590	128	1,930	5,080			2,350	40	254
16-----	5,590	100	1,510	4,640			3,090	106	884
17-----	5,160	72	1,000	4,500	e 490	e 477	3,160	66	563
18-----	5,100	99	1,360	4,620			2,770	51	381
19-----	4,840	114	1,490	4,520			3,460	119	1,110
20-----	4,860	108	1,420	4,520			3,180	70	601
21-----	5,140	390	a 5,400	4,480			2,360	29	185
22-----	5,240	2,400	a 34,000	4,240	40	477	2,120	19	109
23-----	5,200	1,700	23,900	5,180	118	1,650	1,570	12	51
24-----	5,160	220	3,070	5,420	95	1,390	1,280	11	38
25-----	5,160	135	1,880	5,020	66	895	889	18	43
26-----	5,160	125	1,740	5,040	53	721	407	13	14
27-----	5,280	130	1,850	5,060	53	724	346	4	4
28-----	5,340	130	a 1,900	5,060	50	683	236	4	3
29-----	5,340	100	1,440	5,020	51	691	171	5	2
30-----	5,300	100	1,430	5,040	58	789	152	4	2
31-----	4,960	1,500	a 20,000	5,100	55	757	--	--	--
Total--	141,377	--	141,468	141,590	--	32,217	65,831	--	22,841

Total discharge for year (cfs-days)..... 492,962

Total load for year (tons)..... 278,848

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER ABOVE BEDTICK CREEK NEAR DOUGLAS, WYO.

LOCATION.--At county highway bridge, 1 mile upstream from Bedtick Creek, 2½ miles south of Douglas, Converse County, and 2½ miles upstream from gaging station

DRAINAGE AREA.--14,300 square miles, approximately (above gaging station).

RECORDS AVAILABLE.--Chemical analyses, August 1950 to September 1951.

Water temperatures: June 1949 to September 1951.

Sediment records: April 1947 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 77°F July 4, Aug. 22; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 2,370 ppm July 23; minimum daily, not determined.

Sediment loads: Maximum daily, 31,600 tons July 23; minimum daily, not determined.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum, 80°F July 15, 1950; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 18,700 ppm July 12, 1949; minimum daily, less than 1 ton Jan. 11-12, 1949.

Sediment loads: Maximum daily, 349,000 tons July 12, 1949; minimum daily, less than 1 ton Jan. 11-12, 1949.

REMARKS.--Flow affected by ice Nov. 9-27, Nov. 30 to Mar. 22. No appreciable inflow between sampling point and gaging station except during periods of heavy

local runoff. Records of discharge for gaging station near Douglas, Wyo., for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, August 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate						
																		Residue at 180°C					Sum
Aug. 17, 1950	3,640	11	0.04	47	17		38	146	129	11	0.3	0.8	0.29	346	--	0.47	186	68	31	550	8.1	--	--
Oct. 6	304	12	.02	98	33	110	110	244	360	32	.2	2.2		862	--	1.08	383	193	42	1,120	9.9	0.002	0.002
Nov. 8	188	9.8	.02	98	43	120	120	242	415	34	.4	1.7		866	--	1.26	420	222	38	1,220	7.8	.002	.002
Dec. 8	170	16	.08	138	50	158	158	342	530	41	.4	3.5		1,530	1,100	1.36	551	271	38	1,420	7.7	.003	.003
Jan. 2, 1951	1,105	12	.04	126	46	136	136	300	500	40	.4	4.4		1,070	1,030	1.46	502	256	39	1,470	7.8	.013	.013
Feb. 7	1,125	15	.04	119	42	143	143	299	455	40	.4	6.2		1,020	968	1.39	470	225	40	1,390	7.4	.004	.004
Mar. 6	1,380	15	.04	112	41	150	150	267	463	37	.5	1.2		872	--	1.32	450	231	42	1,350	7.8	.002	.002
Apr. 4	1,221	11	.01	86	35	132	132	154	438	38	.6	1.3		872	--	1.19	360	226	44	1,210	7.7	.000	.000
Apr. 30	1,540	9.1	.02	55	16	39	39	160	132	12	.5	2.0		374	--	.51	203	72	30	564	7.6	.000	.000
June 6	2,140	6.6	.04	53	17	44	44	159	144	11	.3	1.1		356	--	.48	203	73	32	555	7.5	.000	.000
July 3	761	4.9	.14	65	24	67	67	182	221	18	.4	1.3		520	--	.71	260	111	36	755	7.9	.001	.001
Aug. 8	2,710	8.7	.02	53	17	41	41	156	140	11	.4	.8		357	--	.49	201	73	31	550	7.7	.000	.000
Sept. 12	1,700	7.2	.01	58	18	47	47	166	157	13	.4	.9		395	--	.54	218	82	32	602	7.8	.000	.000

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER ABOVE BEDTICK CREEK NEAR DOUGLAS, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 4 p. m. and 8 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	42	47	37	32	--	--	47	50	45	a 62	73	a 63
2	51	40	32	32	--	33	54	51	--	70	70	65
3	a 46	42	37	32	--	33	--	60	51	72	67	a 64
4	57	50	33	32	--	34	53	65	58	77	71	66
5	54	49	--	32	--	--	50	59	51	74	a 74	68
6	50	45	32	32	--	35	49	49	61	76	73	63
7	55	47	32	32	33	35	--	a 53	63	72	72	69
8	61	32	32	32	34	36	48	59	63	a 66	69	67
9	55	--	33	32	--	34	--	58	65	68	69	66
10	59	--	33	32	36	35	--	--	66	58	a 68	69
11	63	--	33	33	40	32	37	61	a 63	56	71	56
12	65	--	32	32	32	32	46	59	66	62	69	a 53
13	63	--	32	32	32	32	54	57	62	65	67	61
14	64	--	--	32	32	34	41	55	65	72	64	61
15	60	--	33	32	34	40	--	a 51	65	71	66	61
16	60	--	--	33	32	42	--	50	65	67	68	64
17	58	--	32	33	35	--	60	a 51	69	67	70	66
18	59	--	32	33	34	32	60	58	69	69	72	64
19	60	a 34	34	32	36	32	50	64	63	72	a 69	65
20	58	--	36	32	--	34	39	60	60	74	68	65
21	58	46	35	32	37	45	--	56	56	64	66	54
22	55	38	34	32	35	40	--	a 59	60	67	77	55
23	53	34	35	32	38	43	50	66	59	68	68	--
24	54	37	36	32	33	--	--	65	66	69	66	57
25	55	34	34	32	34	--	51	62	a 64	72	71	59
26	53	37	53	33	34	50	52	66	71	70	67	54
27	48	40	33	--	33	46	56	64	a 60	70	66	53
28	51	41	32	--	34	45	60	66	66	69	a 64	58
29	57	39	32	--	--	48	55	65	63	70	--	63
30	53	42	32	--	--	--	58	63	68	72	a 64	a 59
31	50	--	32	--	--	45	--	55	--	71	a 64	--
Average	56	--	33	32	--	38	--	59	62	69	69	62

a Observations made before 12 m.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER ABOVE BEDTICK CREEK NEAR DOUGLAS, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	363			183			175	13	
2-----	352			186			150	--	
3-----	335	41	37	189			140	--	
4-----	310			189	20	10	160	--	
5-----	300			192			140	--	
6-----	300			189			170		e 7
7-----	282			195			180	15	
8-----	267			201	23	12	170		
9-----	258	30	22	150			170		
10-----	252			120			170	20	
11-----	243			160	--	e 9	170		
12-----	237			170			170		
13-----	231			200			155		
14-----	225			220			140		
15-----	222	8	5	250			170		
16-----	216			180	--	e 18	170		
17-----	210			205			170	14	6
18-----	201			235			170		
19-----	201			205	23	13	160		
20-----	198			200	15		155		
21-----	195	8	4	210	--		160		
22-----	195			200	--		160		
23-----	195			150	--		150		
24-----	192			195	--	e 8	145		
25-----	189	23	12	250			155		
26-----	189			210	--		150	9	3
27-----	192			230	--		145		
28-----	189	38	19	213			120		
29-----	186			204	19		130		
30-----	183			190	13		140		
31-----	180	22	11	--	--	--	120		
Total-	7,288	--	486	5,871	--	318	4,830	--	167
	January			February			March		
1-----	105			92	--		70		
2-----	105			96	--		74		
3-----	120			105	--		70	31	6
4-----	125			110	--		78		
5-----	120	21	7	115	--		90		
6-----	125			115	--	e 6	80		
7-----	130			125	8		100		
8-----	125			135	--		98	68	18
9-----	130			145			84		
10-----	130			160	51		120		
11-----	125			170			90		
12-----	130			170			100		
13-----	135			130			125		
14-----	120			110			150		
15-----	115	9	3	100	26	8	140		
16-----	125			100			130	33	11
17-----	130			105			135		
18-----	130			100			70		
19-----	125			120			85		
20-----	110			120			115		
21-----	105			140			140		
22-----	115			180			125		
23-----	125	7		170	37	13	117		
24-----	135			155			114	14	4
25-----	140	7		125			124		
26-----	135		e 2	100			117		
27-----	90	--		105			122		
28-----	94	--		105			152		
29-----	98	--		--	--	--	152	10	4
30-----	84	--		--	--	--	130		
31-----	88	--		--	--	--	117		
Total-	3,669	--	119	3,503	--	252	3,414	--	293

e Estimated.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER ABOVE BEDTICK CREEK NEAR DOUGLAS, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	119	6	2	1,390	182	683	1,430	78	301
2-----	119			1,230	122	405	1,490	85	a 342
3-----	122			1,140	98	302	1,650	187	s 1,010
4-----	122			1,130	62	189	2,200	152	903
5-----	138	20	10	1,120	50	151	2,200	110	653
6-----	216			1,140	60	a 185	2,180	98	577
7-----	237			1,220	91	300	2,170	70	410
8-----	240			1,230	87	289	2,140	49	283
9-----	240	e 13	13	1,310	55	195	2,110	78	444
10-----	225			1,320	53	189	2,120	60	343
11-----	186			2,100	515	s 3,130	2,100	68	386
12-----	152			2,490	548	3,680	2,140	100	s 591
13-----	127	4	1	2,610	382	2,690	2,830	564	s 4,210
14-----	117			3,190	704	s 6,110	2,920	248	1,960
15-----	114			3,480	737	6,920	2,960	161	1,290
16-----	135			3,770	728	7,410	2,970	130	1,040
17-----	144	6	2	4,100	754	8,350	3,130	134	s 1,160
18-----	124			3,630	549	5,380	4,150	548	6,140
19-----	177			3,390	280	2,560	4,200	468	5,310
20-----	352			2,840	185	1,420	4,160	362	4,070
21-----	328	70	a 62	2,590	168	1,170	4,150	361	4,050
22-----	225	40	a 24	2,560	168	1,160	3,920	323	3,420
23-----	180	32	16	2,220	197	1,180	4,010	552	5,980
24-----	192	30	a 16	1,920	178	923	3,620	240	2,350
25-----	231	42	26	1,800	146	710	3,500	380	3,310
26-----	600	190	s 429	1,690	90	411	2,890	114	s 930
27-----	1,180	408	1,300	1,600	79	341	1,590	47	202
28-----	1,310	292	1,030	1,550	61	255	1,120	18	54
29-----	1,340	230	832	1,470	52	206	989	15	40
30-----	1,400	228	862	1,430	67	259	834	12	27
31-----	--	--	--	1,460	83	327	--	--	--
Total-	10,392	--	4,782	64,120	--	57,480	78,073	--	51,786
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	782	14	30	4,620	1,040	13,000	4,620	66	823
2-----	747	10	20	4,570	1,200	14,800	4,490	--	e 994
3-----	691	135	252	4,390	413	4,900	4,350	55	a 646
4-----	604	25	41	4,180	182	2,050	3,900	48	505
5-----	1,440	132	s 772	3,860	147	a 1,530	3,280	99	877
6-----	3,190	170	1,460	3,570	110	1,060	2,880	43	334
7-----	3,360	169	1,530	2,960	70	559	2,500	77	520
8-----	4,010	297	3,220	2,760	78	581	2,410	62	403
9-----	4,490	369	4,470	2,680	72	521	2,040	673	s 3,790
10-----	5,020	371	5,030	2,660	71	510	1,780	116	557
11-----	5,170	362	5,050	3,830	131	s 1,450	1,700	167	767
12-----	5,580	369	5,510	4,700	217	2,750	1,690	83	379
13-----	5,430	300	4,400	5,090	223	3,060	1,660	32	143
14-----	5,430	257	3,770	5,170	204	2,850	2,280	83	s 524
15-----	5,410	230	3,360	5,040	112	1,520	2,320	91	570
16-----	5,410	280	4,090	4,820	66	823	2,250	58	352
17-----	5,240	288	4,070	4,280	85	982	2,820	97	739
18-----	4,800	277	3,590	4,210	76	864	2,880	76	591
19-----	4,720	208	2,850	4,300	71	824	2,680	66	478
20-----	4,570	238	2,940	4,200	77	873	3,110	106	890
21-----	4,680	286	3,610	4,180	89	1,000	2,890	82	640
22-----	4,960	272	3,640	4,150	98	1,100	2,300	78	484
23-----	4,940	2,370	31,600	4,180	124	1,400	2,080	63	354
24-----	4,860	776	10,200	5,020	134	1,820	1,700	22	101
25-----	4,820	370	4,820	4,900	132	1,750	1,400	20	76
26-----	4,800	177	2,290	4,620	140	1,750	1,100	19	56
27-----	4,840	150	1,960	4,640	90	1,130	598	13	21
28-----	4,980	138	1,860	4,640	69	864	470	6	8
29-----	5,040	138	1,880	4,660	70	a 861	426	5	6
30-----	5,000	126	1,700	4,660	75	a 944	360	4	4
31-----	4,900	159	2,100	4,720	71	905	--	--	--
Total-	129,864	--	121,915	132,060	--	69,051	68,964	--	16,632

Total discharge for year (cfs-days)..... 512,048

Total load for year (tons)..... 323,281

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued
NORTH PLATTE RIVER ABOVE BEDTICK CREEK NEAR DOUGLAS, WYO.--Continued

Particle-size analyses of suspended sediment, April to August 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Apr. 30, 1951.....	10:00 a. m.	1,430	52	248	1,400	44	59	68	80	87	91	95	99		100	--	BWCM
May 11.....	11:30 a. m.	2,290	60	659	3,110	--	48	69	--	89	89	--	--		--	--	SPWCM
May 24.....	9:40 a. m.	1,940	60	138	797	55	62	72	79	82	88	89	93		96	100	BWCM
June 13.....	1:45 p. m.	2,890	67	232	498	39	43	50	60	67	76	81	88		94	100	BWCM
Aug. 13.....	3:30 p. m.	5,150	69	425	4,140	9	11	12	14	20	25	32	43		51	--	BWCM

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, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

Water temperatures: June 1949 to September 1951.

Sediment records: March 1947 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 76° F July 4; minimum, freezing point on many days during November to January.

Sediment concentrations: Maximum daily, 2,140 ppm July 24; minimum daily, not determined.

Sediment loads: Maximum daily, 28,100 tons July 24; minimum daily, not determined.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum, 78° F July 11, 1950; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 10,500 ppm July 23, 1949; minimum daily, not determined.

Sediment loads: Maximum daily, 12,000 tons July 13, 1949; minimum daily, not determined.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium in hardness	Specific conductance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Calcium, mg./l.	Non-carbonate		
Oct. 6, 1950.....	400	14	0.04	97	28	98	7.3	228	0	328	26	0.4	2.0	0.20	728	0.98	359	172	37	1,020
Nov. 9.....	142	9.8	.02	81	30	79	6.5	215	0	275	20	-1	1.1	.30	628	.85	323	147	34	927
Dec. 7.....	a 120	20	.04	146	41	130	8.6	342	0	473	37	-4	4.2	.00	b 1,090	1.48	534	254	34	1,450
Jan. 3, 1951.....	a 135	18	.02	113	43	126	7.3	292	0	438	33	-4	3.8	.11	960	1.31	458	219	37	1,340
Feb. 6.....	a 160	18	.02	130	38	117	7.9	302	0	430	36	-4	2.8	.20	966	1.31	480	232	34	1,330
Mar. 7.....	a 160	16	.04	108	35	110	5.7	250	0	398	31	.3	2.3	-.	852	1.16	414	209	36	1,200
Apr. 4.....	166	13	.04	90	33	112	5.4	192	0	393	31	.2	1.1	-.	804	1.09	380	203	40	1,110
Apr. 30.....	1,430	12	.02	54	18	38	3.2	154	0	148	12	.3	2.2	-.	390	.53	207	81	28	587
June 6.....	2,160	9.0	.03	57	16	38	3.0	157	0	142	11	.3	1.1	-.	366	.50	208	79	28	574
July 3.....	762	9.1	.01	71	23	59	5.0	176	8	220	16	.5	.9	-.	514	.70	273	116	31	756
Aug. 8.....	2,780	9.4	.05	54	17	37	3.6	162	0	137	11	.3	.9	-.	370	.50	206	73	28	548
Sept. 12.....	1,690	9.4	.03	62	19	45	3.8	175	0	166	13	.3	.6	-.	424	.58	234	90	29	628

a Mean daily discharge.

b Sum of determined constituents, 1,030 parts per million.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Nitrogen, phosphorus, and related physical measurements, water year October 1950 to September 1951

Analytical results in parts per million except as indicated

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Oct. 6, 1950	400	53	20	0.03	0.006	0.5	0.22	0.8	0.004	0.04
Nov. 9	142	--	4	.12	.005	.3	.37	.8	.02	.03
Dec. 7	a 120	32	4	.02	.01	.9	.27	1.2	.008	.02
Jan. 3, 1951.....	a 135	33	2	.08	.009	.8	.50	1.4	.009	.04
Feb. 6	a 160	33	3	.48	.02	.6	.49	1.6	.002	.03
Mar. 7	a 160	--	5	.22	.02	.5	.42	1.2	.02	.06
Apr. 4	166	45	1	.01	.005	.3	.22	.5	.01	.04
Apr. 30	1,430	59	120	.03	.007	1.3	.55	1.9	.02	.17
June 6	2,160	65	75	.01	.001	.3	.59	.9	.001	.11
July 3	762	--	8	.00	.009	.6	.26	.9	.008	.05
Aug. 8	2,780	--	25	.01	.003	.1	.17	.3	.001	.08
Sept. 12	1,690	--	65	.01	.01	.2	.28	.5	.01	.10

a Mean daily discharge.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 6 a.m. and 11 a.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	a 49	36	--	--	34	50	51	48	74	72	84
2	46	42	--	a 34	--	33	a 57	47	45	65	71	61
3	a 51	--	--	33	--	a 34	a 59	49	49	67	69	62
4	a 52	43	33	34	--	a 33	45	53	52	a 76	66	63
5	53	a 50	a 32	33	--	33	a 53	55	56	73	71	83
6	a 55	a 49	32	32	a 33	a 35	a 54	51	65	74	69	65
7	a 52	a 47	32	32	a 33	34	a 50	48	59	75	71	65
8	a 60	a 34	a 32	a 34	33	33	44	51	63	72	70	67
9	a 60	32	32	a 33	a 33	35	a 47	55	62	85	a 74	62
10	50	a 34	a 33	32	a 35	37	40	54	65	64	66	65
11	51	34	a 33	a 34	a 35	38	41	53	63	58	a 70	64
12	--	a 33	32	32	35	a 41	a 48	59	61	58	68	55
13	a 63	34	32	a 34	a 33	35	42	56	61	60	69	--
14	62	a 36	32	32	a 35	34	a 45	52	62	65	69	55
15	a 65	a 34	32	a 34	35	34	a 42	53	65	70	61	57
16	--	a 37	32	33	35	a 38	38	50	87	70	62	58
17	a 63	a 38	32	34	36	--	--	50	70	67	65	57
18	51	--	32	34	36	38	a 58	55	69	69	65	58
19	49	a 35	a 33	a 33	34	a 36	48	54	87	73	67	58
20	a 58	a 42	32	32	35	a 39	a 44	57	63	70	65	58
21	a 57	--	33	a 33	34	35	a 39	48	61	69	66	55
22	a 57	37	32	33	34	a 46	40	61	58	64	68	49
23	--	--	33	33	33	42	43	66	59	67	63	52
24	a 48	a 35	32	a 34	33	a 47	a 40	a 66	61	72	--	49
25	54	a 36	34	33	--	a 50	a 44	64	63	69	a 68	50
26	48	--	33	a 35	34	a 50	a 54	57	62	71	68	55
27	a 51	a 41	33	32	35	a 50	53	60	63	71	65	54
28	a 52	a 37	33	--	33	a 48	52	65	63	72	63	49
29	49	a 35	34	--	--	--	58	62	64	77	68	55
30	a 51	a 36	a 32	--	--	--	63	62	68	72	68	60
31	a 40	--	33	--	--	a 50	--	58	--	71	69	--
Average	54	38	33	33	34	39	48	56	61	69	68	58

a Observations made between 1 p.m. and 6 p.m.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Suspended sediment, water year October 1950 to September 1951									
Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	390	22	23	240			232		
2-----	410	125	141	236			236		
3-----	428			236			204		
4-----	422			236			184	14	7
5-----	405	80	88	236	7	4	140		
6-----	390			232			125		
7-----	385			236			120		
8-----	370	26	26	236			160	13	5
9-----	365			173	190				
10-----	355			156	215				
11-----	345	8	7	188	12	6	225	28	16
12-----	340			208			210		
13-----	330			252			190		
14-----	320			300			180	14	7
15-----	310			315	200				
16-----	300			5	4	252	14	11	210	12	7
17-----	295	280	200						
18-----	280	6	4			310			205	--	e 5
19-----	270			290	195				
20-----	260			252	190				
21-----	260	6	4	236	14	9	190	10	5
22-----	256			228			190		
23-----	256			9	6	159			180	7	3
24-----	252	285	175						
25-----	248	330	180						
26-----	248			256	12	10	170	20	9
27-----	240	295	150						
28-----	240	9	6	290			165		
29-----	240			280	175				
30-----	244			260	185				
31-----	240	--	--	--	--	--	190	--	--
Total-	9,694	--	763	7,483	--	236	5,761	--	241

e Estimated.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued									
Day	April			Mean dis- charge (cfs)	May		Mean dis- charge (cfs)	June	
	Mean dis- charge (cfs)	Suspended sediment			Mean con- cen- tration (ppm)	Tons per day		Mean con- cen- tration (ppm)	Tons per day
		Mean con- cen- tration (ppm)	Tons per day						
1-----	150	7	3	1,550	272	1,140	1,540	96	399
2-----	150			1,530	195	806	1,580	99	422
3-----	150			1,370	145	536	1,550	134	561
4-----	166			1,290	83	289	2,050	207	1,150
5-----	173	6	3	1,260	70	238	2,210	239	1,430
6-----	184			1,260	64	218	2,180	220	1,290
7-----	216			1,290	90	313	2,110	127	724
8-----	265	6	4	1,290	139	484	2,100	160	907
9-----	275			1,330	139	499	2,050	105	581
10-----	295	5	4	1,380	90	335	2,020	98	534
11-----	290			1,430	95	367	2,020	55	300
12-----	256	11	8	2,300	541	s 3,420	2,000	45	243
13-----	224			2,560	517	3,570	2,210	64	s 403
14-----	192	7	3	2,740	475	3,510	2,830	238	1,820
15-----	180			3,300	870	7,750	2,870	170	1,320
16-----	180	10	6	3,690	1,060	10,600	2,850	140	1,080
17-----	192			4,860	2,100	27,600	2,900	210	1,640
18-----	208			4,580	1,050	13,000	3,570	1,200	11,800
19-----	208			4,280	660	7,630	4,120	720	8,010
20-----	236			3,660	508	5,020	4,160	500	5,620
21-----	446	25	30	3,240	615	5,380	4,280	450	5,200
22-----	458	34	42	3,000	275	2,290	4,200	420	4,760
23-----	385	18	18	3,030	295	2,410	4,360	880	10,400
24-----	350			2,470	234	1,560	4,020	980	10,600
25-----	345			2,190	161	952	3,640	420	4,130
26-----	380			2,000	196	1,060	3,530	370	3,530
27-----	616	520	s 944	1,840	127	631	2,280	188	s 1,220
28-----	1,150	435	1,350	1,720	83	385	1,330	95	341
29-----	1,320	342	1,220	1,610	69	300	970	60	157
30-----	1,460	301	1,190	1,480	82	328	855	28	65
31-----	--	--	--	1,440	67	260	--	--	--
Total--	11,190	--	4,939	71,050	--	102,881	78,385	--	80,437

s Computed by subdividing day.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Particle-size analyses of suspended sediment, May to August 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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 12, 1951.	11:15 a.m.	2,350	59	557	1,530	35	42	51	61	72	88	92	97	99	100	BWCM
May 12.	11:15 a.m.	2,350	59	557	1,490	11	14	25	38	60	86	91	95	97	100	BN
June 14.	12:20 p.m.	2,830	67	258	640	36	41	47	57	69	76	81	86	89	100	BWCM
Aug. 13.	12:20 p.m.	4,910	71	392	2,360	16	19	22	29	34	47	64	74	80	100	BWCM

PLATTE RIVER BASIN--Continued
GUERNSEY RESERVOIR, WYO.

LOCATION.--At dam on North Platte River, 14 miles northwest of Guernsey, Platte, County.

DRAINAGE AREA.--16 200 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

REMARKS.--Records of reservoir storage for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Reser- voir storage (acre- feet)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Car- bonate (CO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Per- cent so- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25° C)	pH
														Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium	Non- car- bonate			
Oct. 6, 1950.....	14,520	12	0.04	72	22	58	5.4	186	0	204	17	0.4	1.2	0.20	494	0.67	269	116	31	721	7.9
Nov. 9.....	30,180	14	.04	114	42	113	6.7	269	0	408	32	.1	2.3	.30	928	1.26	456	235	35	1,290	8.1
Dec. 7.....	36,070	11	.04	97	27	91	6.3	230	0	333	24	.4	1.2	.00	724	.98	354	185	35	1,030	8.1
Jan. 3, 1951.....	36,300	11	.04	101	35	107	7.4	247	0	365	28	.4	1.6	.21	804	1.09	394	191	37	1,170	8.1
Feb. 6.....	34,620	12	.02	108	34	106	6.2	256	0	383	28	.5	1.6	.30	822	1.12	408	198	36	1,160	8.0
Mar. 7.....	37,520	12	.04	100	33	100	5.7	244	0	350	27	.3	1.6	--	778	1.06	385	185	36	1,110	7.9
Apr. 4.....	41,680	12	.04	100	34	100	5.3	240	0	363	28	.2	2.1	--	792	1.08	388	191	36	1,110	7.9
Apr. 30.....	7,750	9.9	.02	60	30	68	4.5	158	0	242	24	.4	4.4	--	552	.75	273	143	35	797	7.5
June 6.....	28,210	11	.04	53	12	35	2.4	143	0	129	9.5	.3	.9	--	332	.45	183	68	29	508	7.9
July 3.....	30,670	8.5	.02	53	16	38	3.6	148	5	135	11	.4	1.2	--	356	.48	197	67	29	540	8.4
Aug. 8.....	24,810	7.9	.05	52	17	35	3.6	154	0	132	11	.3	1.4	--	360	.49	198	72	27	530	8.2
Sept. 12.....	8,530	8.0	.04	58	19	42	3.8	166	0	160	12	.4	1.4	--	406	.55	222	86	29	604	8.0

PLATTE RIVER BASIN--Continued

GUERNSEY RESERVOIR, WYO.--Continued

Nitrogen, phosphorus, and related physical measurements, water year October 1950 to September 1951
(Analytical results in parts per million except as indicated)

Date of collection	Reser- voir storage (acre- feet)	Tem- pera- ture (° F)	Turbi- dity (as SiO ₂)	Nitrogen (N)					Soluble phos- phorus (P)	Total phos- phorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Oct. 6, 1950	14,520	52	15	0.06	0.003	0.3	0.30	0.7	0.007	0.04
Nov. 9	30,180	45	3	.01	.005	.5	.27	.8	.003	.03
Dec. 7	36,070	32	3	.10	.006	.3	.21	.6	.02	.05
Jan. 3, 1951	36,300	35	2	.10	.002	.4	.35	.9	.005	.05
Feb. 6	34,620	35	2	.09	.009	.4	.36	.9	.001	.03
Mar. 7	37,520	--	3	.10	.02	.4	.36	.9	.01	.04
Apr. 4	41,680	42	2	.06	.009	.5	.15	.7	.009	.03
Apr. 30	7,750	--	40	.94	.02	1.2	.26	2.4	.01	.07
June 6	28,210	60	5	.02	.003	.3	.32	.6	.006	.06
July 3	30,670	--	8	.01	.01	.6	.30	.9	.008	.04
Aug. 8	24,810	--	15	.07	.002	.2	.23	.5	.009	.06
Sept. 12	3,530	--	25	.07	.01	.2	.27	.6	.007	.06

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.

LOCATION.--Three hundred feet downstream from gaging station, 1.1 miles downstream from Guernsey Dam and 1 mile northwest of Guernsey, Platte County.

DRAINAGE AREA.--16,200 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.

Sediment records: April 1947 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, less than 0.50 ton on many days during October and November.

Sediment loads: Maximum daily, not determined; minimum daily, 1,370 ppm July 16, 1947; minimum daily, not determined.

EXTREMES, 1947-51.--Sediment concentrations: Maximum daily, 1,370 ppm July 16, 1947; minimum daily, less than 0.50 ton on some days during fall and winter months some years.

EXTREMES, 1947-51.--Sediment loads: Maximum daily, 16,800 tons July 16, 1947; minimum daily, not determined.

REMARKS.--Daily samples for chemical analysis composed of specific conductance of daily samples available in regional office at Lincoln, Neb. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, December 1950 to September 1951.

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg-nestun	Non-carbonate					
Dec. 7-11, 1950...	174	13	0.24	93	33	100	5.6	232	330	24	--	3.0	0.13	744	1.01	350	366	176	37		1,040	7.5	5
Jan. 1-16, 1951...	205	12	.01	102	37	103	5.5	251	370	33	0.2	3.3	.20	816	1.11	452	406	200	35		1,140	7.9	4
Jan. 22-24, 1951...	141	15	.06	96	39	114	5.8	272	398	28	.5	3.2	.14	840	1.14	320	408	183	37		1,190	8.1	6
Feb. 1-28, 1951...	173	15	.01	109	38	108	5.5	262	390	31	.2	3.2	.19	868	1.18	405	428	213	35		1,190	8.0	4
Mar. 6-9, 1951...	63.3	15	.14	71	57	103	5.8	252	375	27	.4	2.8	.13	778	1.06	133	412	205	35		1,140	8.0	5
Mar. 25-31, 1951...	16.0	13	.06	99	33	98	5.2	243	338	30	.4	3.0	.15	782	1.06	34	383	184	35		1,090	7.9	3
Apr. 2-5, 1951...	726	13	.04	100	34	102	5.3	242	353	30	.3	2.8	.14	796	1.08	1,560	391	193	36		1,120	7.8	3
Apr. 23, 1951...	1,050	13	.08	67	45	101	5.5	206	340	28	.4	2.0	.12	740	1.01	2,100	352	183	38		1,030	7.9	6
Apr. 26-27, 1951...	934	13	.04	81	29	91	4.5	194	300	26	.4	1.5	.15	680	.92	1,710	320	161	38		966	7.8	5
Apr. 30, 1951...	958	12	.18	64	33	80	5.0	186	270	23	--	5.2	.11	616	.84	1,590	296	143	37		872	7.8	8
May 3-14, 1951...	1,638	13	.20	54	16	40	3.6	149	145	10	.4	2.4	.04	374	.51	1,650	202	80	30		570	7.8	13
June 4-22, 1951...	2,768	13	.04	54	17	39	3.2	161	137	10	.2	1.0	.12	368	.50	2,750	204	72	29		559	7.5	3
July 6-10, 1951...	4,150	10	.02	56	18	42	3.5	167	152	11	.2	1.2	.11	368	.53	4,350	214	77	30		583	7.8	5
Aug. 10-31, 1951...	4,653	12	.02	51	18	36	3.2	156	131	10	.2	1.8	.11	352	.48	4,420	199	71	28		538	7.8	3
Sept. 1-11, 1951...	3,213	9.8	.02	53	16	37	3.3	158	134	11	.2	1.3	.09	344	.47	2,980	199	69	28		545	7.7	4
Sept. 12-27, 1951...	2,374	14	.04	57	18	42	3.5	169	151	12	.4	1.8	.10	394	.54	2,530	216	77	29		597	7.7	7
Sept. 28-30, 1951...	1,011	11	.02	64	21	49	3.8	185	171	14	.2	1.9	.08	430	.58	1,170	244	92	30		665	7.9	3

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,110			16	--		106		
2-----	1,100			63	--		105		
3-----	1,080	7	21	116	--		94		
4-----	1,080			47	--		113		
5-----	1,060			74	--		167		e 2
6-----	718	10	19	118	--	e 2	141		
7-----	378	--	e 6	119	--		140	5	
8-----	16	--		41	--		140		
9-----	16	--		100	9		200		
10-----	16	--		118	--		198		
11-----	16	--		244	--		191		
12-----	16	--		146	--		158		
13-----	16	--		41	--		154		
14-----	16	--		24	--		193		
15-----	16	--		28	--		193		
16-----	16	--		73	--		146		e 4
17-----	16	--		72	--		188		
18-----	16	--		69	--		194		
19-----	16	--		66	--		188		
20-----	16	--	(t)	71	--		191		
21-----	16	--		69	1	(t)	192		
22-----	16	--		69	--		210		
23-----	16	--		70	--		195		
24-----	16	4		125	--		193		
25-----	16	--		116	--		192		
26-----	16	--		112	--		204		e 7
27-----	16	--		44	--		204		
28-----	16	--		108	--		204		
29-----	16	--		110	--		204		
30-----	16	--		108	--		205		
31-----	16	--		--	--		208		
Total-	6,910	--	134	2,579	--	28	5,411	--	126
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	203			188			179		
2-----	206			189			180		
3-----	203	12		190			179	--	e 3
4-----	204			187			179		
5-----	204			187			77	--	
6-----	204			189	7		63	--	
7-----	205			190			63	8	
8-----	204			189			63	--	
9-----	205	e 7		166			64	--	e 1
10-----	204			154			69	--	
11-----	205			145			64	--	
12-----	205			166			63	--	
13-----	204			165			51	--	
14-----	208			167			42		
15-----	205			168	e 3		42		
16-----	206			165			43	--	e 1
17-----	121			165			42		
18-----	96	e 2		164			42		
19-----	99			171			16	--	
20-----	120			165			16	--	
21-----	143			165			16	--	
22-----	141			165			16	--	
23-----	141			164			16	16	
24-----	141			166			24	--	
25-----	166			166			16	--	e 1
26-----	165	e 3		179			16	--	
27-----	193			178			16	--	
28-----	190			178			16	--	
29-----	181			--		--	16	--	
30-----	185			--		--	16	--	
31-----	190			--		--	16	--	
Total-	5,547	--	153	4,831	--	84	1,721	--	39

e Estimated.

t Less than 0.50 ton.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	116	13	16	982	--	e 30	2,520	--	e 46
2-----	558			1,040	11		2,010	--	
3-----	666			1,070	--		2,040	--	
4-----	802			1,120	--		2,040	9	
5-----	878	14	e 34	1,130	--	e 55	2,020	8	e 40
6-----	894	--		1,130	--		1,990	6	
7-----	902	--		1,010	--		2,140	--	
8-----	902	--		1,020	--		2,590	6	
9-----	902	--	e 34	1,240	--	e 100	2,660	--	73
10-----	902	--		1,640	24		2,600	--	
11-----	910	--		1,760	--		2,600	7	
12-----	910	--		2,830	32	e 280	2,380	11	e 160
13-----	902	--	e 55	2,830	--		2,210		
14-----	934	--		2,880	45		2,360		
15-----	1,010	--		3,040	--		2,880		
16-----	1,020	--	e 55	2,830	--	e 90	3,590	--	e 46
17-----	1,040	--		2,620	--		3,570	--	
18-----	1,100	--		2,550	--		3,830	14	
19-----	1,100	22		2,050	--		3,570	--	
20-----	1,090	--	e 65	1,800	22	e 95	3,180	19	e 46
21-----	1,080	--		1,790	--		3,280	--	
22-----	1,070	--		1,820	--		3,100	20	
23-----	1,050	19		1,860	--		2,710	--	
24-----	1,040	--	e 65	1,870	12	e 95	2,390	--	e 46
25-----	1,010	--		1,970	--		2,110	--	
26-----	934	26		2,010	--		1,850	9	
27-----	934	26		2,020	--		1,860	--	
28-----	918	--	e 65	2,060	--	e 95	1,820	--	e 46
29-----	934	--		2,640	--		1,780	--	
30-----	958	26		3,000	--		1,700	--	
31-----	--	--	--	3,050	--		--	--	--
Total-	27,466	--	1,352	60,662	--	3,810	75,380	--	2,364
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,770	--	e 32	4,500	--	e 220	4,410	48	e 550
2-----	1,840	--		4,480	--		4,260	--	
3-----	1,900	6		4,340	--		3,710	--	
4-----	1,940	--		4,370	--		3,330	--	
5-----	2,360	--	e 70	4,340	--	e 220	3,120	--	165
6-----	3,550	7		4,340	--		2,910	--	
7-----	3,910	--		4,350	10		2,830	--	
8-----	4,050	--		4,410	--		2,700	--	
9-----	4,410	19	e 240	4,450	--	480	2,700	22	523
10-----	4,830	19		4,600	27		2,720		
11-----	4,850	--		4,710	--		2,650		
12-----	4,710	--		4,680	--		2,580		
13-----	4,540	--	e 200	4,680	38	397	2,550	75	228
14-----	4,580	--		4,620	--		2,480		
15-----	4,470	--		4,690	--		2,500		
16-----	4,470	--		4,660	--		2,530		
17-----	4,390	--	e 200	4,730	--	e 260	2,520	36	169
18-----	4,390	17		4,770	31		2,620		
19-----	4,600	--		4,790	--		2,660		
20-----	4,830	--		4,770	--		2,590		
21-----	4,810	--	e 220	4,710	9	100	2,640	98	83
22-----	4,770	--		4,660	--		2,550		
23-----	4,770	--		4,640	--		2,450		
24-----	4,790	--		4,640	8		2,350		
25-----	4,810	--	e 220	4,620	70	555	2,040	101	297
26-----	4,900	--		4,600	--		1,650		
27-----	4,900	--		4,580	--		1,280		
28-----	4,260	--		4,580	--		1,350		
29-----	3,960	--	e 220	4,580	45	555	1,090	98	157
30-----	3,910	18		4,580	--		594		
31-----	4,230	--		4,480	--		--		
Total-	126,500	--	5,560	141,950	--	11,668	76,364	--	8,948
Total discharge for year (cfs-days)									535,321
Total load for year (tons)									34,266

e Estimated.

PLATTE RIVER BASIN--Continued
NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Particle-size analyses of suspended sediment, July 1949 to August 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350		0.500	1.000
July 12, 1949.....	8:20 p. m.	4,750	70	24	72			88	92	97	99	100				BW
Aug. 13, 1951.....	7:00 a. m.	4,690	70	34	376	74	84	90	93	96	98	99	100			BWCM

PLATTE RIVER BASIN--Continued
NORTH PLATTE RIVER AT OSHKOSH, NEBR.

LOCATION.--At gaging station at bridge on State Highway 27, 1 mile south of Oshkosh, Garden County.
DRAINAGE AREA.--27,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1951.
REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Nov. 2, 1950	1,740	40	0.02	71	20	87	307	0	155	21	0.4	4.5	578	0.79	578	0.79	259	7	42	829	7.9	0.001
Dec. 27	1,590	37	.04	81	19	91	314	0	178	20	.6	6.4	600	.82	600	.82	280	23	41	862	7.7	.000
Jan. 4, 1951	1,560	38	.04	77	17	85	292	0	167	20	.4	6.0	568	.77	568	.77	263	24	41	788	8.1	.000
Feb. 2	997	42	.04	95	17	96	340	0	192	22	.6	5.8	654	.89	654	.89	308	27	41	953	8.0	.000
Mar. 6	1,360	33	.04	75	19	89	293	0	179	20	.5	6.8	578	.79	578	.79	267	27	42	846	8.1	.000
Apr. 8	1,310	34	.02	72	16	31	266	9	148	20	.5	7.1	560	.75	560	.75	245	12	42	763	8.4	.000
May 3	1,575	38	.02	69	19	86	277	6	160	20	.5	6.4	556	.76	556	.76	231	14	43	816	8.3	.000
June 3	1,420	38	.02	67	19	72	289	0	153	19	.3	5.5	508	.69	508	.69	226	16	43	771	8.1	.000
July 8	1,100	36	.02	64	16	76	269	0	142	18	.3	4.9	508	.69	508	.69	226	12	43	733	8.1	.000
Aug. 7	1,120	36	.02	64	16	81	245	10	152	18	.6	6.9	520	.71	520	.71	232	15	43	753	8.2	.000
Sept. 11	2,560	36	.01	72	16	87	291	0	158	19	.4	5.2	552	.75	552	.75	246	7	43	805	8.0	.000

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT LITTLETON, COLO.

LOCATION.--At gaging station at Hazard Street Bridge at Littleton, Arapahoe County, 3.1 miles upstream from Bear Creek.
 DRAINAGE AREA.--3,090 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: October 1950 to August 1951.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, October 1950 to August 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 13, 1950 ...	21	15	0.04	67	14	46	5.2	198	101	45	1.0	1.1	0.20	382	0.53		225	63	30		619	8.0
Dec. 5	38	12	.04	59	13	40	3.0	176	83	43	1.0	1.6	.30	356	.48		201	57	30		576	7.8
Dec. 26	58	11	.02	53	14	42	3.2	160	83	46	.8	2.0	.06	338	.46		190	59	32		576	8.0
Feb. 7, 1951	72	11	.04	51	14	38	2.9	154	81	46	.9	2.5	.07	328	.45		184	58	31		551	7.6
Mar. 26	20	13	.04	60	16	41	2.0	184	93	37	1.0	3.3	--	366	.50		217	66	29		587	7.9
Apr. 30	91	14	.06	40	4.9	21	1.4	104	44	21	1.0	1.8	--	212	.29		120	35	27		333	7.9
May 22	450	11	.05	28	7.1	21	1.6	82	41	27	.8	1.8	--	194	.25		99	32	31		309	7.7
July 3	100	11	.02	34	8.5	24	2.0	106	51	23	.7	1.4	--	224	.30		120	33	30		361	8.1
July 31	359	9.2	.03	34	12	31	2.5	108	60	42	.6	1.6	--	260	.35		135	46	33		429	8.1
Aug. 20	148	9.6	.02	40	16	39	2.2	135	71	52	.7	1.1	--	302	.41		165	54	34		512	8.2

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT LITTLETON, COLO.--Continued

Nitrogen, phosphorus, and related physical measurements, October 1950 to August 1951
(Analytical results in parts per million except as indicated)

Date of collection	Instantaneous discharge (cfs)	Temperature (°F)	Turbidity (as SiO ₂)	Nitrogen (N)					Soluble phosphorus (P)	Total phosphorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Oct. 13, 1950.....	21	68	2	0.09	0.006	0.3	0.45	0.8	0.01	0.02
Dec. 5.....	38	35	20	.04	.003	.4	.24	.7	.02	.06
Dec. 26.....	58	42	8	.08	.000	.5	.25	.8	.001	.01
Feb. 7, 1951.....	72	34	15	.05	.005	.6	.16	.8	.02	.03
Mar. 26.....	20	44	3	.01	.01	.8	.30	1.1	.004	.07
Apr. 30.....	91	49	45	.00	.002	.4	.20	.6	.04	.09
May 22.....	450	--	120	.00	.008	1.0	.50	1.5	.02	.12
July 3.....	100	--	15	.00	.01	1.0	.25	1.3	.01	.05
July 31.....	359	74	150	.01	.003	1.7	.47	2.2	.03	.20
Aug. 20.....	148	61	10	.01	.009	.3	.18	.5	.006	.08

PLATTE RIVER BASIN--Continued
SOUTH PLATTE RIVER AT FORT LUPTON, COLO.

LOCATION.--at gaging station at bridge on State Highway 52 at Fort Lupton, Weld County.
DRAINAGE AREA.--5,070 square miles, approximately
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
REMARKS.--Records of discharge for water year October 1950 to September 1951.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (Residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Oct. 2, 1950	69	17	0.05	95	22	118	283	0	230	75	1.0	4.0	0.30	717	0.98	328	96	44	45	1,090	8.0
Nov. 1	104	16	0.05	95	29	131	297	10	227	94	1.1	1.2	0.30	782	1.06	356	96	45	45	1,190	8.3
Dec. 5	97	20	--	130	29	135	420	0	283	71	--	--	3	--	--	464	120	40	40	1,330	7.6
Dec. 26	95	19	0.05	140	27	124	418	0	278	68	8	2.4	25	882	1.20	462	119	37	37	1,300	7.6
Jan. 15, 1951	266	14	0.08	91	19	97	258	0	183	73	9	8.8	23	652	89	304	92	41	41	1,000	7.1
Mar. 6	72	15	0.10	112	28	170	306	0	355	94	9	13	10	950	1.29	396	145	48	48	1,310	8.1
Apr. 2	69	12	0.04	104	27	124	290	0	280	70	1.0	1.3	32	790	1.07	372	134	42	42	1,150	7.7
May 1	21	--	--	--	--	116	276	0	255	74	--	--	--	--	--	356	130	42	42	1,140	8.2
June 4	522	--	--	--	--	40	98	0	91	28	--	--	--	--	--	133	53	41	41	463	8.0
July 12	875	--	--	--	--	48	123	0	91	35	--	--	--	--	--	146	45	45	45	519	8.0
Aug. 3	3,650	--	--	--	--	34	141	0	79	26	--	--	--	--	--	158	42	32	32	472	7.2
Sept. 14	a 76	--	--	--	--	111	238	0	188	85	--	--	--	--	--	284	89	47	47	1,043	7.0

a Mean daily discharge.

PLATTE RIVER BASIN--Continued
SOUTH PLATTE RIVER AT EVANS, COLO.

LOCATION.--At bridge on U. S. Highway 85, approximately three-quarters of a mile south of Evans, Weld County.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
REMARKS.--No gaging station in the immediate vicinity of sampling station.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Car-bonate (CO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids			Hardness as CaCO ₃		Per-cent so-ladepor-tion	Specific conduct-ance (micro-mhos at 25°C)	pH	
															Parts permillion	Resi-due at (180°C)	Sum	Tons per acre-foot	Calcium				Non-mag-nesium
Oct. 13, 1950.....		16	0.04	153	81	154	9.2	320	0	715	44	1.2	7.2	0.30	1,420	1,340	1.93	715	453	32	1,740	7.8	
Dec. 5.....		16	.16	147	55	141	20	430	0	498	55	1.0	.6	.27	1,170	1,150	1.59	594	241	33	1,640	7.4	
Dec. 26.....		13	.02	143	66	149	20	414	0	530	54	.8	1.6	.17	1,220	1,180	1.66	628	289	33	1,710	7.4	
Jan. 15, 1951.....		13	.06	114	48	131	7.0	326	0	388	65	.8	5.8	.15	.990	--	1.35	482	215	37	1,429	7.8	
Mar. 6.....		12	.04	124	68	146	5.5	327	0	550	53	1.0	11	--	1,180	1,130	1.60	590	322	35	1,583	8.0	
Apr. 2.....		7.9	.04	134	76	154	4.4	313	0	653	44	1.2	6.3	--	1,350	1,230	1.84	648	391	34	1,680	7.9	
May 1.....		9.3	.02	90	50	95	2.7	214	0	395	27	.8	6.3	--	838	--	1.14	429	254	32	1,140	7.8	
June 4.....		11	.02	68	29	66	2.4	156	0	246	25	.7	9.0	--	570	--	.78	290	162	33	831	7.8	
July 12.....		14	.03	107	61	124	4.6	220	10	510	34	1.1	8.8	--	1,020	983	1.39	517	320	34	1,360	8.5	
Aug. 3.....		10	.04	75	37	77	7.2	170	0	313	29	.6	8.2	--	686	--	.93	340	201	32	955	7.9	
Sept. 14.....		16	.02	143	78	156	5.6	306	0	658	41	1.2	8.5	--	1,370	1,260	1.86	678	427	33	1,720	7.8	

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT EVANS, COLO.--Continued

Nitrogen, phosphorus, and related physical measurements, water year October 1950 to September 1951
(Analytical results in parts per million except as indicated)

Date of collection	Mean dis-charge (cfs)	Tem-pera-ture (°F)	Turbi-dity (as SiO ₂)	Nitrogen (N)					Soluble phos-phorus (P)	Total phos-phorus (P)
				Ammonia	Nitrite	Nitrate	Organic	Total		
Oct. 13, 1950.....		58	1	0.29	0.03	1.6	0.22	2.1	0.05	0.07
Dec. 5.....		34	50	1.2	.000	.1	.72	2.0	.17	.82
Dec. 26.....		37	40	1.5	.02	.4	3.9	5.8	.02	.38
Jan. 15, 1951.....		36	50	3.1	.13	1.3	.72	5.3	.09	.62
Mar. 6.....		39	15	.17	.08	2.4	.40	3.1	.07	.20
Apr. 2.....		--	10	.00	.05	1.4	.52	2.0	.03	.09
May 1.....		52	40	.05	.04	2.1	.47	2.7	.04	.17
June 4.....		--	100	.04	.05	2.4	1.0	3.5	.07	.44
July 12.....		--	30	.07	.04	1.9	.61	2.8	.02	.10
Aug. 3.....		--	750	.16	.06	1.5	1.3	3.0	.06	1.1
Sept. 14.....		--	3	.04	.07	1.9	.37	2.4	.05	.25

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER NEAR KERSEY, COLO.

LOCATION.--At gaging station at bridge on State Highway 37, 1.9 miles north of railroad in Kersey, Weld County, and 2½ miles downstream from Cache la Poudre River.

DRAINAGE AREA.--9,500 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1951.

Water temperatures: December 1950 to September 1951.

EXTREMES, December 1950 to September 1951.--Dissolved solids: Maximum, 1,330 ppm Feb. 27 to Mar. 31; minimum, 418 ppm June 19-25.

Hardness: Maximum, 682 ppm May 8-17; minimum, 216 ppm June 19-25.

Specific conductance: Maximum daily, 1,790 microhms Sept. 14, 18; minimum daily, 521 microhms June 22.

Water temperatures: Maximum, 72°F Aug. 1, 2, 6; minimum, freezing point Jan. 29.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Car-bonate (CO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids			Hardness as CaCO ₃		Per-cent so-dium	Specific conductance (micro-mhos at 25°C)				
															Parts per million	Resi-due at (180°C)	Sum	Tons per acre-foot	Tons per day			Calcium	Non-carbonate		
Oct. 2, 1950 ^a	157	17	0.08	120	92	156	6.8	246	0	723	40	0.5	8.5	0.56	1,410	1,260	1.92	598	676	476	33	1,750	7.7		
Nov. 1 ^a	174	19	0.08	203	71	153	12	398	0	770	40	0.5	6.3	0.36	1,560	1,470	2.12	733	800	474	29	1,320	7.8		
Dec. 6 ^a	409	17	0.1	144	63	140	14	356	0	548	50	9	8.8	0.31	1,230	1,160	1.67	1,360	820	328	32	1,820	8.1		
Dec. 26-Jan. 28, 1951	442	16	0.08	139	62	136	9.2	342	0	515	58	5	4.1	0.28	1,180	1,110	1.60	1,410	802	322	32	1,590	7.8		
Jan. 29-Feb. 5	391	16	0.08	147	65	142	6.7	342	0	558	61	5	15	0.26	1,280	1,180	1.74	1,350	636	356	32	1,660	8.1		
Feb. 6-26	591	14	0.08	139	53	133	5.9	314	0	503	56	5	10	0.28	1,130	1,070	1.54	1,800	563	306	34	1,520	7.2		
Feb. 27-Mar. 31	327	15	0.05	146	77	144	5.2	328	0	615	48	1.0	9.9	0.28	1,330	1,220	1.81	1,170	680	411	31	1,680	8.0		
Apr. 1-30	305	13	0.02	236	13	137	4.5	272	8	620	37	9	8.0	0.27	1,280	1,210	1.74	1,050	644	408	31	1,560	8.3		
May 1-7	245	--	--	125	57	117	4.7	--	--	503	32	--	3.2	--	--	--	--	--	--	548	--	31	--	--	
May 8-17	84.4	--	--	159	69	140	5.9	--	--	640	39	--	8.6	--	--	--	--	--	--	682	--	31	--	--	
May 18-June 1	478	15	0.04	90	44	83	5.1	203	0	378	24	8	7.3	0.16	796	--	--	--	1,030	406	240	30	1,070	8.2	
June 2-5	890	12	0.02	73	31	60	3.3	166	0	269	21	6	7.0	0.13	586	--	--	--	1,80	410	308	172	29	834	7.6
June 6-10	421	14	0.02	96	49	93	4.1	217	0	418	29	8	8.7	0.17	874	--	--	--	1,19	993	442	264	31	1,170	7.6
June 11-18	1,143	12	0.02	83	42	79	3.9	193	0	358	26	8	8.0	0.13	750	--	--	--	1,02	2,310	381	223	31	1,030	7.6
June 19-25	1,846	9.4	0.02	51	22	40	2.4	123	0	184	12	5	4.8	0.14	418	--	--	--	57	2,060	216	115	28	597	7.4
June 26-July 4	507	13	0.03	81	41	74	3.4	183	0	340	21	7	6.8	0.12	728	--	--	--	99	997	369	219	30	986	7.6
July 5-Aug. 3	354	18	0.04	113	55	106	5.7	245	0	483	32	1.2	6.9	0.20	992	--	--	--	1,35	948	507	305	31	1,340	7.7
Aug. 4-7	6,093	13	0.08	71	30	59	7.1	159	0	265	19	7	8.7	0.14	576	--	--	--	1,76	9,480	300	170	29	829	7.7
Aug. 8-11	1,578	15	0.06	97	47	87	4.6	209	0	408	24	8	7.6	0.18	852	--	--	--	1,16	3,630	437	266	30	1,150	7.8
Aug. 12-31	321	--	--	141	69	132	6.4	--	--	618	--	--	4	--	--	--	--	--	--	637	--	31	--	--	--
Sept. 1-30	306	--	--	141	74	142	5.7	--	--	648	43	--	3.8	--	--	--	--	--	--	656	--	32	--	--	--
Weighted average ^b	536	14	0.05	114	47	101	5.6	c 241	--	437	34	0.7	7.1	0.20	917	--	--	--	1,25	1,330	718	280	31	1,250	--

^a Not included in weighted average.

^b For period of daily sampling only.

^c Includes carbonate as bicarbonate.

Includes estimates where data are missing. Represents 84 percent of runoff for water year October 1950 to September 1951.

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER NEAR KERSEY, COLO.--Continued

Temperature (°F) of water, December 1950 to September 1951
 /Once-daily temperature measurement between 8 a. m. and 10 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	36	--	39	46	49	55	60	72	62
2			--	34	33	41	44	49	48	a 62	72	64
3			--	34	34	35	46	51	52	a 63	69	64
4			--	34	33	38	48	54	50	64	70	63
5			--	36	33	38	48	55	56	65	71	63
6			--	35	34	39	45	50	59	65	72	64
7			--	33	33	39	46	48	59	68	69	64
8			--	33	35	38	45	52	59	a 63	67	63
9			--	34	37	38	45	55	58	61	65	58
10			--	33	41	39	42	54	58	59	66	58
11			--	33	41	37	41	53	56	57	65	57
12			--	33	44	36	39	55	57	57	65	53
13			--	33	35	39	42	51	60	60	65	54
14			--	33	33	42	48	54	60	63	65	55
15			--	34	33	44	45	54	60	64	62	55
16			--	35	33	46	45	55	64	65	61	53
17			--	35	36	39	49	57	64	63	62	55
18			--	37	37	38	51	56	65	63	60	55
19			--	37	40	38	54	58	64	63	60	56
20			--	33	38	41	48	59	64	64	61	55
21			--	33	40	41	43	57	60	63	59	50
22			--	36	42	45	45	56	61	a 62	59	49
23			--	35	40	40	51	59	61	65	62	55
24			--	36	40	42	51	61	62	67	64	a 53
25			--	35	41	43	47	60	64	68	61	54
26			41	36	41	45	48	58	63	68	61	54
27			39	36	40	46	50	59	64	67	62	52
28			38	33	39	40	54	61	62	67	62	51
29			39	32	--	40	56	61	a 61	67	61	55
30			35	33	--	43	56	62	a 57	67	63	55
31			35	33	--	44	--	60	--	68	64	--
Average			--	34	37	40	47	56	59	64	64	57

a Observations made between 6 a. m. and 7 a. m.

PLATTE RIVER BASIN--Continued

BIJOU CREEK NEAR WIGGINS, COLO.--Continued

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	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	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	22	36,000	sa 7,200
12-----				0		0	2.0	80,000	a 440
13-----				0		0	0	--	0
14-----				0		0	0	--	0
15-----				0		0	0	--	0
16-----				0		0	0	--	0
17-----				0		0	0	--	0
18-----				0		0	0	--	0
19-----				0		0	0	--	0
20-----				0		0	0	--	0
21-----				0		0	0	--	0
22-----				0		0	8.8	--	e 1,000
23-----				0		0	40	--	e 8,200
24-----				1.8		e 250	.9	--	e 50
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-	0		0	1.8		250	73.7	--	16,890
July				August			September		
1-----	0		0	33	--	e 1,600	0	--	--
2-----	0		0	3.6	--	e 140	128	--	e 30,000
3-----	0		0	8,410	61,800	sb 2,500,000	150	--	e 19,000
4-----	4.6		e 550	1,260	41,200	s 159,000	48	--	e 12,000
5-----	0		0	186	24,000	12,000	58	--	e 11,000
6-----	0		0	212	--	e 72,000	3.0	--	e 340
7-----	0		0	839	68,300	s 218,000	0	--	0
8-----	0		0	46	40,000	5,150	0	--	0
9-----	0		0	482	--	e 120,000	0	--	0
10-----	0		0	88	45,000	11,100	0	--	0
11-----	0		0	17	--	e 1,400	0	--	0
12-----	0		0	.3	--	e 13	0	--	0
13-----	0		0	0	--	0	0	--	0
14-----	0		0	0	--	0	0	--	0
15-----	0		0	0	--	0	0	--	0
16-----	0		0	0	--	0	0	--	0
17-----	0		0	0	--	0	0	--	0
18-----	0		0	0	--	0	0	--	0
19-----	0		0	0	--	0	0	--	0
20-----	0		0	0	--	0	0	--	0
21-----	0		0	0	--	0	0	--	0
22-----	0		0	0	--	0	0	--	0
23-----	0		0	0	--	0	0	--	0
24-----	0		0	0	--	0	0	--	0
25-----	0		0	0	--	0	0	--	0
26-----	0		0	0	--	0	0	--	0
27-----	0		0	0	--	0	0	--	0
28-----	0		0	0	--	0	0	--	0
29-----	0		0	0	--	0	0	--	0
30-----	0		0	0	--	0	0	--	0
31-----	92		e 12,000	0	--	0	--	--	--
Total-	96.6		12,550	11,576.9	--	3,100,403	387.0		72,340

Total discharge for year (cfs-days) 12,136.0
 Total load for year (tons) 3,202,433

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from concentration graph partly based on surface samples.

PLATTE RIVER BASIN--Continued
BLJOU CREEK NEAR WIGGINS, COLO.--Continued

Particle-size analyses of suspended sediment, June to August 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- centage discharge (°F)	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		0.350	0.500	1.000
June 11, 1951.....	10:30 a. m.	40	--	105,000	6,540	--	90	--	99	--	100	--	--	--	--	SPWCM
June 22.....	2:00 p. m.	2.0	71	7,280	4,960	--	93	--	99	--	100	--	--	--	--	SPWCM
July 31.....	5:30 p. m.	308	--	17,400	6,630	63	75	82	86	88	90	94	98	--	--	SPWCM
July 31.....	5:30 p. m.	308	--	17,400	6,790	8	23	78	83	87	91	94	98	--	--	SPN
Aug. 3.....	11:20 a. m.	84	--	59,400	5,740	--	83	--	96	--	98	99	100	--	--	SPWCM
Aug. 3.....	12:25 p. m.	49,800	--	135,000	9,310	--	42	--	54	--	87	77	92	--	99	SPWCM
Aug. 3.....	1:00 p. m.	44,200	--	120,000	8,580	--	43	--	55	--	87	75	92	--	99	SPWCM
Aug. 3.....	4:10 p. m.	19,500	--	95,700	8,140	--	45	--	59	--	70	75	86	--	97	SPWCM
Aug. 4.....	12:10 a. m.	2,860	--	55,600	8,270	48	56	63	70	73	88	94	98	--	99	SPWCM
Aug. 4.....	12:10 a. m.	2,660	--	55,600	10,300	--	1	4	72	77	87	94	98	--	100	SPN
Aug. 7.....	12:10 a. m.	4,440	--	117,000	11,800	41	46	53	58	72	84	92	98	--	100	SPWCM
Aug. 7.....	12:10 a. m.	4,440	65	117,000	13,100	1	2	4	55	63	76	85	95	--	100	SPN
Aug. 7.....	8:00 a. m.	613	65	70,600	8,930	--	64	--	82	--	94	97	99	--	100	SPWCM
Aug. 7.....	8:00 a. m.	618	65	70,600	8,670	--	6	--	84	--	94	97	99	--	100	SPN

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT BALZAC, COLO.

LOCATION.--At gaging station at highway bridge at Balzac siding and 2½ miles (revised) northeast of Union, Morgan County.

DRAINAGE AREA.--17,700 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1951.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

PLATTE RIVER BASIN

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Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color
														Parts per million	Tons per acre foot	Calcium, magnesium	Non-carbonate				
Oct. 2, 1950.....	44	18	0.25	196	32	173		262	675	53	0.7	3.0	0.33	1,360	1,280	620	499	38	1,710	8.0	
Novr.	33	18	.02	223	42	162		318	755	53	.7	1.8	.39	1,450	1,430	728	467	35	1,820	8.0	
Dec. 27.....	15	15	.02	197	59	172		337	725	51	.7	3.6	.27	1,420	1,390	734	456	34	1,790	7.9	
Jan. 15, 1951.....	12	17	.03	196	54	174		316	725	51	.7	3.6	.26	1,410	1,380	712	453	35	1,760	8.1	
Feb. 27.....	17	14	.10	194	55	162		304	710	50	.6	2.7	.00	1,400	1,340	709	460	33	1,790	8.1	
Apr. 4.....	169	15	.04	199	60	--		323	745	--	.9	2.2	.29	1,440	--	744	479	--	1,840	8.0	
Apr. 30.....	14	--	--	--	--	153	--	194	695	52	--	--	--	--	--	605	454	35	1,680	7.9	
June 5.....	389	--	--	--	--	106	--	229	470	35	--	--	--	--	--	502	314	32	1,310	8.0	
July 11.....	197	--	--	--	--	152	--	284	685	51	--	--	--	--	--	685	452	32	1,760	8.2	
Aug. 2.....	247	--	--	--	--	132	--	250	580	41	--	--	--	--	--	587	362	33	1,550	7.9	
Sept. 13.....	256	--	--	--	--	162	--	311	740	53	--	--	--	--	--	753	488	32	1,890	8.0	

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT JULESBURG, COLO.

LOCATION.--At gaging station at bridge on State Highway 51, 0.5 mile east of Julesburg, Sedgwick County, 4 miles upstream from Colorado-Nebraska State line, and 8 miles downstream from Lodgepole Creek.

DRAINAGE AREA.--22,800 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1951.

Water temperatures: October 1945 to September 1951.

EXTREMES, 1950-51.--Dissolved solids: Maximum, 1,610 ppm Feb. 1; minimum, 694 ppm May 21.

Hardness: Maximum, 786 ppm Feb. 1; minimum, 301 ppm May 21.

Specific conductance: Maximum, 1,172, 920 micromhos Feb. 2; minimum daily, 887 micromhos May 21.

Water temperatures: Maximum, 78°; minimum, 36°.

EXTREMES, 1945-51.--Dissolved solids: Maximum, 1,610 ppm Feb. 1, 1951; minimum, 478 ppm Aug. 5-7, 1950.

Hardness: Maximum, 770 ppm Feb. 1, 1951; minimum, 301 ppm May 21.

Specific conductance: Maximum, 1,172, 920 micromhos Feb. 2, 1951; minimum, 887 micromhos May 21, 1950.

Water temperatures: Maximum daily, 78°; minimum, 36°.

REMARKS.--Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25° C)	pH	Color		
														Parts per million		Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate	
														Residual at 180° C	Sum								
Oct. 1-31, 1950...	150	40	0.40	183	52	161	26	350	670	64	0.5	5.7	0.10	1,390	1,380	1.99	563	670	383	33	1,780	7.5	---
Nov. 1-15.....	271	---	---	---	---	171	---	---	---	---	---	---	---	1,500	---	2.04	1,100	718	---	34	1,860	---	---
Dec. 14-31.....	341	---	---	---	---	178	---	---	---	---	---	---	---	1,520	---	2.07	1,400	726	---	35	1,890	---	---
Jan. 1-7, 1951.....	316	---	---	---	---	181	---	---	---	---	---	---	---	1,530	---	2.08	1,310	730	---	35	2,030	---	---
Jan. 14-31.....	299	---	---	---	---	172	---	---	---	---	---	---	---	1,460	---	1.99	1,180	703	---	35	1,850	---	---
Feb. 1, Channel 2	242	---	---	---	---	190	---	---	---	---	---	---	---	1,610	---	2.19	1,050	766	---	35	2,010	---	---
Feb. 1, Channel 4 a	12	---	---	---	---	134	---	---	---	---	---	---	---	1,330	---	1.81	43	678	---	30	1,690	---	---
Feb. 2-14.....	333	30	.10	203	46	168	13	300	680	60	.6	5.6	.33	1,480	1,350	2.01	1,330	696	450	34	1,830	7.8	5
Feb. 15, Channel 2	300	---	---	---	---	181	---	---	---	---	---	---	---	1,530	---	2.08	1,240	730	---	35	1,940	---	---
Feb. 15, Channel 4 a	9.5	---	---	---	---	135	---	---	---	---	---	---	---	1,310	---	1.78	34	666	---	31	1,670	---	---
Feb. 16-Mar. 14	276	---	---	---	---	172	---	---	---	---	---	---	---	1,480	---	2.01	1,100	696	---	35	1,850	---	---
Mar. 15, Channel 1 a	---	---	---	---	---	170	---	---	---	---	---	---	---	1,450	---	1.97	---	682	---	35	1,830	---	---
Mar. 15, Channel 2	242	---	---	---	---	171	---	---	---	---	---	---	---	1,460	---	1.99	954	684	---	35	1,830	---	---
Mar. 15, Channel 4 a	4.4	---	---	---	---	175	---	---	---	---	---	---	---	1,480	---	1.90	14	610	---	29	1,520	---	---
Mar. 16-31.....	195	---	---	---	---	172	---	---	---	---	---	---	---	1,450	---	1.97	763	684	---	35	1,840	---	---
Apr. 1, Channel 1 a	---	---	---	---	---	165	---	---	---	---	---	---	---	1,330	---	1.81	---	598	---	37	1,720	---	---
Apr. 1, Channel 2	85	---	---	---	---	156	---	---	---	---	---	---	---	1,360	---	1.85	312	658	---	34	1,730	---	---
Apr. 1, Channel 4 a	2.6	---	---	---	---	83	---	---	---	---	---	---	---	1,030	---	1.40	7.2	568	---	24	1,350	---	---
Apr. 2-30.....	144	30	.03	161	53	167	15	215	715	63	.5	3.5	.23	1,370	1,310	1.66	533	620	444	36	1,750	7.8	4
May 1, Channel 1 a	---	28	---	175	54	187	15	193	739	97	---	2.4	.25	1,390	---	1.69	---	658	500	33	1,760	8.1	3
May 1, Channel 2	216	33	---	190	52	189	16	306	747	58	---	1.5	.23	---	1,440	1.96	840	691	440	37	1,780	8.0	3
May 1, Channel 4 a	3.2	46	---	171	37	94	15	276	480	48	---	4.8	.11	---	1,030	1.40	8.9	580	354	25	1,260	8.4	2
May 2-20.....	128	---	---	---	---	159	---	---	---	---	---	---	---	1,290	---	1.75	446	570	---	38	1,640	---	---

a Not included in weight-2 average.

May 21, 1951.....	855	18	0.10	88	21	76	13	166	290	28	0.5	5.2	0.13	694	--	0.94	1,230	301	185	34	887	7.5	16
May 22-June 22.....	195	--	--	--	--	157	--	--	--	--	--	--	--	1,260	--	1.71	863	589	--	36	1,850	--	--
June 23-24.....	700	--	--	--	--	125	--	--	--	--	--	--	--	904	--	1.23	1,710	388	--	41	1,240	--	--
June 25-July 2.....	522	--	--	--	--	174	--	--	--	--	--	--	--	1,100	--	1.50	1,550	810	--	38	1,770	--	--
July 3-Aug. 5.....	131	--	--	--	--	144	--	--	--	--	--	--	--	1,200	--	1.63	424	567	--	36	1,570	--	--
Aug. 6-10.....	1,259	17	.02	128	32	89	11	208	440	29	.8	1.7	.28	876	--	1.19	2,980	452	281	29	1,160	7.7	18
Aug. 11-Sept. 2.....	234	--	--	--	--	151	--	--	--	--	--	--	--	1,230	--	1.87	777	591	--	36	1,600	--	--
Sept. 3-30.....	448	--	--	--	--	155	--	--	--	--	--	--	--	--	--	--	--	575	--	37	--	--	--
Weighted average ^b	260	--	--	--	--	158	--	--	--	--	--	--	--	1,320	--	1.80	927	822	--	36	1,710	--	--

^b Represents 88 percent of runoff for water year October 1950 to September 1951.

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 3 p.m. and 7 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60			--	a 33	a 40	45	59	51	a 65	88	78
2	63			--	--	38	a 45	63	61	70	76	75
3	--			--	a 33	a 33	62	64	59	a 69	a 74	62
4	65			--	a 35	a 35	54	69	61	a 72	83	74
5	65			--	a 34	a 44	46	71	72	76	a 82	a 64
6	65			--	a 34	a 44	a 49	a 54	a 65	84	78	a 64
7	64			--	a 34	a 45	a 50	63	--	85	76	a 62
8	64			--	a 35	a 37	a 49	60	a 67	79	74	74
9	64			--	a 37	35	a 60	56	65	83	75	a 66
10	63			--	a 43	a 33	47	61	69	62	70	a 63
11	64			--	a 39	a 31	51	71	68	a 58	71	68
12	65			--	a 36	a 37	52	69	71	a 58	76	64
13	64			--	a 33	a 38	59	69	73	a 69	76	64
14	64			--	a 32	a 46	a 50	a 70	76	85	76	a 58
15	62			a 35	a 36	51	a 44	65	77	a 76	76	a 58
16	66			--	a 36	a 41	52	a 60	81	78	78	64
17	67			a 35	a 39	a 41	61	69	a 76	a 80	a 68	a 66
18	67			a 37	a 37	40	a 60	67	72	a 78	--	65
19	68			37	a 36	a 39	58	74	78	a 80	a 74	68
20	67			a 35	a 41	a 42	a 44	a 58	72	82	65	a 63
21	64			a 32	a 42	a 43	51	55	75	a 76	a 61	58
22	63			--	a 37	a 53	a 48	69	a 63	76	68	64
23	64			a 32	38	a 48	60	74	69	a 76	a 73	a 59
24	63			a 36	a 42	a 46	a 47	69	a 65	75	80	62
25	62			40	a 41	a 47	49	75	72	82	a 72	65
26	--			a 40	a 40	53	a 46	70	77	90	a 75	64
27	--			a 32	a 43	50	59	68	76	83	79	60
28	--			a 33	a 36	43	70	74	73	a 80	76	a 51
29	--			a 34	--	a 45	62	70	63	a 81	84	a 56
30	--			a 33	--	a 53	62	70	a 63	87	a 82	a 62
31	--			a 33	--	51	--	58	--	84	79	--
Average	--			--	37	43	53	66	69	77	75	64

a Observations made between 11 a.m. and 2 p.m.

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT NORTH PLATTE, NEBR.

LOCATION.--At gaging station at bridge on U. S. Highway 83, three-quarters of a mile south of North Platte, Lincoln County, and 4 miles upstream from confluence with North Platte River.

DRAINAGE AREA.--24,300 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1951.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Nov. 24, 1950.....	146	39	0.10	85	16	67		226	11	178	21	0.5	4.5	0.10	554	0.75		278	75	34	777	8.4
Dec. 27.....	204	38	0.10	84	16	61		217	15	164	22	.5	4.5	.10	536	.73		276	73	33	763	8.4
Jan. 31, 1951.....	90	32	0.10	89	16	73		244	6	173	23	.5	3.8	.10	562	.76		289	79	35	795	8.3
Mar. 2.....	158	35	.04	82	16	61		239	0	164	23	.4	4.9	.08	520	.71		270	74	33	747	7.8
Apr. 2.....	132	35	.06	84	14	58		242	0	154	23	.4	3.5	.13	550	.75		269	71	32	742	8.1
May 1.....	156	29	.02	79	18	63		238	0	171	22	.5	3.7	.10	524	.71		271	76	34	752	7.6
May 22.....	1,690	29	.02	50	9.7	34		195	0	65	7.5	.4	.8	.08	296	.40		165	5	31	443	7.5
July 6.....	201	34	.02	72	21	66		226	0	181	22	.5	2.8	.09	524	.71		265	81	35	749	8.2
Aug. 3.....	190	--	--	--	--	61	--	237	0	175	22	--	--	--	--	--		268	72	33	767	7.7
Sept. 12.....	870	--	--	--	--	--	--	208	0	310	--	--	--	--	--	--		347	176	--	991	7.6
Sept. 28.....	185	--	--	--	--	--	--	239	0	199	--	--	--	--	--	--		286	90	--	821	7.9

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.

LOCATION--At gaging stations at highway bridges 1 mile and 2½ miles south of Brady, Lincoln County, and 18 miles downstream from confluence of North Platte and South Platte Rivers.

DRAINAGE AREA--56,900 square miles, approximately.

RECORDS AVAILABLE--Chemical analyses: November 1950 to September 1951.

Water temperatures: March to September 1951.

REMARKS: Daily samples for chemical analysis composited by discharge. Composite periods identical to those of Supply Canal (Tri-County Diversion) near Max-well, Neb. Records of specific conductance of daily samples taken at each of the two major channels, available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, November 1950 to September 1951

Date of collection	Mean dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Car-bonate (CO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per-cent so-dium	Specific conductance (micro-mhos at 25°C)	pH	Col-or	
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate magnesium					
Nov. 24, 1950, Channel 1 a	75	39	0.10	64	14	56		218	6	121	15	0.5	1.4	0.10	426	0.58	86	216	27	36	619	8.4	--
Jan. 9, 1951, Channel 1 a	67	35	.04	56	9.8	43	9.1	193	0	92	11	.4	2.6	.20	348	.47	63	180	22	34	511	8.0	--
Feb. 28-Mar. 31	227	36	.01	59	13	43		208	0	103	14	.4	3.5	.08	404	.55	248	200	29	31	560	8.0	4
Apr. 1-26	179	29	.10	54	15	46	9.8	204	0	102	16	.5	2.4	.14	408	.55	197	196	29	32	584	7.9	32
Apr. 27-May 1	292	43	.03	54	13	45	10	192	7	107	14	.5	2.7	.06	404	.55	319	188	19	33	564	8.4	7
May 2-13	167	40	.05	60	14	46	8.0	214	0	112	15	.6	1.7	.08	424	.58	191	208	33	31	598	8.2	7
May 14, Channel 1	541	33	.04	51	9.2	40	8.0	182	0	89	11	.4	2.7	.07	338	.46	494	165	16	33	484	7.5	6
May 14, Channel 4	122	40	.06	62	15	41	12	220	0	109	16	.4	3.4	.09	418	.57	138	216	36	28	595	7.5	5
May 15, Channel 1	3, 670	30	.08	55	8.1	39	9.2	210	0	73	8.0	.4	4.2	.08	340	.46	3,370	171	0	32	457	7.4	7
May 15, Channel 4	222	45	.10	66	17	49	13	243	0	126	17	.4	2.5	.10	482	.66	289	235	36	30	655	7.6	8
May 16-17	3, 760	43	.10	54	14	45	8.0	192	0	116	15	.5	2.8	.08	402	.55	4,080	192	35	33	566	8.2	7
May 20-24	704	36	.05	62	16	46	8.4	228	0	112	15	.6	2.1	.06	424	.58	806	220	33	30	617	8.1	10
May 25-30	259	31	.05	56	11	43	7.9	196	0	108	12	.3	1.9	.05	392	.53	274	184	23	33	549	7.9	11
May 31-June 2	647	35	.05	64	14	48	8.4	218	0	110	21	.5	1.8	.32	436	.59	762	218	39	31	608	8.1	5
June 3-7	382	37	.05	62	14	50	10	234	0	106	15	.7	1.0	.08	436	.59	450	214	22	32	600	8.1	21
June 8	2, 270	32	.02	44	10	30	9.6	171	0	71	8.5	.6	3.7	.12	312	.42	1,910	151	11	28	439	8.0	7
June 9-10	2, 550	30	.02	48	10	39	9.4	197	0	84	11	.6	2.0	.09	346	.47	2,380	163	1	33	500	8.1	9
June 11-21	481	43	.03	81	14	44	9.6	234	0	107	12	.5	2.1	.10	420	.57	545	210	18	30	562	8.2	12
June 22-24	980	41	.02	49	11	38	8.6	187	9	80	10	.5	2.3	.13	352	.48	931	169	1	31	493	8.3	13
June 25-July 17	383	46	.02	59	14	46	9.7	216	5	108	13	.5	2.0	.12	426	.58	441	205	20	31	591	8.2	9

a Not included in weighted average.

July 18-Aug. 10	537	39	0.02	54	14	53	9.8	202	8	114	15	0.5	2.0	0.15	434	0.59	629	192	13	36	501	8.3	7
Aug. 11-Sept. 5	841	33	.02	53	15	62	9.7	220	0	131	17	.5	2.1	.12	448	.61	1,020	193	13	40	648	8.0	6
Sept. 6-30,	276	40	.08	60	13	56	10	204	6	131	16	.5	1.8	.15	456	.62	340	202	25	36	646	8.4	6
Channel 1																							
Sept. 6-30,	64	--	--	70	20	56	14	--	--	126	--	--	1.7	.15	--	--	--	257	--	31	--	--	--
Channel 4																							
Weighted average b	488	37	0.04	56	14	50	9.5	c 214	--	111	14	0.5	2.3	0.12	417	0.57	549	197	22	34	588	--	--

b For period of daily sampling only. Includes estimates where data are missing. Represents 73 percent runoff for water year October 1950 to September 1951.

c Includes carbonate as bicarbonate.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

Temperature (°F) of water, March to September 1951

[Once-daily temperature measurement, between 7 a. m. and 11 a. m.]

Channel 1 (Main Channel)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						35	40	48	54	63	a 85	68
2						--	45	51	50	62	a 82	69
3						--	45	58	51	67	a 77	--
4						a 38	42	50	53	65	a 78	--
5						36	45	58	53	63	76	64
6						a 40	a 56	--	50	68	a 82	66
7						34	45	57	--	75	a 85	64
8						a 34	40	55	a 68	76	a 86	64
9						a 34	42	56	66	72	a 84	67
10						--	42	62	57	--	a 76	62
11						--	37	54	66	--	70	64
12						a 35	--	60	63	a 64	72	58
13						a 36	a 62	65	64	a 76	70	56
14						32	a 54	--	66	a 85	70	58
15						34	38	60	65	--	66	54
16						--	a 56	60	69	a 85	74	59
17						--	41	62	65	a 85	73	56
18						34	44	62	66	a 86	70	59
19						a 39	43	63	79	90	74	a 75
20						--	44	65	62	a 90	70	58
21						37	38	59	63	--	68	52
22						45	45	57	62	--	64	52
23						38	51	59	68	a 86	64	a 60
24						40	49	62	62	a 84	67	50
25						a 60	46	62	68	a 88	74	52
26						48	48	60	66	a 92	72	55
27						--	56	59	68	a 84	67	44
28						a 45	60	58	60	72	70	52
29						--	65	63	52	a 87	74	49
30						35	59	62	--	--	76	62
31						43	--	63	--	a 88	74	--
Average						--	48	59	62	78	74	59

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.

LOCATION--At gaging station at Parshall Flume in sec. 28, T. 13 N., R. 29 W., near Maxwell, Lincoln County.
RECORDS AVAILABLE--Chemical analyses: March to September 1951.
Water temperatures: March to September 1951.

EXTREMES--March to September 1951--Water temperatures: Maximum, 84°F July 19, 27.

REMARKS--Daily samples for chemical analysis composited by discharge. Composite periods normally the same as for Platte River at Brady, Nebr. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in reports of State Engineer

Chemical analyses, in parts per million, March to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carb. bicarbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Color	
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Mar. 1-31, 1951	1,664	30	0.10	65	19	69	9.8	222	0	165	23	0.4	2.1	0.12	516	0.70	2,320	234	52	38	732	8.1	17
Apr. 1-26	1,824	26	0.20	63	14	59	13	210	0	183	19	8	2.4	0.10	508	.69	2,500	214	42	36	681	7.9	21
Apr. 27-May 1	1,834	31	.03	56	16	71	11	214	0	183	20	5	2.3	.14	492	.67	2,440	207	32	41	710	8.2	3
May 2-13	1,571	29	.05	60	17	72	9.5	214	0	183	22	6	1.5	.08	496	.67	2,100	218	43	40	720	8.1	5
May 14	2,020	24	.04	59	15	62	10	206	0	155	18	4	3.1	.11	458	.62	2,500	209	40	38	647	7.5	7
May 15	1,920	23	.06	52	10	39	12	169	0	104	11	4	4.0	.07	368	.50	1,910	171	32	31	499	7.4	12
May 16-17	1,960	32	.05	55	16	74	9.2	196	0	165	22	6	1.4	0.10	508	.69	2,890	204	43	43	711	8.1	1
May 18-19	2,000	31	.05	59	15	81	9.9	158	0	211	25	5	1.8	.12	528	.72	2,850	208	78	44	768	8.1	2
May 20-24	1,888	30	.04	65	16	62	11	216	0	150	20	4	2.7	.20	488	.66	2,490	226	49	36	721	8.2	8
May 25-30	1,768	29	.04	61	18	70	10	222	0	164	21	4	2.1	.21	500	.68	2,390	224	42	39	742	8.0	5
May 31-June 2	1,823	25	.04	62	17	67	10	211	0	166	21	4	2.1	.14	492	.67	2,420	223	50	38	731	8.1	7
June 3-6	1,683	34	.02	64	17	67	9.8	202	8	174	21	6	2.5	.16	512	.70	2,330	229	50	38	738	8.3	4
June 7-8	1,990	23	.04	56	13	46	11	179	0	124	15	4	1.3	0.10	388	.53	2,080	192	45	33	573	7.5	10
June 9-10	2,005	33	.02	66	17	65	12	215	0	171	21	4	2.9	.21	508	.69	2,750	235	59	36	740	8.1	15
June 11-21	1,823	30	.02	65	19	67	12	210	0	189	22	6	2.8	.13	530	.72	2,610	239	67	36	759	7.9	5
June 22-24	1,977	24	.02	63	18	65	11	195	0	185	22	5	3.3	.11	500	.68	2,870	229	69	37	737	7.9	6
June 25-July 17	1,927	24	.02	70	21	82	11	203	0	231	26	5	2.3	.12	588	.80	3,060	260	94	39	847	8.1	4
July 18-Aug. 10	1,992	25	.03	68	17	83	11	214	0	210	24	5	2.4	.14	564	.77	3,030	240	65	42	814	8.1	4
Aug. 11-Sept. 5	2,011	27	.02	64	19	77	11	217	0	199	22	6	2.6	.14	550	.75	2,960	238	60	40	802	8.1	5
Sept. 6-30	1,976	27	.02	63	19	80	11	214	0	209	23	5	2.0	.18	551	.75	2,940	235	60	41	811	8.0	5
Weighted average ^a	1,864	27	0.06	64	18	73	11	b212	--	188	22	0.5	2.3	0.14	533	0.72	2,860	234	60	39	765	--	--

^a For period of daily sampling only. Represents 62 percent of runoff for water year October 1951 to September 1951.

^b Includes carbonate as bicarbonate.

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.--Continued

Temperature (°F) of water, March to September 1951
 /Once-daily temperature measurement at 4:30 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						41	a 38	56	a 55	78	a 73	--
2						a 35	48	a 50	61	a 83	80	76
3						35	a 40	62	a 52	74	a 73	a 67
4						a 34	44	a 52	63	a 64	78	68
5						41	a 43	66	--	67	a 73	a 66
6						a 34	50	a 51	--	a 65	82	70
7						40	a 42	63	--	78	a 74	a 65
8						a 33	49	a 52	69	a 70	80	73
9						33	a 40	59	a 64	76	a 70	a 64
10						a 33	44	a 51	72	a 65	75	71
11						32	a 36	68	a 66	63	a 67	a 65
12						a 32	44	a 56	70	a 60	78	66
13						33	a 36	66	a 64	74	a 70	a 60
14						a 32	49	a 56	76	a 67	78	66
15						40	a 37	61	a 65	82	a 68	a 61
16						a 34	47	a 61	80	a 71	77	68
17						36	a 42	64	a 69	79	a 70	a 58
18						a 34	a 45	a 60	71	a 72	78	67
19						37	52	68	a 67	84	a 72	a 62
20						a 33	a 46	a 63	68	a 75	74	69
21						43	42	59	a 65	80	a 67	a 58
22						a 37	a 38	a 54	a 73	a 70	a 68	64
23						44	54	69	66	81	68	a 57
24						a 36	a 46	a 64	a 59	a 72	a 66	60
25						43	55	73	77	82	74	a 55
26						a 40	a 47	a 63	a 66	a 74	a 70	64
27						45	59	73	71	84	75	a 54
28						a 38	a 55	a 63	a 64	a 74	a 71	57
29						43	64	71	67	82	79	a 50
30						a 37	a 57	a 63	a 62	a 75	a 74	65
31						48	--	65	--	82	77	--
Average						37	46	61	67	74	74	64

a Observations made at 8:30 a.m.

PLATTE RIVER BASIN--Continued
PLATTE RIVER NEAR LEXINGTON, NEBR.

LOCATION.--At gaging station at bridge on U. S. Highway 283, 2½ miles south of Lexington, Dawson County.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.

REMARKS.--Gage at sampling station not in operation. Estimated discharges furnished by Surface Water Branch office at Lincoln, Nebr.

Date of collection	Instantaneous discharges (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Dec. 4, 1950.....	177	35	0.04	80	20	64		257	4	158	22	0.5	5.3	0.10	524	0.71		280	63	33	766	8.3
Jan. 3, 1951.....	164	36	.04	77	20	63		282	0	153	21	.4	5.7	.10	508	.69		273	58	33	742	8.0
Feb. 20.....	401	32	.04	69	17	58		236	0	140	18	.4	4.6	.07	526	.72		242	48	34	687	8.2
Mar. 19.....	325	33	.04	71	18	60		233	6	142	18	.4	4.8	.07	480	.65		250	49	34	691	8.3
Apr. 17.....	258	--	--	--	--	54	--	252	0	144	20	--	--	--	--	--		259	52	31	729	7.7
May 24.....	893	--	--	--	--	56	--	248	0	141	18	--	--	--	--	--		241	38	32	706	7.5
July 6.....	194	--	--	--	--	59	--	263	0	154	20	--	--	--	--	--		273	56	32	764	7.9
Aug. 3.....	86	--	--	--	--	56	--	256	0	143	20	--	--	--	--	--		262	52	31	737	7.8
Aug. 30.....	530	--	--	--	--	61	--	248	0	149	19	--	--	--	--	--		244	41	34	732	7.6
Sept. 27.....	236	--	--	--	--	--	--	243	0	150	--	--	--	--	--	--		250	51	--	733	7.8

PLATTE RIVER BASIN--Continued

PLATTE RIVER NEAR ODESSA, NEBR.

LOCATION.--At gaging station at highway bridge, 2½ miles south of Odessa, Buffalo County, and 5 miles downstream from Elm Creek.
 DRAINAGE AREA.--58,800 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1951.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Oct. 31, 1950	1,440	22	0.04	62	18	85		217	0	193	23	0.4	1.3		512	0.70	229	51	45	767	7.9
Dec. 5	1,380	27		75	22	94		246	6	219	27	.5	2.7		598	.81	277	65	42	881	8.3
Jan. 4, 1951	2,040	24	.04	81	18	94		236	0	235	27	.5	1.9		598	.81	274	50	43	876	8.1
Feb. 19	2,000	21	.04	72	19	84		213	0	219	25	.4	2.0		570	.78	257	52	42	823	8.0
Mar. 20	2,100	22	.04	72	20	85		224	0	216	24	.4	2.2		568	.77	261	77	41	831	7.8
Apr. 17	1,850	--	--	--	--	72	--	220	0	193	23	--	--	--	--	--	244	64	39	812	7.5
May 25	3,150	--	--	--	--	81	--	212	0	190	19	--	--	--	--	--	212	38	38	898	7.2
July 25	1,950	--	--	--	--	85	--	203	0	173	22	--	--	--	--	--	227	63	38	734	7.4
Aug. 2	1,389	--	--	--	--	78	--	214	0	205	24	--	--	--	--	--	256	90	39	884	7.3
Aug. 30	1,800	--	--	--	--	78	--	214	0	205	24	--	--	--	--	--	238	83	40	807	7.6
Sept. 28	1,670	--	--	--	--	84	--	219	0	223	25	--	--	--	--	--	256	76	41	831	7.8

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 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 9,830 ppm June 1; minimum daily not determined.

Sediment loads: Maximum daily, 5,780 tons June 1; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1947-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 356,000 tons June 22, 1947; minimum daily, less than 0.50 ton on many days each year.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3.7	100	a 1	2.8	56	--	3.6		
2-----	4.5	102	1	2.6	--	--	4.1		
3-----	6.5	--	e 2	2.3	42		4.1	42	(t)
4-----	106	3,100	s 999	3.0	66	(t)	4.1		
5-----	34	1,400	128	3.0	--	--	4.1		
6-----	14	880	33	3.0	32		4.1		
7-----	4.9	540	7	3.0	120		3.6	116	1
8-----	2.8	415	3	3.2			4.1		
9-----	2.5	284	2	2.9			4.1		
10-----	2.9	180	1	3.0	54	(t)	4.1		
11-----	3.0	113	1	3.3			4.1		
12-----	3.3	87	1	3.3			3.6	23	(t)
13-----	4.9	72	1	3.3	30	(t)	3.2		
14-----	4.4	50	1	3.3	31	(t)	3.2		
15-----	4.4	54	1	3.3			3.2		
16-----	4.4	38	(t)	2.9			3.2		
17-----	4.1	30	(t)	3.0			3.2	27	(t)
18-----	3.2	25	(t)	3.0			2.9		
19-----	2.9	52	(t)	3.0	61	(t)	3.2		
20-----	2.9	--	e 1	2.9			2.9	38	(t)
21-----	2.6	--	e 1	3.2			2.9		
22-----	2.9			2.5			3.2		
23-----	2.9			2.7			3.2	38	(t)
24-----	3.0			2.6			3.2		
25-----	2.8			2.6			3.2		
26-----	3.2	44	(t)	2.9	45	(t)	2.9		
27-----	2.8			2.9			2.9		
28-----	2.9			3.2			2.9	13	(t)
29-----	2.9			3.2			3.2		
30-----	2.8			3.6			3.2		
31-----	2.6			--	--	--	3.2	25	(t)
Total--	250.7	--	1,188	89.5	--	13	106.7	--	12

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3.2			5.0			5.0		
2-----	3.2	25	(t)	4.1	64	1	4.6	27	(t)
3-----	3.2			5.0			4.1		
4-----	2.9			5.0			4.1		
5-----	3.2	12	(t)	5.0			3.6		
6-----	2.9			4.6			4.1		
7-----	3.2			4.1			4.6		
8-----	3.2	19	(t)	4.1			4.1	53	1
9-----	3.2			4.1			5.0		
10-----	3.2			5.0			5.0		
11-----	3.2	32	(t)	5.6			5.0		
12-----	3.6			5.6			5.0	20	(t)
13-----	3.2			5.6			4.6		
14-----	3.2	92	1	5.0	47	1	4.6	20	(t)
15-----	3.2			5.0			4.6		
16-----	3.2			5.6			4.6		
17-----	3.2	70	1	5.6			5.0		
18-----	3.2			5.6			4.6	45	1
19-----	3.2			5.6			4.6		
20-----	3.2	48	(t)	5.6	24	(t)	4.6		
21-----	3.2			5.0			5.0	25	(t)
22-----	3.2			5.0			5.6		
23-----	3.2	36	(t)	5.6			5.0		
24-----	2.9			6.1			5.0		
25-----	2.9			6.1			5.0	12	(t)
26-----	3.6	21	(t)	6.1	13	(t)	6.1		
27-----	3.6			4.6			7.8		
28-----	4.6			5.0			2.6		
29-----	2.9	36	(t)	--			3.2	18	(t)
30-----	3.6			--			3.2		
31-----	4.6			--			3.3		
Total--	102.1	--	14	144.3	--	20	143.2	--	14
Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	3.3	18	(t)	32	1,510	130	218	9,830	5,780
2-----	4.0	18	(t)	14	870	33	236	6,080	s 3,950
3-----	4.9	70	1	5.7	475	7	53	4,400	s 650
4-----	4.9			3.7	395	4	19	2,270	116
5-----	5.2			3.8	190	2	11	700	21
6-----	5.4			3.8	108	1	6.0	310	5
7-----	5.2			3.2	112	1	4.2	215	2
8-----	3.8	68	1	4.5	80	1	4.0	210	2
9-----	3.5			4.5			3.7	180	a 2
10-----	4.5			4.5			3.2	133	1
11-----	4.5			4.2			2.5	130	1
12-----	4.5			4.2			3.7	--	e 2
13-----	4.5	43	1	4.2			11	--	e 65
14-----	4.9			4.9			44	2,500	a 300
15-----	4.7			4.9			18	1,400	e 8
16-----	4.9			5.2			61	3,310	s 867
17-----	4.9			12	--	e 8	50	3,650	s 518
18-----	5.2	42	1	18	280	sa 15	18	1,440	70
19-----	4.7			11	110	3	26	--	e 200
20-----	5.2			4.9	75	a 1	24	2,800	sa 220
21-----	6.0			27	--	e 16	17	2,100	96
22-----	5.7			24	300	a 19	83	3,860	s 1,230
23-----	5.4	42	1	23	--	e 48	143	6,630	s 2,760
24-----	5.2			21	725	41	156	6,970	s 3,050
25-----	5.2			15	558	23	107	6,600	a 1,900
26-----	5.4			9.5	502	13	216	7,050	4,110
27-----	42	--	e 380	6.6	240	a 4	114	6,360	s 2,020
28-----	171	3,680	s 1,170	5.7	123	2	34	5,600	514
29-----	42	4,800	a 550	6.3	95	2	12	3,100	sa 110
30-----	31	2,300	sa 200	8.7	67	2	14	1,400	53
31-----	--	--	--	34	--	e 220	--	--	--
Total--	341.6	--	2,324	334.0	--	604	1,712.3	--	28,683

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	9.5	480	12	1.8			1.0	118	(t)
2-----	7.0	201	4	.8			1.0	95	(t)
3-----	6.1	149	2	.9			1.3	147	1
4-----	5.0	120	2	.6			1.9	110	1
5-----	3.6	111	1	1.3			2.8	100	1
6-----	3.5	82	1	1.6	119	(t)	2.2	97	1
7-----	3.8	101	1	.4			1.3	122	(t)
8-----	3.3	92	1	.4			1.0		
9-----	2.9	103	1	.6			1.1		
10-----	3.3	135	1	.6			.9		
11-----	38	750	sa 120	1.3			.7	85	(t)
12-----	81	2,620	573	1.2			.7		
13-----	68	2,400	a 440	1.3	125	(t)	.5		
14-----	34	1,560	s 152	1.0			.9		
15-----	11	810	24	1.2			1.2		
16-----	5.6	275	4	1.0			1.6		
17-----	5.4	150	2	.5	125	(t)	1.4		
18-----	4.1	142	2	.4	130	(t)	1.2		
19-----	4.1	126	1	38	2,200	sa 550	1.2	59	(t)
20-----	2.5	129	1	31	2,100	sa 200	1.2		
21-----	1.4	127	(t)	10	1,430	s 42	1.4		
22-----	3.3	119	1	1.4	558	2	1.2		
23-----	1.7			.6	340	1	1.2		
24-----	1.3			.7	284	1	1.4		
25-----	1.2	88	(t)	.7	215	(t)	1.4		
26-----	1.2			3.3	220	2	1.6		
27-----	1.7			2.2	180	1	1.4	42	(t)
28-----	2.1	98	1	1.0	150	(t)	1.4		
29-----	2.9	89	1	1.0	128	(t)	1.4		
30-----	2.8	122	1	.9	117	(t)	1.8		
31-----	2.3	102	1	.9	140	(t)	--	--	--
Total-	323.6	--	1,352	108.6	--	806	39.3	--	10

Total discharge for year (cfs-days)..... 3,695.9

Total load for year (tons)..... 35,040

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued
WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Particle-size analyses of suspended sediment, October 1950 to August 1951
(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)

Suspended sediment																	Methods of analysis
Date of collection	Time	Instan- taneous discharge (cfs)	Water- tem- per- ature (° F)	Concentration of suspension analyzed (ppm)		Percent finer than indicated size, in millimeters											
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
Oct. 4, 1950.....	8:35 a.m.	156	--	4,600	3,910	--	82	--	92	--	100	--	--	--	--	--	SPWCM
Oct. 4.....	11:20 a.m.	156	--	3,830	2,200	80	84	92	93	96	98	98	99	100	100	100	EWCM
Oct. 4.....	4:30 p.m.	103	--	2,460	1,440	72	80	82	83	86	88	89	93	--	--	--	EWCM
Oct. 6.....	8:20 a.m.	17	--	969	733	78	86	89	90	95	97	--	--	--	--	--	EWCM
Apr. 27, 1951.....	8:45 a.m.	47	--	3,560	2,460	--	82	--	97	--	100	--	--	--	--	--	SPWCM
Apr. 28.....	4:10 p.m.	150	--	6,540	4,400	--	73	--	87	--	100	--	--	--	--	--	SPWCM
June 1.....	11:15 a.m.	205	--	9,000	5,440	--	75	--	94	--	100	--	--	--	--	--	SPWCM
June 1.....	6:10 p.m.	262	--	10,400	5,940	--	75	--	92	--	100	--	--	--	--	--	SPWCM
June 1.....	6:40 p.m.	266	--	10,300	8,690	53	72	84	90	95	100	--	--	--	--	--	SPWCM
June 1.....	6:40 p.m.	266	--	10,300	8,930	8	23	84	92	95	100	--	--	--	--	--	SPN
June 2.....	8:20 a.m.	284	54	5,740	4,400	--	76	--	92	--	100	--	--	--	--	--	PWCM
June 16.....	4:40 p.m.	122	74	6,530	4,090	--	70	--	93	--	100	--	--	--	--	--	PWCM
June 22.....	6:40 p.m.	142	68	7,680	5,500	--	71	--	92	--	100	--	--	--	--	--	PWCM
June 25.....	5:00 p.m.	58	74	6,830	5,560	--	78	--	97	--	100	--	--	--	--	--	PWCM
June 26.....	8:05 a.m.	261	64	7,150	5,810	--	77	--	91	--	100	--	--	--	--	--	PWCM
June 26.....	1:45 p.m.	234	--	7,170	5,440	60	74	88	92	97	100	--	--	--	--	--	SPWCM
June 26.....	1:45 p.m.	234	--	7,170	5,560	27	62	82	94	97	100	--	--	--	--	--	SPN
Aug. 19.....	7:40 p.m.	102	--	8,440	10,900	--	67	--	95	--	100	--	--	--	--	--	PWCM

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (Total load section)

LOCATION --At downstream measuring sill of turbulence flume beneath bridge on State Highway 2 at northeast limits of Dunning, Blaine County, 1,150 feet downstream from gaging station, and 1 mile upstream from Dismal River.

DRAINAGE AREA 1,760 square miles, approximately, of which about 80 square miles contribute directly to surface runoff.

RECORDS AVAILABLE--Water temperatures: October 1949 to September 1951.

Sediment loadings: March 1950 to September 1951.

EXTREMES 1950--Water temperatures: Maximum, 89° F July 18; minimum, freezing point on many days during November to April.

Sediment loadings: Maximum daily, 3,110 ppm Dec. 2; minimum daily, not determined.

Sediment loadings: Maximum daily, 3,360 tons Dec. 2; minimum daily, not determined.

EXTREMES 1949-51--Water temperatures: Maximum, 89° F July 18, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations (March 1950 to September 1951): Maximum daily, 3,290 ppm Apr. 30, 1950; minimum daily, not determined.

Sediment loads (March 1950 to September 1951): Maximum daily, 4,000 tons Mar. 25, 1950; minimum daily, not determined.

REMARKS--Investigations indicate that practically all the total sediment load is transported in suspension at this section of the river.

Records of discharge for water year October 1950 to September 1951.

Temperature (°F) of water, water year October 1950 to September 1951

T_m --day mercury actuated thermograph

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
1	56	47	51	45	39	34	35	32	32	32	43	32	43	36	39	49	53	50	75	62	85	70	72	66
2	54	46	48	40	35	32	32	32	32	32	32	32	32	32	32	48	60	46	66	83	84	73	64	
3	49	43	43	35	32	32	32	32	32	32	32	32	32	32	32	63	60	46	77	82	80	75	62	
4	52	44	49	36	32	32	32	32	32	32	38	32	56	42	68	80	61	49	72	86	86	69	61	
5	61	46	53	42	32	32	32	32	32	32	48	32	48	43	68	52	66	52	66	82	88	72	70	
6	58	51	49	43	32	32	32	32	32	32	40	32	56	43	62	48	89	58	82	63	87	73	62	
7	52	46	49	42	32	32	32	32	32	32	32	32	32	32	55	39	65	47	79	62	84	70	68	
8	59	45	45	32	32	32	32	32	32	32	32	32	51	34	66	50	76	64	82	73	80	69	75	
9	59	48	32	32	32	32	32	32	32	32	32	32	33	37	60	50	78	62	78	67	86	69	63	
10	60	49	32	32	32	32	--	--	--	--	32	32	32	32	66	47	77	65	67	59	77	85	71	
11	62	51	33	32	32	32	32	32	32	32	32	32	40	33	70	50	72	64	59	57	64	75	60	
12	64	51	37	32	32	32	35	32	32	32	32	32	43	32	68	54	77	59	61	58	77	87	66	
13	66	54	40	35	32	32	32	32	32	32	32	32	37	33	63	54	76	65	75	55	79	88	67	
14	65	56	43	33	32	32	32	36	32	32	32	32	42	40	65	55	78	62	83	65	80	68	56	
15	64	55	44	36	32	32	32	32	32	32	32	32	47	33	66	58	80	64	86	71	77	62	54	
16	61	54	40	32	37	32	40	33	32	32	46	34	53	32	66	60	85	67	84	70	84	67	50	
17	63	50	42	34	37	32	39	32	32	32	41	35	39	32	68	60	82	69	86	72	82	88	69	
18	65	54	44	37	41	34	43	34	36	32	35	32	49	45	73	57	78	67	89	73	87	86	54	
19	61	53	40	32	39	34	39	32	38	35	32	32	56	43	70	57	78	67	87	74	78	68	59	
20	61	49	35	32	40	32	32	32	45	32	39	32	48	37	64	57	70	64	87	73	69	62	60	
21	56	47	44	36	41	34	32	32	46	34	49	32	42	35	60	54	72	62	83	73	76	59	62	
22	48	44	32	42	34	32	32	32	41	35	40	32	42	35	72	55	72	61	78	68	66	62	48	
23	59	41	32	42	35	32	32	32	41	35	49	38	54	42	69	56	66	60	82	66	83	61	56	
24	54	43	32	41	35	32	32	32	40	40	50	36	49	43	69	56	74	56	84	69	81	94	56	
25	54	43	32	43	35	32	32	32	41	41	50	38	61	41	69	55	81	66	86	70	81	60	50	
26	57	46	38	32	35	32	34	32	48	35	57	42	56	46	66	52	82	65	88	72	79	67	65	
27	54	46	41	34	32	32	32	32	43	36	52	46	66	48	75	55	75	67	87	73	85	56	46	
28	54	45	40	33	32	32	32	32	41	34	45	37	71	54	70	60	75	62	79	73	76	68	54	
29	57	47	39	33	36	32	32	32	--	--	44	32	64	58	74	62	67	61	85	71	81	72	62	
30	60	47	37	35	37	32	32	32	--	--	49	32	63	53	74	62	73	59	86	74	84	72	69	
31	58	49	--	--	37	32	32	32	--	--	52	35	--	--	66	58	--	--	83	72	77	70	--	
Average	58	48	41	35	36	33	34	32	36	33	42	34	54	40	66	54	73	61	80	68	79	67	66	56

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (Total load section)--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	347	990	930	373	980	970	400	1,900	2,050
2-----	361	1,210	1,180	376	1,380	1,400	400	3,110	3,380
3-----	344	1,070	990	352	1,530	1,450	400	2,500	2,700
4-----	341	1,010	930	373	1,270	1,280	400	2,080	2,250
5-----	355	960	920	379	710	730	100	480	120
6-----	367	1,150	1,140	373	860	870	100	210	57
7-----	361	1,000	970	403	1,130	1,230	200	380	210
8-----	336	880	800	418	1,340	1,510	300	300	240
9-----	344	1,310	1,220	350	2,040	1,930	500	400	a 550
10-----	344	790	730	380	1,880	1,930			
11-----	344	1,230	1,140	380	1,650	1,690	600	640	1,040
12-----	350	1,080	1,020	360	2,220	2,160			
13-----	344	1,050	980	380	1,540	1,580	550	1,440	2,140
14-----	347	890	830	379	1,720	1,760	482	1,360	1,770
15-----	347	1,100	1,030	373	1,860	1,870	450	1,060	1,290
16-----	352	840	800	385	1,460	1,520	400	1,020	1,100
17-----	336	860	780	403	1,820	1,980	390	830	870
18-----	341	860	790	388	1,480	1,550	376	2,380	2,420
19-----	341	1,020	940	403	1,850	2,010	373	1,970	1,580
20-----	341	800	740	403	1,970	2,140	400	2,000	2,160
21-----	333	770	690	370	1,700	1,700	409	2,340	2,580
22-----	317	1,300	1,110	406	2,240	2,460	355	1,640	1,570
23-----	314	1,660	1,410	380	1,370	1,410	379	1,970	2,020
24-----	341	930	860	350	1,620	1,530	397	1,830	1,960
25-----	338	1,030	940	406	1,380	1,510	379	1,310	1,340
26-----	355	1,120	1,070	406	1,060	1,160	368	2,400	2,380
27-----	355	1,000	960	388	1,760	1,840	360	1,760	1,710
28-----	344	950	880	385	1,250	1,300	370	1,580	1,580
29-----	341	970	890	388	2,110	2,210	394	1,340	1,430
30-----	373	1,260	1,270	397	1,690	1,810	376	2,200	2,230
31-----	373	850	960	--	--	--	373	2,860	2,880
Total-	10,727	--	29,900	11,507	--	48,490	12,181	--	49,667
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	397	1,580	1,690	273	110	81	394	1,470	1,560
2-----	391	1,620	1,710	292	100	79	397	1,480	1,590
3-----	390	2,500	2,700	342	390	360	390	1,940	2,040
4-----				410	130	140	390	2,020	2,130
5-----				439	420	500	406	1,300	1,430
6-----	400	1,970	2,130	451	100	120	424	1,690	1,930
7-----				452	410	500	394	1,490	1,590
8-----				412	200	220	380	1,480	1,520
9-----	420	2,000	2,270	429	280	320	370	1,900	1,900
10-----	415	2,680	3,000	470	360	460	360	1,980	1,920
11-----	403	1,710	1,860	490	340	450	350	1,940	1,830
12-----	409	2,420	2,670	546	380	560	340	1,890	1,740
13-----	415	1,720	1,930	530	160	230	350	1,660	1,670
14-----	412	1,940	2,160	514	190	260	355	1,950	1,870
15-----	415	1,650	1,850	528	100	140	350	1,870	1,770
16-----	418	1,570	1,770	500	420	570	361	1,430	1,390
17-----	397	1,630	1,750	474	260	330	391	1,260	1,330
18-----	397	2,320	2,490	455	340	420	367	1,480	1,470
19-----	388	2,110	2,210	400	1,420	1,530	361	1,610	1,570
20-----	380	2,510	2,580	409	1,310	1,450	364	1,760	1,730
21-----				412	1,770	1,970	355	1,610	1,540
22-----				421	1,300	1,490	367	1,560	1,550
23-----	379	2,280	2,330	403	1,420	1,550	403	1,350	1,470
24-----	373	2,450	2,470	406	1,000	1,100	385	1,100	1,140
25-----	376	2,960	3,000	437	1,100	1,300	379	960	980
26-----	364	2,420	2,380	397	1,360	1,460	394	1,160	1,230
27-----	200	740	400	382	1,500	1,550	421	1,180	1,340
28-----	250	100	a 70	421	1,710	1,940	400	1,310	1,410
29-----				--	--	--	373	1,310	1,320
30-----				--	--	--	352	1,340	1,270
31-----	270	110	80	--	--	--	373	1,410	1,420
Total-	11,499	--	60,460	12,095	--	21,070	11,696	--	48,550

a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (Total load section)--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	387	1,360	1,350	382	1,410	1,450	469	1,850	2,340
2-----	352	1,470	1,400	373	1,160	1,170	409	1,680	1,860
3-----	355	1,360	1,300	367	1,120	1,110	388	1,700	1,780
4-----	355	1,180	1,130	361	960	940	391	1,150	1,210
5-----	370	1,020	1,020	364	930	910	391	1,000	a 1,100
6-----	370	1,230	1,230	350	1,230	1,160	394	900	a 950
7-----	370	1,430	1,430	338	1,130	1,130	421	900	a 1,000
8-----	317	1,420	1,220	347	1,160	1,090	466	890	1,120
9-----	320	1,420	1,230	361	1,210	1,180	440	900	1,070
10-----	338	1,400	1,280	355	1,070	1,030	421	960	1,090
11-----	299	1,580	1,280	347	930	870	421	1,030	1,170
12-----	294	1,350	1,070	344	1,040	970	421	1,100	1,250
13-----	302	1,350	1,100	397	920	990	412	1,080	1,200
14-----	330	1,420	1,270	519	1,360	1,910	440	1,270	1,510
15-----	299	1,520	1,230	513	1,300	1,800	403	1,030	1,120
16-----	269	1,280	930	463	1,220	1,530	376	930	940
17-----	280	1,010	760	453	860	1,050	350	960	910
18-----	304	950	780	476	1,070	1,380	350	940	890
19-----	302	980	800	472	1,160	1,480	382	1,100	1,130
20-----	302	1,520	1,240	513	1,220	1,690	370	1,170	1,170
21-----	290	1,830	1,430	513	1,420	1,970	376	1,090	1,110
22-----	290	1,390	1,090	447	1,400	1,690	403	1,010	1,100
23-----	309	1,310	1,090	437	1,250	1,470	434	1,380	1,620
24-----	325	1,640	1,440	434	1,350	1,580	409	1,180	1,300
25-----	341	1,460	1,340	431	1,160	1,350	409	1,150	1,270
26-----	341	1,460	1,340	406	1,540	1,690	431	1,080	1,260
27-----	412	1,450	1,610	373	990	1,000	431	1,220	1,420
28-----	403	1,170	1,270	370	1,060	1,060	394	1,020	1,090
29-----	403	1,460	1,590	376	1,000	1,020	400	860	830
30-----	397	1,330	1,430	373	910	920	400	980	1,060
31-----	--	--	--	400	1,150	1,240	--	--	--
Total-	10,006	--	36,680	12,655	--	39,830	12,202	--	36,970
	July			August			September		
1-----	394	860	910	361	680	640	403	890	970
2-----	415	710	800	367	740	730	379	920	940
3-----	415	900	1,010	373	750	760	406	1,000	a 1,100
4-----	373	980	990	350	710	670	466	1,600	a 2,000
5-----	379	1,000	1,020	350	940	890	536	2,100	a 3,000
6-----	382	880	910	358	760	730	489	1,960	2,590
7-----	388	760	800	361	710	680	476	1,460	1,880
8-----	388	700	730	355	800	770	469	1,280	1,620
9-----	382	870	900	370	850	850	479	1,900	2,460
10-----	412	1,250	1,390	373	940	950	428	1,360	1,570
11-----	415	1,890	2,120	367	980	970	409	1,210	1,340
12-----	400	1,250	1,350	358	920	890	424	1,270	1,450
13-----	373	1,020	1,030	350	860	810	379	1,310	1,340
14-----	370	940	940	355	950	910	387	1,200	1,190
15-----	376	860	870	352	850	810	373	1,060	1,070
16-----	391	770	810	341	780	720	367	1,090	1,080
17-----	400	910	980	350	810	770	367	1,120	1,110
18-----	400	840	910	355	910	870	382	1,340	1,380
19-----	361	810	790	350	770	730	385	1,010	1,050
20-----	358	690	670	397	1,010	1,080	373	970	980
21-----	355	680	650	384	800	790	382	1,110	1,140
22-----	373	820	830	355	820	790	370	1,280	1,280
23-----	355	800	770	364	850	910	364	1,260	1,260
24-----	352	820	780	388	960	1,040	364	1,410	1,390
25-----	341	830	760	394	760	810	364	1,110	1,090
26-----	352	710	670	379	710	730	379	1,180	1,210
27-----	352	760	720	385	790	820	347	1,230	1,150
28-----	370	1,100	1,100	382	810	840	333	1,620	1,460
29-----	424	1,390	1,590	388	840	880	336	1,470	1,330
30-----	367	860	850	394	740	790	361	1,230	1,200
31-----	364	750	740	379	890	910	--	--	--
Total-	11,777	--	29,390	11,365	--	25,550	11,957	--	42,630
Total discharge for year (cfs-days)									139,667
Total load for year (tons)									469,187

a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued
MIDDLE LOUP RIVER AT DUNNING, NEBR. (Total load section)--Continued

Particle-size analyses of suspended sediment, October 1950 to August 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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, 1950 . . .	3:00 p. m.	336	51	990							7	24	64	91	97	--	S
Nov. 8	2:30 p. m.	437	39	1,420							8	28	69	92	99	--	S
Nov. 30	2:10 p. m.	406	38	1,560							6	23	60	89	96	100	S
Dec. 14	2:50 p. m.	497	32	1,800							6	19	68	92	98	--	S
Jan. 24, 1951 . . .	1:30 p. m.	367	33	2,600							4	16	65	94	--	--	S
Feb. 20	6:15 p. m.	367	45	1,260							10	30	71	94	99	100	S
Mar. 14	4:00 p. m.	347	32	1,680							8	29	72	95	99	99	S
Mar. 14	4:00 p. m.	350	32	1,860							7	27	72	95	99	99	S
Mar. 30	7:00 p. m.	367	46	1,410							9	26	66	90	97	--	S
Apr. 25	7:00 p. m.	394	59	902							9	27	66	94	99	--	S
May 11	6:20 p. m.	330	70	748							9	31	64	90	96	98	S
June 4	4:30 p. m.	412	61	935							13	36	73	94	--	--	S
June 26	4:25 p. m.	409	82	652							18	37	68	88	94	96	S
July 26	7:15 p. m.	341	85	543							12	25	61	91	98	--	S
Aug. 16	4:15 p. m.	367	80	654							10	28	62	86	94	98	S
Aug. 30	12:00 p. m.	376	77	716							10	23	58	89	96	--	S

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, approximately, of which about 1,650 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Sediment records: June 1946 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 13,500 ppm May 31; minimum daily, 40 ppm Jan. 30.

Sediment loads: Maximum daily, 68,400 tons May 31; minimum daily, 8 tons Jan. 30.

EXTREMES, 1946-51.--Sediment concentrations: Maximum daily, 19,100 ppm June 19, 1946; minimum daily, 30 ppm Nov. 20-21, 1948.

Sediment loads: Maximum daily, 672,000 tons June 22, 1947; minimum daily, 8 tons Jan. 30, 1951.

REMARKS.--Flow affected by ice Nov. 9-12, 20, 21, 23-27, Dec. 3 to Feb. 23, Mar. 10-16. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Day	Suspended sediment, water year October 1950 to September 1951								
	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	182	380	190	187	230	120	233	1,400	880
2-----	442	4,440	± 6,880	185	300	150	226	910	560
3-----	541	8,310	12,100	182	280	130	194	320	170
4-----	461	5,280	± 7,160	180	390	190	144	190	74
5-----	326	1,160	1,020	174	480	230	67	130	24
6-----	290	900	700	180	280	140	56	100	15
7-----	245	720	480	190	300	150	65	130	23
8-----	221	860	510	190	280	140	80	160	35
9-----	209	760	430	186	290	150	103	190	53
10-----	197	620	330	175	570	270	140	180	68
11-----	190	700	360	173	770	380	158	130	55
12-----	190	1,060	540	194	850	450	178	110	53
13-----	190	590	300	216	1,060	620	188	100	51
14-----	190	440	230	216	540	310	212	170	97
15-----	190	480	250	214	550	320	237	130	83
16-----	190	540	280	209	700	400	237	100	64
17-----	190	540	280	209	800	450	254	120	82
18-----	180	550	270	244	1,040	600	235	150	85
19-----	182	400	200	218	400	240	224	100	60
20-----	187	570	290	201	240	130	219	150	89
21-----	182	470	230	216	230	130	204	250	140
22-----	182	420	210	214	250	140	202	240	130
23-----	190	730	370	200	450	240	198	570	300
24-----	197	460	240	190	280	140	194	440	230
25-----	199	640	340	200	130	70	189	580	300
26-----	197	680	360	220	480	290	182	260	130
27-----	197	530	280	250	3,780	2,550	175	190	90
28-----	197	310	160	283	3,060	2,340	146	190	75
29-----	194	260	140	258	1,530	1,070	146	220	87
30-----	192	320	170	242	2,250	1,470	149	270	110
31-----	190	290	150	--	--	--	160	190	82
Total-	7,110	--	35,450	6,166	--	13,990	5,395	--	4,305

a Computed by subdividing day.

PLATTE RIVER BASIN--Continued

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	164	120	53	82	60	13	269	1,710	1,240
2-----	169	130	59	85	110	25	269	1,480	1,070
3-----	174	150	70	101	90	25	274	1,950	1,440
4-----	184	170	84	138	80	30	269	1,990	1,450
5-----	189	150	77	169	70	32	258	1,460	1,020
6-----	186	110	50	180	70	34	268	1,120	800
7-----	191	130	67	178	140	67	258	1,110	770
8-----	186	80	40	166	150	75	250	1,420	960
9-----	173	80	37	190	120	62	238	1,400	900
10-----	174	160	75	205	90	50	210	1,010	570
11-----	174	100	47	206	120	67	120	390	130
12-----	178	180	87	206	130	72	122	80	26
13-----	171	170	78	198	210	110	126	380	130
14-----	165	200	89	194	370	190	133	1,630	590
15-----	199	180	97	188	120	61	172	2,600	1,210
16-----	207	200	110	190	90	46	230	5,600	3,480
17-----	228	310	190	232	90	56	283	1,300	990
18-----	231	380	240	254	120	82	242	860	560
19-----	232	380	240	300	170	140	226	1,380	840
20-----	183	230	110	317	190	160	238	1,620	1,040
21-----	163	180	79	294	250	200	240	1,730	1,120
22-----	182	200	98	326	1,680	1,480	245	1,270	840
23-----	190	230	120	406	3,480	3,810	266	1,430	1,030
24-----	202	190	100	446	2,700	3,250	269	1,470	1,070
25-----	197	210	110	360	1,950	1,900	266	1,260	900
26-----	202	190	100	330	1,520	1,350	260	1,110	780
27-----	145	280	110	293	1,230	970	266	1,040	750
28-----	84	140	32	283	1,650	1,260	269	1,110	810
29-----	78	60	13	--	--	--	235	760	480
30-----	73	40	8	--	--	--	223	550	330
31-----	78	100	21	--	--	--	233	550	350
Total-	5,352	--	2,691	6,537	--	15,617	7,225	--	27,676
Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	233	720	450	437	2,470	2,910	1,510	9,600	39,100
2-----	240	640	410	368	2,280	2,270	665	5,220	9,370
3-----	235	720	460	319	1,520	1,310	446	2,790	3,360
4-----	233	900	570	312	950	800	372	1,820	1,830
5-----	250	600	410	299	660	530	348	2,000	1,880
6-----	302	1,380	1,130	286	520	400	337	1,520	1,380
7-----	312	1,880	1,580	274	520	380	309	1,140	950
8-----	280	1,850	1,400	252	630	430	316	1,240	1,060
9-----	266	1,780	1,280	299	2,100	1,700	316	1,140	970
10-----	266	1,480	1,060	277	1,360	1,020	376	1,520	1,540
11-----	255	1,290	890	263	950	a670	376	1,710	1,740
12-----	247	1,180	790	247	630	420	306	1,240	1,020
13-----	255	990	680	252	420	290	277	950	710
14-----	247	950	630	274	520	380	410	2,620	s3,030
15-----	242	1,010	660	280	1,150	870	480	6,600	8,550
16-----	226	870	530	706	4,410	s11,600	364	3,420	3,360
17-----	226	900	550	1,500	8,260	33,500	330	1,500	a1,300
18-----	218	640	380	1,560	7,950	33,500	368	1,420	1,410
19-----	221	910	540	1,860	8,720	43,800	421	5,760	6,550
20-----	242	1,170	760	1,280	6,640	22,900	376	3,700	3,760
21-----	266	730	520	916	4,590	11,400	337	2,560	2,330
22-----	272	1,000	730	630	2,970	5,050	526	7,710	s11,900
23-----	258	1,950	1,360	520	2,250	3,160	380	5,320	5,460
24-----	252	1,800	a1,200	480	1,800	2,330	550	7,350	10,900
25-----	263	860	610	470	1,530	1,940	480	5,510	7,140
26-----	269	430	310	406	1,900	2,080	528	6,970	9,940
27-----	935	13,300	s41,500	312	1,800	1,520	475	6,310	8,090
28-----	592	7,030	11,200	280	1,600	1,210	432	5,040	5,880
29-----	461	3,230	4,020	296	1,000	800	419	3,300	a3,700
30-----	451	1,610	1,960	283	1,000	760	401	2,000	2,170
31-----	--	--	--	1,490	13,500	s68,400	--	--	--
Total-	9,015	--	78,570	17,428	--	258,330	13,231	--	160,380

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	392	1,240	1,310	194	940	490	221	800	480
2-----	406	900	990	182	900	440	221	660	390
3-----	384	1,140	1,180	180	700	340	223	580	350
4-----	538	6,010	s 10,800	178	580	280	226	640	390
5-----	680	9,600	17,600	168	620	280	242	760	500
6-----	630	8,460	14,400	174	730	340	252	1,300	a 880
7-----	521	6,510	9,160	170	710	330	286	2,300	1,780
8-----	485	3,040	3,980	164	470	210	312	2,940	2,480
9-----	480	1,400	a 1,800	164	470	210	280	1,990	1,500
10-----	495	1,330	1,780	160	600	260	250	870	590
11-----	851	9,440	21,700	206	1,480	820	238	600	390
12-----	677	8,060	14,700	312	2,250	1,900	272	1,090	800
13-----	451	4,080	4,970	627	7,810	s 14,200	250	1,520	1,050
14-----	372	2,090	2,100	560	7,020	10,600	226	1,230	750
15-----	341	1,520	1,400	593	8,590	s 14,400	247	710	470
16-----	334	1,620	1,460	485	4,320	5,660	245	480	320
17-----	286	1,330	1,030	341	1,660	1,530	223	600	360
18-----	258	1,040	720	296	990	790	206	290	160
19-----	258	860	a 600	258	980	680	206	340	190
20-----	247	660	440	255	1,100	760	206	230	130
21-----	242	760	500	238	820	530	204	1,060	580
22-----	310	5,160	s 5,450	206	700	390	204	1,100	610
23-----	453	6,670	s 9,370	192	820	430	204	700	390
24-----	699	8,360	15,800	197	1,160	620	204	530	290
25-----	410	2,420	2,680	206	1,250	700	211	400	230
26-----	323	2,040	1,780	240	1,440	930	211	400	a 230
27-----	274	1,820	1,200	250	1,610	1,090	206	380	210
28-----	250	950	a 640	250	1,390	940	199	340	180
29-----	242	520	340	228	810	560	187	280	140
30-----	218	620	a 360	218	950	550	190	380	190
31-----	194	820	430	214	880	510	--	--	--
Total-	12,701	--	150,670	8,102	--	61,770	6,852	--	16,990

Total discharge for year (cfs-days) 105,114

Total load for year (tons) 826,439

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued
SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Oct. 2, 1950	4:00 p.m.	644	--	10,600	8,740	--	10	--	18	--	61	82	99		100	SPWCM
Oct. 2	6:35 p.m.	592	--	4,340	6,380	--	22	--	41	--	96	100	--		--	SPWCM
Oct. 4	4:00 p.m.	414	52	2,970	6,720	--	45	--	61	--	83	93	100		--	SPWCM
Oct. 25	12:05 p.m.	190	49	460	1,480	--	26	--	38	--	70	84	98		100	SPWCM
Oct. 4	4:00 p.m.	183	33	584	1,470	--	19	--	25	--	54	72	96		100	SPWCM
Dec. 14	12:15 p.m.	211	33	185	1,240	--	22	26	31	45	60	70	96		--	BWCM
Dec. 29	11:30 a.m.	149	32	184	765	--	24	27	31	42	59	68	87		--	BWCM
Jan. 24, 1951	5:45 p.m.	190	32	189	--	--	--	--	--	--	72	82	100		--	S
Feb. 6	4:30 p.m.	182	32	91	--	--	--	--	--	--	80	88	100		--	S
Feb. 16	12:00 m.	188	32	86	--	--	--	--	--	--	80	90	100		--	S
Mar. 13	4:20 p.m.	126	32	470	3,760	--	23	--	37	--	98	100	--		--	SPWCM
May 9	3:10 p.m.	302	65	3,330	7,710	--	53	--	69	--	89	94	99		100	SPWCM
June 4	3:15 p.m.	368	67	1,780	3,910	--	44	--	58	--	84	96	100		--	SPWCM
Aug. 9	2:30 p.m.	160	79	570	--	--	--	--	--	--	75	87	99		100	S
Aug. 14	4:00 p.m.	536	78	6,750	8,550	30	40	53	65	76	92	97	100		--	SPN
Aug. 14	4:00 p.m.	536	78	6,750	8,550	40	51	60	68	79	93	98	100		--	SPWCM
Aug. 29	2:50 p.m.	226	81	811	1,870	--	33	--	47	--	84	93	99		100	SPWCM
Sept. 5	2:30 p.m.	233	70	930	1,870	--	11	--	36	--	70	84	99		100	SPWCM
Sept. 19	1:35 p.m.	204	65	566	1,330	--	26	--	37	--	68	82	99		100	SPWCM
Sept. 27	12:30 p.m.	206	57	488	1,590	--	34	--	47	--	71	84	100		--	SPWCM

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.

LOCATION.--At bridge on U. S. Highway 281 at St. Paul, Howard County, 400 feet downstream from gaging station and 6 miles upstream from confluence with North Loup River.

DRAINAGE AREA.--7,720 square miles, approximately, of which about 3,200 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Sediment records: April 1946 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 13,300 ppm May 31; minimum daily, 70 ppm Jan. 8.

Sediment loads: Maximum daily, 259,000 tons May 31; minimum daily, 130 tons Jan. 31, Feb. 1.

EXTREMES, 1946-51.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 1,600,000 tons June 23, 1947; minimum daily, not determined.

REMARKS.--Flow affected by ice Nov. 9-12, Nov. 23 to Feb. 25, Mar. 8-15, 18-20. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,260	1,090	s 4,080	1,190	1,100	a 3,500	688	2,640	4,900
2-----	2,240	2,860	17,300	1,130	1,290	3,940	964	--	e 7,000
3-----	1,840	2,850	14,200	1,050	1,420	4,030	973	--	e 7,200
4-----	1,410	3,580	13,600	1,100	2,120	6,300	990	--	e 7,400
5-----	1,220	1,750	5,760	1,070	1,330	3,840	558	--	e 900
6-----	1,200	1,050	3,400	1,050	1,020	2,890	260	--	e 200
7-----	1,240	910	3,050	1,120	--	e 3,000	230	--	e 190
8-----	1,280	930	3,210	1,190	--	e 3,100	275	260	a 190
9-----	1,090	770	2,270	1,100	--	e 3,000	308	200	170
10-----	1,050	520	1,470	1,060	1,030	2,950	353	340	320
11-----	1,120	600	1,810	900	750	1,820	440	430	510
12-----	1,060	780	2,230	1,100	850	2,520	527	340	480
13-----	982	720	1,910	1,240	1,520	5,090	626	650	1,100
14-----	930	510	1,280	1,300	1,500	a 5,300	880	850	2,020
15-----	1,020	520	1,430	1,320	1,250	4,460	1,230	980	3,250
16-----	1,030	500	1,390	1,190	1,320	4,240	1,360	690	2,530
17-----	1,100	690	2,050	1,220	1,400	4,610	1,290	680	2,370
18-----	1,070	560	1,620	1,320	1,180	4,210	1,330	550	1,980
19-----	1,010	700	1,910	1,070	1,300	a 3,800	1,310	710	2,510
20-----	1,130	830	2,530	1,030	2,080	5,780	1,230	940	3,120
21-----	1,170	770	2,430	1,050	1,730	4,900	1,250	830	2,800
22-----	1,280	810	2,800	1,240	1,820	6,090	1,300	700	a 2,500
23-----	1,340	870	3,150	800	--	e 3,400	1,360	660	2,420
24-----	1,220	810	2,670	358	--	e 1,500	1,380	820	3,060
25-----	1,100	780	2,320	258	1,480	1,030	1,270	680	2,330
26-----	1,060	1,000	2,860	375	2,000	b 2,000	1,200	400	a 1,300
27-----	1,130	1,000	a 3,100	626	2,500	b 4,200	996	200	540
28-----	1,140	1,000	3,080	700	3,310	6,260	983	90	240
29-----	1,130	970	2,960	750	3,850	7,800	878	110	260
30-----	1,140	940	2,890	741	3,620	7,240	836	470	1,060
31-----	1,100	800	2,380	--	--	--	970	550	a 1,400
Total-	37,092	--	117,140	29,648	--	122,800	28,245	--	66,250

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,230	530	1,760	286	170	130	1,990	2,120	11,400
2-----	1,250	400	1,350	298	240	190	1,720	2,300	10,700
3-----	1,200	160	520	358	420	410	1,700	2,850	13,100
4-----	975	300	790	434	390	460	1,540	2,390	9,940
5-----	870	--	e 750	540	540	790	1,410	1,780	6,780
6-----	898	--	e 700	691	780	1,480	1,530	2,680	11,100
7-----	858	--	e 800	908	780	1,910	1,450	--	e 9,600
8-----	858	70	160	924	570	1,420	1,200	--	e 4,000
9-----	856	120	280	1,040	500	1,410	800	--	e 2,000
10-----	893	180	430	1,170	450	1,420	700	--	e 1,500
11-----	921	200	500	1,250	460	1,550	300	--	e 460
12-----	940	270	690	1,230	550	1,830	400	440	480
13-----	1,040	260	730	1,200	650	a 2,100	500	350	470
14-----	1,090	230	680	1,170	740	2,340	750	--	e 1,100
15-----	1,110	240	a 700	1,220	520	1,710	914	1,700	b 4,200
16-----	1,170	280	880	1,160	270	850	1,660	2,840	12,700
17-----	1,270	320	1,100	1,100	190	560	2,150	2,900	a 17,000
18-----	1,350	350	1,280	1,220	200	660	1,600	2,990	12,900
19-----	1,330	330	1,190	1,330	200	720	1,200	2,700	8,750
20-----	1,100	240	710	1,470	270	1,070	1,100	2,220	6,590
21-----	1,000	160	430	1,830	280	1,380	1,060	2,000	5,720
22-----	874	180	420	2,220	410	2,460	1,220	2,050	6,750
23-----	720	250	490	2,920	1,070	8,440	1,680	2,130	9,660
24-----	641	200	350	3,380	3,710	33,900	1,340	1,690	6,110
25-----	829	270	600	2,720	4,060	s 30,100	1,170	1,340	4,230
26-----	975	250	660	2,420	2,720	17,800	1,190	1,400	4,500
27-----	902	260	630	2,130	1,900	10,900	1,260	1,340	4,560
28-----	536	280	a 400	2,070	1,970	11,000	1,460	1,450	5,720
29-----	366	310	310	--	--	--	1,370	1,500	5,550
30-----	260	260	180	--	--	--	1,340	1,340	4,850
31-----	214	220	a 130	--	--	--	1,260	1,380	4,690
Total--	28,514	--	20,000	38,669	--	138,970	38,964	--	207,110
	April			May			June		
1-----	1,140	1,260	3,880	1,750	3,050	14,400	3,780	8,980	91,600
2-----	1,160	1,060	3,400	1,490	2,650	10,700	2,110	4,050	23,100
3-----	1,200	1,050	3,400	1,090	1,530	4,500	1,790	2,700	13,000
4-----	1,230	1,250	4,150	918	1,160	2,880	1,540	2,120	8,810
5-----	1,240	1,130	3,780	1,020	1,030	2,840	1,350	1,730	6,310
6-----	1,280	1,440	4,980	1,050	1,070	3,030	1,410	1,370	5,220
7-----	1,530	1,540	6,360	1,120	830	2,510	1,400	1,210	4,570
8-----	1,380	1,480	5,510	1,130	820	2,500	1,350	960	3,500
9-----	1,200	1,700	5,510	1,140	710	2,190	1,540	1,300	5,410
10-----	1,240	1,640	5,490	1,240	930	3,110	1,530	1,200	a 5,000
11-----	1,280	1,430	4,940	1,130	950	2,900	1,340	1,080	3,910
12-----	1,140	1,060	3,260	995	730	1,960	1,320	940	3,350
13-----	1,030	1,000	2,780	1,030	700	1,950	1,260	840	2,860
14-----	1,060	1,080	3,090	1,170	980	3,100	1,610	1,200	5,220
15-----	1,050	1,120	3,180	2,010	2,070	s 12,600	2,010	2,320	s 13,100
16-----	1,070	1,240	3,580	3,390	2,880	26,400	1,370	2,260	8,360
17-----	1,140	1,050	3,230	3,750	3,670	s 37,600	1,200	1,460	4,730
18-----	1,100	830	2,470	3,480	3,990	37,500	1,280	1,140	3,940
19-----	1,010	860	2,350	4,330	4,240	49,600	1,900	1,780	9,130
20-----	1,340	1,740	6,300	3,390	3,800	34,800	1,480	2,200	8,790
21-----	1,630	1,450	6,380	2,820	3,830	29,200	1,410	1,620	6,170
22-----	1,810	1,460	7,140	2,400	2,160	14,000	1,820	1,660	s 9,030
23-----	1,370	1,380	5,100	1,970	1,990	10,600	2,050	2,610	14,400
24-----	1,410	1,400	a 5,300	1,660	1,400	6,270	2,420	2,810	16,900
25-----	1,580	1,410	6,020	1,600	1,620	7,000	1,940	3,500	18,300
26-----	1,610	1,400	a 6,100	1,750	1,800	8,510	1,870	3,920	s 22,100
27-----	3,230	7,270	s 82,700	1,540	1,630	6,780	1,640	5,700	s 25,700
28-----	2,360	8,160	s 60,200	1,320	1,240	4,420	1,400	5,900	22,300
29-----	1,320	2,130	7,590	1,220	930	3,060	1,260	2,180	7,420
30-----	1,410	2,150	s 8,310	1,460	1,760	s 9,800	1,170	1,820	5,750
31-----	--	--	--	7,210	13,300	259,000	--	--	--
Total--	41,550	--	276,400	61,573	--	615,710	49,550	--	377,980

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,170	1,300	4,110	943	710	1,810	1,070	860	1,910
2-----	1,230	1,090	3,620	834	840	1,890	1,070	840	1,850
3-----	3,320	6,700	s 82,400	799	590	1,270	1,260	840	2,860
4-----	3,080	7,200	59,900	755	520	1,080	1,200	850	2,750
5-----	1,770	4,880	23,300	690	680	1,270	1,540	1,440	5,990
6-----	1,530	3,260	13,500	680	480	880	1,960	2,160	s 11,700
7-----	1,280	1,730	5,980	690	400	750	1,650	1,590	7,080
8-----	1,170	1,150	3,630	690	510	950	1,450	1,200	4,700
9-----	1,220	980	3,230	882	530	1,260	1,510	770	3,140
10-----	1,370	1,180	4,360	1,140	700	2,150	1,340	780	2,750
11-----	1,920	3,170	16,400	1,160	650	2,040	1,320	600	2,140
12-----	1,540	3,730	15,500	1,400	1,250	s 5,080	1,610	1,200	5,220
13-----	1,460	2,820	11,100	2,640	3,750	s 34,000	1,630	1,450	6,380
14-----	1,030	1,720	4,780	3,170	4,480	s 40,500	1,380	1,340	4,990
15-----	995	1,170	3,140	1,450	4,220	16,500	1,190	870	2,800
16-----	1,100	1,300	a 3,900	1,010	2,830	7,720	1,340	1,050	3,800
17-----	1,130	1,400	4,270	956	1,470	3,790	1,180	1,480	4,640
18-----	1,230	1,300	a 4,300	858	850	1,970	982	1,270	3,370
19-----	1,230	1,100	a 3,700	834	600	1,350	1,100	1,220	3,620
20-----	1,300	900	3,160	882	700	1,670	982	940	2,490
21-----	1,220	700	2,310	1,280	1,880	s 8,390	1,060	950	2,720
22-----	1,480	1,650	s 7,190	1,040	1,000	2,810	1,750	1,090	5,150
23-----	1,410	1,740	s 6,770	1,020	700	1,930	1,540	1,180	4,910
24-----	1,630	2,420	10,700	1,100	890	2,640	1,320	1,140	4,060
25-----	1,130	1,950	5,950	1,380	1,130	4,210	1,240	1,170	3,920
26-----	918	1,240	3,070	1,200	920	2,980	1,100	1,030	3,060
27-----	846	830	1,900	1,300	770	2,700	1,260	1,320	4,490
28-----	846	670	1,530	1,140	600	1,850	1,230	1,420	4,720
29-----	930	720	1,810	1,130	570	1,740	858	1,140	2,640
30-----	906	680	1,660	1,070	560	1,620	834	900	2,030
31-----	943	660	1,680	1,020	610	1,690	--	--	--
Total-	42,334	--	318,850	35,143	--	160,440	38,936	--	121,880
Total discharge for year (cfs-days)									470,238
Total load for year (tons)									2,543,530

s Computed by subdividing day.

a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
 (Methods of analysis: B, bottom with raw tail tube; D, decantation; P, pipette; S, sieve; N, in native water;
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Instantaneous discharge (cfs)	Water temperature per-centage (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspen- sion 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	0.350	0.500		1.000
Oct. 2, 1950	6:30 a. m.	2,530	--	2,740	3,500		8		14		46	68	95		100	--	SPWCM
Oct. 11	6:10 p. m.	1,020	--	668	1,530		15		21		42	67	95		100	--	SPWCM
Oct. 20	4:00 p. m.	1,120	--	806	1,260		10		13		26	48	80		99	100	SPWCM
Nov. 6	2:00 p. m.	943	--	1,030	1,300		8		11		26	48	96		100	--	SPWCM
Nov. 16	5:00 p. m.	1,140	--	1,370	1,920		8		13		27	55	97		100	--	SPWCM
Nov. 26	4:40 p. m.	448	--	2,320	--		--		--		10	29	82		95	100	S
Dec. 15	2:30 p. m.	1,080	--	656	--		--		--		12	25	78		100	--	S
Jan. 4, 1951	4:20 p. m.	903	--	300	--		--		--		21	39	93		99	100	S
Jan. 9	1:25 p. m.	835	--	140	--		--		--		60	86	97		100	--	S
Jan. 29	3:30 p. m.	358	35	309	--		--		--		21	40	100		--	--	S
Mar. 5	4:30 p. m.	1,600	45	1,670	1,780		5		8		20	43	91		100	--	SPWCM
Mar. 26	2:30 p. m.	1,260	38	1,610	3,250		9		15		42	67	98		100	--	SPWCM
Apr. 20	5:30 p. m.	1,510	--	2,430	2,670		4		8		24	44	94		100	--	SPWCM
Apr. 22	8:00 a. m.	1,860	--	1,560	1,990		6		11		28	51	94		100	--	SPWCM
May 14	4:30 p. m.	1,280	65	1,020	2,080		11		17		42	61	90		100	--	SPWCM
May 23	2:30 p. m.	2,030	74	1,960	3,700		17		24		41	55	87		100	--	SPWCM
June 11	3:40 p. m.	1,190	77	980	2,360		20		29		52	70	92		100	--	SPWCM
June 15	4:10 p. m.	2,530	--	4,110	6,910		22		25		77	86	97		100	--	SPWCM
June 27	7:00 a. m.	1,840	--	5,930	11,500		52		70		84	89	--		--	--	SPWCM
July 3	12:30 p. m.	1,650	--	2,840	--		--		--		68	78	98		100	--	S
July 3	11:45 p. m.	4,680	--	9,810	19,100		36		50		78	89	--		--	--	SPWCM
July 20	5:00 p. m.	1,220	--	881	--		--		--		37	58	93		100	--	S
July 21	4:30 p. m.	1,140	--	662	--		--		--		49	58	94		100	--	S
July 23	12:00 m.	1,530	--	2,060	3,820		34		47		68	80	94		100	--	SPWCM
Aug. 1	3:30 p. m.	943	--	703	--		--		--		57	71	93		100	--	S
Aug. 6	4:30 p. m.	660	--	372	--		--		--		41	61	93		100	--	S
Aug. 19	5:00 p. m.	846	--	568	--		--		--		76	77	96		100	--	S
Aug. 25	3:30 p. m.	1,540	--	1,180	--		--		--		39	53	86		100	--	S
Sept. 4	4:30 p. m.	1,170	--	848	--		--		--		33	53	89		100	--	S
Sept. 12	12:50 p. m.	1,640	--	1,350	--		--		--		31	56	87		100	--	S
Sept. 18	11:15 a. m.	1,956	64	1,260	--		--		--		24	58	98		100	--	S

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.

LOCATION.--At bridge on U. S. Highway 281, 60 feet upstream from gaging station, 3 miles north of St. Paul, Howard County, and 4 miles upstream from confluence with the Middle Loup River.

DRAINAGE AREA.--4,460 square miles, approximately, of which about 1,270 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: April to November 1948.

Sediment records: April 1946 to September 1951.

EXTREMES, 1950-51.--Sediment concentrations: Maximum daily, 17,200 ppm Apr. 27; minimum daily, 40 ppm Dec. 8.

Sediment loads: Maximum daily, 99,100 tons Apr. 27; minimum daily, 50 tons Dec. 7.

EXTREMES, 1946-51.--Sediment concentrations: Maximum daily, 17,200 ppm Apr. 27, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 463,000 tons June 22, 1947; minimum daily, 20 tons

Aug. 3, 1946.

REMARKS.--Flow affected by ice Nov. 10-13, Nov. 20 to Feb. 26, Mar. 8-17. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,610	3,200	sa 22,000	1,040	290	810	1,130	--	e 1,900
2-----	2,120	4,440	25,400	1,060	370	1,060	1,030	--	e 1,600
3-----	1,580	1,730	7,380	1,070	430	1,240	912	--	e 1,300
4-----	1,200	860	2,790	1,040	460	1,290	819	--	e 1,100
5-----	1,100	520	1,540	1,030	450	1,250	450	--	e 220
6-----	1,000	370	1,000	980	380	1,010	450	--	e 60
7-----	980	440	1,160	968	330	860	400	50	50
8-----	955	450	1,160	1,070	--	e 950	550	40	60
9-----	894	320	770	1,040	--	e 900	600	--	e 160
10-----	894	340	820	850	--	e 800	750	--	e 600
11-----	894	370	890	650	470	820	854	470	1,080
12-----	859	320	740	750	630	1,280	897	--	e 1,100
13-----	859	390	900	915	680	1,680	1,020	--	e 1,200
14-----	870	320	750	1,060	590	1,690	1,030	--	e 1,000
15-----	859	470	1,090	1,170	730	2,310	1,130	340	1,040
16-----	894	330	800	1,200	650	a 2,100	1,130	260	790
17-----	894	280	680	1,140	460	1,420	1,060	170	a 480
18-----	882	280	670	1,100	350	1,040	1,010	130	350
19-----	859	300	700	1,130	480	1,460	975	130	340
20-----	836	460	1,040	1,050	700	a 2,000	958	160	a 420
21-----	848	460	1,050	1,000	860	2,320	969	190	500
22-----	905	400	a 1,000	1,000	730	1,970	1,020	--	e 550
23-----	930	390	980	927	--	1,200	1,040	--	e 550
24-----	930	360	900	440	--	e 360	1,110	--	e 650
25-----	882	350	830	280	220	170	1,120	--	e 650
26-----	882	330	790	610	280	460	1,040	220	620
27-----	894	310	750	681	760	a 1,480	916	100	250
28-----	905	350	860	1,010	1,060	2,890	700	--	e 150
29-----	905	270	660	1,210	920	3,010	760	--	e 220
30-----	894	230	560	1,130	760	2,320	880	--	e 240
31-----	942	250	640	--	--	--	975	--	e 320
Total--	30,956	--	81,300	28,611	--	42,160	27,685	--	19,550

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,040	--	e 360	421	190	220	1,580	1,870	7,120
2-----	992	120	320	493	200	270	1,820	1,470	6,430
3-----	921	120	300	632	200	340	1,480	1,400	a 5,500
4-----	1,020	--	e 300	858	210	490	1,110	1,350	4,050
5-----	843	--	e 180	979	170	450	955	1,050	2,710
6-----	864	60	140	944	210	540	1,180	1,150	s 3,730
7-----	732	60	120	912	160	390	1,200	1,160	3,760
8-----	729	80	160	905	120	290	1,100	--	e 2,500
9-----	745	90	180	850	120	280	1,000	--	e 1,300
10-----	778	100	210	876	150	350	850	--	e 400
11-----	812	110	240	926	190	480	550	--	e 320
12-----	856	120	280	965	200	a 500	400	--	e 220
13-----	872	130	310	961	180	470	340	--	e 190
14-----	948	120	a 300	874	110	260	550	530	790
15-----	902	100	240	807	100	220	860	1,330	3,090
16-----	915	120	300	890	110	260	1,300	1,710	6,000
17-----	978	170	450	979	130	340	1,500	2,230	9,030
18-----	993	--	e 460	1,010	140	380	1,960	1,600	a 6,700
19-----	1,010	--	e 400	1,080	190	550	1,300	1,650	5,790
20-----	993	--	e 320	1,130	140	430	1,140	1,160	3,570
21-----	750	70	140	1,250	80	270	1,060	1,400	4,010
22-----	614	70	120	1,360	70	260	1,040	1,650	4,630
23-----	598	100	160	1,600	--	e 2,400	1,060	1,960	5,610
24-----	735	110	220	1,960	2,500	sa 14,000	1,060	1,430	4,090
25-----	815	140	310	1,610	1,810	s 8,120	1,000	1,090	2,940
26-----	714	130	250	1,270	1,760	6,040	1,000	770	2,080
27-----	640	90	160	1,200	3,300	3,300	1,030	720	2,000
28-----	396	80	a 90	1,300	1,350	4,740	1,170	1,030	3,250
29-----	282	100	80	--	--	--	1,130	980	2,990
30-----	265	120	80	--	--	--	1,040	880	2,470
31-----	347	150	a 140	--	--	--	968	820	2,140
Total--	24,099	--	7,320	29,042	--	46,640	33,113	--	109,410
Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	980	770	2,040	1,380	1,210	4,510	1,280	2,950	10,200
2-----	992	600	1,610	1,370	1,160	4,290	1,490	2,700	10,900
3-----	955	450	1,160	1,260	880	2,990	1,690	1,820	8,300
4-----	968	480	1,250	1,230	640	2,130	1,560	1,130	4,760
5-----	1,020	580	1,600	1,170	570	1,800	1,460	870	3,430
6-----	1,160	790	2,470	1,040	520	1,460	1,380	750	2,790
7-----	1,160	960	3,010	1,020	500	1,380	1,290	610	2,120
8-----	1,140	1,030	3,170	905	460	1,120	1,230	560	1,860
9-----	1,070	710	2,050	930	490	1,230	1,260	660	2,250
10-----	1,070	560	1,620	918	470	1,160	1,690	1,320	6,020
11-----	1,140	760	2,340	894	460	1,110	1,290	790	2,750
12-----	1,060	640	1,830	813	420	920	1,110	540	1,620
13-----	905	450	1,100	859	410	950	1,020	430	1,180
14-----	918	530	1,310	1,000	600	1,620	1,090	440	1,290
15-----	955	580	1,500	1,530	2,670	s 16,700	1,540	1,200	sa 6,700
16-----	894	480	1,160	2,120	3,600	20,600	2,000	1,600	a 8,800
17-----	894	460	1,110	2,610	2,700	19,000	1,580	820	3,500
18-----	918	480	1,190	2,620	1,920	s 14,100	1,650	1,200	5,350
19-----	905	440	1,080	2,360	2,640	16,800	1,370	940	3,480
20-----	1,020	580	1,600	1,940	960	5,030	1,160	510	1,600
21-----	1,230	1,280	4,250	1,720	700	3,250	1,390	700	2,630
22-----	1,110	1,150	3,450	1,620	580	2,540	1,350	560	2,040
23-----	1,070	690	1,990	1,620	560	2,450	1,280	450	1,560
24-----	1,130	650	1,980	1,400	440	1,660	1,560	3,130	s 13,700
25-----	1,230	690	2,290	1,240	400	1,340	1,380	1,060	3,950
26-----	1,260	640	2,180	1,290	470	1,640	1,940	5,920	s 31,400
27-----	1,770	17,200	s 99,100	1,170	420	1,330	1,320	1,910	6,810
28-----	1,380	2,620	9,760	1,070	390	1,130	1,240	670	2,240
29-----	1,320	1,250	4,460	968	310	810	1,370	760	2,810
30-----	1,370	1,840	6,810	1,050	1,650	s 6,560	1,180	550	1,750
31-----	--	--	--	1,890	8,100	s 48,400	--	--	--
Total--	32,994	--	170,470	43,007	--	190,010	42,150	--	157,590

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,160	480	1,500	748	280	a 550	1,040	410	1,150
2-----	1,230	500	1,660	706	290	550	1,060	360	1,030
3-----	2,430	11,800	s 82,800	627	200	340	1,110	430	1,280
4-----	1,630	3,000	13,200	526	170	240	1,140	400	a 1,200
5-----	1,280	920	3,180	509	230	320	1,540	1,290	s 6,210
6-----	1,220	600	1,980	476	170	220	2,390	3,250	s 21,800
7-----	1,180	470	1,500	436	120	140	1,620	1,260	5,510
8-----	1,110	440	1,320	742	2,320	s 9,140	1,420	630	2,420
9-----	1,030	400	1,110	1,100	4,950	s 15,100	1,280	530	1,830
10-----	1,070	460	1,330	1,440	4,000	15,600	1,180	420	1,340
11-----	1,200	750	2,430	1,700	2,670	12,300	1,240	420	1,410
12-----	1,350	920	3,350	2,360	2,950	18,800	2,710	3,670	s 30,500
13-----	1,500	1,050	4,250	4,120	7,850	a 93,000	1,850	3,000	15,000
14-----	1,400	820	3,100	2,740	2,900	21,500	1,500	850	3,440
15-----	1,220	540	1,780	2,040	1,000	5,510	1,400	550	2,080
16-----	1,180	440	1,400	1,650	620	2,760	1,290	340	1,180
17-----	1,110	460	1,380	2,020	1,820	s 10,500	1,200	400	a 1,300
18-----	1,340	1,410	s 8,130	1,530	1,330	5,490	1,200	460	1,490
19-----	1,850	3,700	18,500	1,040	550	a 1,500	1,200	370	1,200
20-----	1,140	1,020	3,140	1,020	570	1,570	1,140	390	1,200
21-----	1,080	630	s 2,360	1,670	1,750	7,890	1,130	400	1,220
22-----	2,190	5,730	33,900	1,600	1,350	5,830	1,180	380	1,210
23-----	1,060	1,350	3,860	1,550	980	4,100	1,140	410	1,260
24-----	942	450	1,140	1,600	1,780	s 7,630	1,160	470	1,470
25-----	894	370	890	1,900	1,550	7,950	1,140	590	1,820
26-----	870	330	780	1,350	850	3,100	1,170	500	1,580
27-----	859	320	740	1,320	1,000	3,560	1,110	400	1,200
28-----	824	320	710	1,170	730	2,310	1,070	400	1,160
29-----	824	300	670	1,070	390	1,130	1,030	370	1,030
30-----	870	300	700	1,040	430	1,210	992	350	940
31-----	859	280	650	1,040	430	1,210	--	--	--
Total-	37,902	--	203,440	42,840	--	261,050	39,632	--	115,470
Total discharge for year (cfs-days)									412,031
Total load for year (tons)									1,404,410

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued
NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500	1.000	
Oct. 2, 1950	11:25 a. m.	2,200	52	4,020	3,700	29	38	45	53	62	80	89	99		100	--	SPWCM
	Oct. 2	2,200	52	4,020	2,210	--	28	35	42	53	63	76	86		93	--	BNM
	6:00 p. m.	882	--	248	1,500	10	12	18	21	28	33	43	63		--	--	BWMC
	4:10 p. m.	882	--	281	1,250	--	21	27	40	51	62	77		--	--	--	BWMC
	12:30 p. m.	903	32	672	2,880	--	7	11	14	21	33	57		--	--	--	BWMC
	Nov. 13	926	--	616	2,890	--	5	7	11	15	22	36	52		--	--	BWMC
	5:30 p. m.	950	--	877	3,150	--	8	9	10	13	18	30	54		--	--	BWMC
	3:30 p. m.	1,170	--	840	--	--	--	--	--	--	20	30	69		99	100	S
	Dec. 15	992	33	132	530	--	21	25	26	37	47	62	88		--	--	BWMC
	Jan. 2, 1951	603	--	78	--	--	--	--	--	--	60	72	90		100	--	S
	Jan. 22																
	Feb. 27	1,130	39	756	--	--	--	--	--	--	10	42	82		98	100	S
	4:30 p. m.	1,260	36	1,080	1,700	--	16	--	22	--	26	47	83		98	100	SPWCM
	Mar. 6	955	--	1,650	1,400	--	4	--	6	--	19	34	76		98	100	SPWCM
	4:45 p. m.	1,060	--	2,070	5,760	--	22	--	31	--	61	68	89		99	100	SPWCM
	Mar. 23	980	55	707	1,650	--	15	--	20	--	45	60	90		100	--	SPWCM
	2:35 p. m.																
	Apr. 13	918	--	404	--	--	--	--	--	--	49	52	90		100	--	S
	6:00 p. m.	1,130	47	666	--	--	--	--	--	--	25	42	79		100	--	S
	9:45 a. m.	955	--	445	--	--	--	--	--	--	59	61	--		--	--	S
	May 10	1,480	60	852	--	--	--	--	--	--	48	64	87		--	--	S
	June 5	1,780	77	1,260	1,830	--	22	--	34	--	64	74	93		100	--	SPWCM
	4:30 p. m.																
	June 18																
	July 3	3,390	--	16,500	34,500	--	31	--	52	--	89	95	99		100	--	SPWCM
	9:30 a. m.	2,060	--	9,700	20,700	--	35	--	58	--	90	93	--		100	--	SPWCM
	6:35 p. m.	830	86	434	--	--	--	--	--	--	83	91	98		100	--	S
	4:45 p. m.	530	87	276	--	--	--	--	--	--	67	81	95		100	--	S
	July 24	420	--	110	--	--	--	--	--	--	63	--	--		--	--	S
	5:30 p. m.																
	Aug. 7																
	5:45 p. m.																

Aug. 14, 1951...	4:30 p. m.	2,660	--	2,090	1,900	38	42	49	56	66	85	92	98	100	--	SPWMC
Aug. 14	4:30 p. m.	2,660	--	2,090	2,010	29	35	43	52	63	83	90	98	100	--	SPNM
Aug. 20	1:15 p. m.	930	76	337	1,400	--	28	--	34	--	75	76	90	--	--	SPWMC
Aug. 21	6:00 p. m.	1,890	--	2,150	4,860	27	36	42	49	62	84	91	98	100	--	SPWMC
Aug. 25	3:30 p. m.	1,700	--	1,450	2,810	32	40	43	49	58	79	88	97	100	--	SPWMC
Sept. 5	10:30 p. m.	2,260	--	3,520	2,020	20	23	29	37	52	70	--	--	--	--	BNM
Sept. 5	10:30 p. m.	2,260	--	3,520	3,080	--	26	31	38	52	76	84	96	100	--	SPWMC
Sept. 6	6:30 a. m.	3,070	--	4,040	7,770	--	18	--	28	--	72	85	96	100	--	SPWMC

PLATTE RIVER BASIN--Continued

BEAVER CREEK AT LORETTO, NEBR.

LOCATION.--At county highway bridge at gaging station at west edge of Loretto, Boone County.

DRAINAGE AREA.--311 square miles, of which about 100 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: April 1948 to March 1949.

Sediment records: June 1946 to November 1950 (discontinued).

EXTREMES, October to November 1950.--Sediment concentrations: Maximum daily, 1,000 ppm Oct. 2; minimum daily, 29 ppm Nov. 6.

Sediment loads: Maximum daily, 451 tons Oct. 2; minimum daily, 5 tons Nov. 6, 7.

EXTREMES, 1946-50.--Sediment concentrations: Maximum daily, 11,200 ppm May 15, 1947; minimum daily, not determined.

Sediment loads: Maximum daily; 39,000 tons June 2, 1950; minimum daily, 1 ton Feb. 6, 7, 9, 1948, Jan. 14, 18, 1950.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in

Water-Supply Paper 1210.

Suspended sediment, October to November 1950

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	61	94	15	58	58	9			
2-----	146	1,000	s 451	58	62	10			
3-----	180	590	287	64	58	10			
4-----	162	400	175	65	50	9			
5-----	132	240	86	64	40	7			
6-----	118	220	70	62	29	5			
7-----	104	180	51	60	30	5			
8-----	94	140	36	60	39	6			
9-----	87	130	31	--	--	--			
10-----	82	130	29	--	--	--			
11-----	78	110	23	--	--	--			
12-----	75	87	18	--	--	--			
13-----	72	80	a 16	--	--	--			
14-----	69	83	15	--	--	--			
15-----	66	70	a 12	--	--	--			
16-----	66	57	10	--	--	--			
17-----	64	50	a 9	--	--	--			
18-----	66	57	10	--	--	--			
19-----	64	59	10	--	--	--			
20-----	60	52	8	--	--	--			
21-----	60	40	a 6	--	--	--			
22-----	60	36	6	--	--	--			
23-----	60	44	7	--	--	--			
24-----	61	58	10	--	--	--			
25-----	60	44	7	--	--	--			
26-----	60	58	9	--	--	--			
27-----	62	62	10	--	--	--			
28-----	60	50	a 8	--	--	--			
29-----	59	50	a 8	--	--	--			
30-----	58	57	9	--	--	--			
31-----	58	80	13	--	--	--			
Total-	2,504	--	1,460	491	--	61			

Total discharge for period Oct. 1 to Nov. 8, 1950 (cfs-days) 2,995

Total load for period Oct. 1 to Nov. 8, 1950 (tons) 1,521

s Computed by subdividing day.

a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

PLATTE RIVER NEAR ASHLAND, NEBR.

LOCATION.--At gaging station at bridge on U. S. Highway 6, 100 feet downstream from Chicago, Burlington & Quincy Railroad bridge, 2 miles upstream from Salt Creek, and 3 miles northeast of Ashland, Saunders County.
 DRAINAGE AREA.--83,800 square miles, approximately.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, November 1950 to August 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Nov. 8, 1950	5,150	31	0.04	55	10	30	30	197	7	55	8.0	0.4	2.2	0.10	296	0.40		179	6	27	447	8.3
Nov. 29	2,320	34	.04	65	14	33	33	241	7	64	11	.3	1.7	.15	360	.49		221	12	25	527	8.4
Jan. 11, 1951	2,140	36	.04	53	11	36	36	228	0	74	11	.3	1.7	.10	352	.48		203	16	28	519	8.0
Mar. 23	10,600	26	.03	50	7.5	32	32	180	0	60	9.0	.3	4.0	.00	288	.39		156	8	31	417	7.9
Apr. 10	9,680	24	.05	59	14	30	30	245	0	51	7.0	.4	4.5	.07	320	.44		203	2	24	493	7.6
May 4	11,300	23	.04	55	12	33	33	239	0	46	6.5	.5	3.5	.16	316	.43		186	0	23	471	7.8
June 27	10,400	23	.04	59	9.7	24	24	207	0	38	4.0	.5	4.8	.04	268	.37		183	0	24	462	7.6
July 11	6,860	23	.05	56	12	27	27	227	0	46	6.0	.4	4.1	.07	306	.42		189	0	23	450	8.0
Aug. 6	3,480	29	.04	58	14	26	26	215	9	51	8.0	.2	2.5	--	332	.45		201	10	22	462	8.4

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.

LOCATION.--At gaging station at bridge on North 27th Street at north edge of Lincoln, Lancaster County, 1 mile downstream from Oak Creek.

RECORDS AVAILABLE.--Water temperatures: May to September 1951.

Sediment records: March to September 1951.

EXTREMES, March to September 1951.--Water temperatures (May to September 1951): Maximum, 89°F July 21.

Sediment concentrations: Maximum daily, 34,000 ppm June 11, 24; minimum daily, 10 ppm Sept. 22.

Sediment loads: Maximum daily, 857,000 tons June 2; minimum daily, 3 tons Sept. 22, 23.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, May to September 1951

[Once-daily temperature measurement between 7 a.m. and 11 a.m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	66	68	a 80	67
2								a 64	61	a 74	a 83	66
3								--	56	72	a 80	68
4								--	58	69	a 85	66
5								--	58	65	74	64
6								--	58	69	70	--
7								--	60	71	79	65
8								a 67	63	76	80	67
9								a 68	64	70	74	67
10								--	66	66	74	64
11								--	61	64	72	67
12								--	64	a 66	76	63
13								58	67	65	70	64
14								--	66	65	69	61
15								60	68	76	69	61
16								--	69	--	69	55
17								66	73	a 87	69	a 75
18								67	68	a 87	69	a 71
19								63	70	a 87	72	a 72
20								a 73	68	a 84	75	a 74
21								66	63	a 89	70	a 52
22								63	65	a 73	68	a 67
23								63	68	--	67	a 63
24								65	67	a 86	69	a 56
25							47	66	71	a 84	71	--
26								61	68	a 85	73	a 69
27								63	70	a 83	70	a 61
28								63	67	--	a 71	--
29								65	66	a 88	a 75	a 64
30								71	66	a 83	76	a 72
31								71	--	--	75	--
Average							--	--	65	76	74	65

a Observations made after 12 m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.--Continued

Suspended sediment, March to September 1951

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----							--	--	--
2-----							--	--	--
3-----							--	--	--
4-----							--	--	--
5-----							--	--	--
6-----							--	--	--
7-----							--	--	--
8-----							--	--	--
9-----							--	--	--
10-----							--	--	--
11-----							--	--	--
12-----							--	--	--
13-----							--	--	--
14-----							--	--	--
15-----							--	--	--
16-----							106	300	86
17-----							150	550	223
18-----							193	1,450	756
19-----							142	520	199
20-----							113	480	146
21-----							134	410	148
22-----							113	330	101
23-----							783	15,000	sa 35,000
24-----							190	4,980	s 2,990
25-----							145	2,510	983
26-----							132	2,090	745
27-----							120	1,730	560
28-----							223	3,600	sa 2,400
29-----							473	9,850	12,600
30-----							174	4,180	1,960
31-----							122	1,400	461
Total--							3,313	--	59,358
Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	98	--	e 190	2,960	16,000	s 126,000	8,340	32,200	s 683,000
2-----	94	--	e 70	1,880	8,880	s 42,700	22,100	13,700	s 857,000
3-----	94	--	e 65	397	4,950	5,300	4,350	7,430	87,300
4-----	84	--	e 44	238	1,600	1,030	753	7,300	14,800
5-----	92	--	e 65	183	640	316	443	3,500	4,190
6-----	111	--	e 140	147	600	b 240	504	4,400	a 5,990
7-----	120	680	214	127	550	188	5,120	24,700	s 411,000
8-----	127	600	b 200	127	510	175	3,110	11,500	s 107,000
9-----	140	1,600	a 600	124	620	208	1,040	3,800	10,700
10-----	145	1,500	b 600	165	4,000	a 1,800	855	4,300	b 15,000
11-----	111	--	e 150	153	2,750	1,140	2,550	34,000	sa 260,000
12-----	78	--	e 34	117	850	268	990	10,000	sa 30,000
13-----	94	--	e 70	88	520	124	580	2,700	4,230
14-----	98	--	e 80	234	2,300	sa 2,000	2,550	14,000	s 153,000
15-----	102	--	e 100	1,030	10,400	s 31,100	3,410	17,000	sa 150,000
16-----	86	--	e 50	281	5,580	4,230	1,270	7,000	s 27,600
17-----	78	--	e 34	266	3,400	2,440	630	2,250	3,830
18-----	78	--	e 34	238	1,460	938	10,700	22,700	s 716,000
19-----	78	--	e 34	589	9,800	a 16,000	5,100	6,880	s 106,000
20-----	183	1,200	b 600	413	7,000	s 8,600	1,210	3,800	12,400
21-----	316	4,200	sa 4,600	213	2,030	1,170	3,120	14,000	sa 140,000
22-----	649	9,900	sa 18,000	344	3,500	a 3,200	2,760	9,600	a 72,000
23-----	187	3,950	s 2,280	156	2,100	b 900	2,170	7,200	a 42,000
24-----	200	2,100	sa 1,500	113	600	183	2,280	34,000	sa 230,000
25-----	2,210	21,600	s 136,000	828	12,800	s 77,300	742	7,050	s 15,900
26-----	1,950	5,610	s 37,900	845	15,600	s 47,100	2,330	19,000	a 120,000
27-----	526	7,900	sa 13,000	213	2,780	s 1,690	1,470	7,400	s 34,000
28-----	633	8,200	sa 18,000	129	1,000	348	728	5,530	s 11,900
29-----	241	2,300	1,500	124	800	268	340	1,420	1,300
30-----	801	13,000	sa 41,000	109	400	118	289	720	562
31-----	--	--	--	1,510	22,500	s 178,000	--	--	--
Total--	9,804	--	277,154	14,341	--	555,074	91,834	--	4,326,702

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.--Continued

Suspended sediment, March to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	248	560	375	96	59	15	127	47	16
2-----	255	440	303	92	73	18	124	65	22
3-----	230	430	267	674	22,000	sa 57,000	127	29	10
4-----	196	380	201	127	1,840	631	129	28	10
5-----	183	270	133	90	398	97	165	260	sb 170
6-----	324	3,200	sa 3,200	98	200	53	1,020	4,400	sa 13,000
7-----	297	2,130	1,710	90	147	36	364	2,620	s 2,940
8-----	187	720	364	88	92	22	156	902	380
9-----	147	290	115	102	150	41	700	4,100	sb 10,000
10-----	150	200	81	124	129	43	360	4,850	s 5,070
11-----	686	2,200	sa 5,100	113	123	38	190	875	449
12-----	1,110	3,700	sa 12,000	123	1,100	sb 1,200	646	2,100	sa 5,100
13-----	638	2,340	4,030	557	14,000	sb 26,000	1,720	4,300	20,000
14-----	304	1,000	821	1,660	14,600	s 79,600	376	1,680	s 2,060
15-----	203	380	208	1,320	12,000	sa 46,000	180	634	308
16-----	190	140	72	1,100	6,500	sa 25,000	142	272	104
17-----	171	120	55	224	1,620	980	142	142	54
18-----	230	1,500	sa 1,700	142	640	245	132	66	24
19-----	224	2,960	s 1,920	109	310	91	127	45	15
20-----	142	650	249	271	4,000	sa 5,700	122	27	9
21-----	132	200	71	535	7,320	10,600	109	13	4
22-----	145	175	69	187	2,590	s 1,420	106	10	3
23-----	132	204	73	117	900	284	102	12	3
24-----	122	39	13	715	8,370	s 22,000	113	50	a 15
25-----	113	38	12	2,130	5,000	28,800	124	70	b 24
26-----	109	36	11	535	1,980	s 3,310	115	30	9
27-----	307	11,000	sb 9,500	234	900	569	106	16	5
28-----	196	4,050	s 2,390	213	760	437	94	16	b 4
29-----	122	385	127	162	310	136	90	16	4
30-----	100	170	46	140	130	49	90	20	5
31-----	94	66	17	140	66	25	--	--	--
Total--	7,687	--	45,233	12,308	--	312,440	8,098	--	59,617

Total discharge for period Mar. 16 to Sept. 30, 1951 (cfs-days) 147,385

Total load for period Mar. 16 to Sept. 30, 1951 (tons) 5,635,778

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.--Continued

Particle-size analyses of suspended sediment, May 1950 to June 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350		0.500	1.000	
May 9, 1950	12:10 p. m.	24,200	58	11,700	8,170	48	63	76	81	89	93	--	--	--	--	--	SPWCM	
May 9	12:10 p. m.	24,200	58	11,700	8,800	5	5	7	26	92	94	--	--	--	--	--	SPN	
May 9	12:45 p. m.	22,600	--	11,000	7,880	52	66	78	84	92	98	--	--	--	--	--	SPWCM	
May 9	1:40 p. m.	20,700	--	10,600	5,330	55	67	81	86	93	94	--	--	--	--	--	SPWCM	
Apr. 22, 1951	1:50 p. m.	652	47	9,250	27,000	--	50	--	74	--	99	99	100	--	--	--	SPWCM	
Apr. 25	1:20 p. m.	2,860	--	24,200	35,800	--	41	--	65	--	98	100	--	--	--	--	SPWCM	
Apr. 25	1:20 p. m.	2,860	--	24,200	37,000	--	5	--	53	--	97	98	100	--	--	--	SPN	
May 1	2:10 p. m.	3,430	--	15,000	39,800	--	46	--	66	--	96	97	98	100	--	--	SPWCM	
May 31	8:25 p. m.	3,110	--	36,600	40,600	--	41	--	63	--	97	99	100	--	--	--	SPWCM	
June 1	4:55 a. m.	7,320	66	36,600	40,000	--	34	--	55	--	96	97	98	--	--	99	100	SPWCM

Particle-size analyses of bed material, May to June 1951

(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 of collection	Number sampling points	Instantaneous discharge (cfs)	Bed material										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	0.062	0.125	0.250	0.500	1.000		2.000	4.000			
May 1, 1951	2	3 430																S
June 18	3	17 200							1	2	4	44	86	97	99			S

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Bo-ron (B)	Dissolved solids			Hardness as CaCO ₃		Per-centage so-dium	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million		Tons per acre-foot	Calcium	Non-carbonate			
															Resi-due at (180° C)	Sum						
NORTH PLATTE RIVER AT NORTH PLATTE, NEBR.																						
Nov. 24, 1950.....	786	36	0.06	71	17	71	9.3	216	8	176	22	0.7	4.4	0.24	544		0.74	248	58	37	762	8.4
Dec. 27.....	314	42	.03	52	11	47	169	12	95	12		.5	2.1	.32	362		.49	176	18	37	515	8.6
ST. VRAIN CREEK AT MOUTH NEAR PLATTEVILLE, COLO.																						
May 1, 1951.....	a 213							136	0	183											630	8.1
July 12.....	270							195	6	415											1,150	8.4
BIG THOMPSON RIVER AT MOUTH NEAR LASALLE, COLO.																						
Dec. 6, 1950.....	45	17	0.05	225	125	228		435	0	1,100	30	0.9	32	0.51	2,160	1,970	2.94	1,080	723	32	2,480	8.0
May 1, 1951.....	4.4							220	0	1,400											2,680	8.0
July 12.....	45							238	0	985											2,040	8.0
CACHE LA POUDRE RIVER NEAR GREELEY, COLO.																						
Dec. 6, 1950.....	56	15	0.10	325	61	156		610	0	815	32	0.3	6.0	0.10	1,800	1,710	2.45	1,060	560	24	2,130	8.1
May 1, 1951.....	30							306	6	755											1,820	8.2
July 12.....	10							231	0	685											1,630	8.0
JOHNSON RESERVOIR NEAR LEXINGTON, NEBR.																						
Oct. 31, 1950.....	b 43,435	23	0.04	58	16	79		212	0	171	22	0.4	0.8	0.20	478		0.65	212	38	45	722	8.2
Jan. 15, 1951.....	b 42,060	24	.10	73	20	96		228	0	237	25	.6	1.6	.10	614		.84	264	77	44	688	8.1
Apr. 3.....	b 39,585					77		217	0	215	24							254	76	38	832	7.6
June 24.....	b 44,835					64		202	0	163	19							214	48	38	709	7.5
July 6.....	b 47,935					69		196	0	177	21							222	61	40	729	7.5
Sept. 27.....	b 43,685					--		214	0	215	--							247	72	--	831	7.9
PLATTE RIVER NEAR GRAND ISLAND, NEBR.																						
Dec. 11, 1950.....	1,350	26	0.04	79	22	99		262	0	235	28	.5	2.0	0.10	622		0.85	286	71	43	916	7.8
Mar. 12, 1951.....	1,000	27	.02	91	22	100		275	0	254	28	.5	2.5	.15	694			316	90	41	967	8.0
June 11.....	2,130	26	.02	70	19	77		242	0	180	22	.4	2.1	.17	534		.73	253	55	40	776	7.6

a Mean daily discharge.

b Reservoir storage, in acre-feet.

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Periodic determinations of suspended sediment discharge, year October 1950 to September 1951			
Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
PLUM CREEK NEAR SMITHFIELD, NEBR.			
May 18, 1951.....	54	3,800	554
May 18	61.5	4,870	809
May 18	57.9	4,220	660
May 23	127.5	3,970	1,370
June 1	7.9	3,370	72
June 7	7.1	2,790	53
June 8	11.5	2,530	79
June 9	251	6,460	4,380
June 11	200.0	3,780	2,040
June 21	21.4	2,100	121
June 21	18.3	1,940	96
June 24	251	3,020	2,050
June 28	285.0	3,400	2,620
July 13	126.0	5,930	2,020
July 19	20.1	1,680	91
July 25	1.0	1,000	2.7
Aug. 2	1.8	466	2.3
Aug. 3	7.5	992	20
Aug. 10	1.9	906	4.6
Aug. 16	5.2	2,010	28.4
Aug. 17	a 2.0	1,710	9.2
Aug. 30 .....	.8	1,060	2.3
Sept. 6	50.4	2,230	303
Sept. 11 .....	.5	675	.9

PLATTE RIVER NEAR OVERTON, NEBR.

Oct. 11, 1950.....	1,260	47	160
Oct. 19.....	2,010	287	1,560
Oct. 20.....	1,050	26	74
Oct. 30.....	1,700	84	386
Oct. 31.....	958	27	70
Nov. 13.....	1,900	52	267
Nov. 14.....	977	28	74
Nov. 27.....	2,200	547	3,250
Dec. 4.....	2,090	86	485
Dec. 5.....	a 1,560	142	598
Dec. 11.....	a 1,990	107	575
Dec. 12.....	a 2,260	120	732
Dec. 18.....	1,900	107	549
Dec. 19.....	701	55	104
Jan. 3, 1951.....	1,980	154	823
Jan. 4.....	1,090	72	212
Jan. 15.....	1,850	128	639
Jan. 16.....	1,170	66	208
Jan. 29.....	2,330	32	201
Jan. 30.....	a 1,850	231	1,150
Feb. 19.....	2,470	109	727
Feb. 20.....	1,220	76	250
Mar. 5.....	2,460	87	578
Mar. 6.....	1,340	68	246
Mar. 19.....	2,120	111	635
Mar. 20.....	1,460	88	347
Apr. 2.....	2,040	53	292
Apr. 3.....	1,600	83	358
Apr. 16.....	1,960	87	480
Apr. 17.....	1,850	110	549
May 1.....	2,140	110	636
May 17.....	5,970	364	5,870
May 18.....	6,020	194	3,150
May 18.....	6,870	282	5,230
May 24.....	7,720	276	2,030

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)

PLATTE RIVER NEAR OVERTON, NEBR.--Continued

May 25, 1951.....	2,510	95	644
June 7.....	1,390	106	398
June 21.....	2,060	94	523
July 5.....	1,940	200	1,050
July 6.....	1,320	73	260
July 19.....	2,160	81	472
Aug. 2.....	952	165	424
Aug. 3.....	536	28	40
Aug. 17.....	373	16	16
Aug. 30.....	2,020	90	491
Sept. 11.....	2,260	248	1,510
Sept. 12.....	1,900	60	308
Sept. 27.....	2,030	77	422
Sept. 28.....	1,900	97	498

MIDDLE LOUP RIVER NEAR SENECA, NEBR.

Oct. 5, 1950.....	196	730	386
Oct. 19.....	194	426	223
Nov. 2.....	194	520	272
Nov. 15.....	186	510	256
Nov. 29.....	186	918	461
Dec. 13.....	191	470	242
Dec. 27.....	186	359	180
Jan. 12, 1951.....	199	610	328
Jan. 24.....	178	474	228
Feb. 7.....	191	480	248
Feb. 21.....	202	605	330
Mar. 6.....	196	620	328
Mar. 21.....	178	650	312
Apr. 3.....	188	648	329
Apr. 18.....	184	538	267
May 1.....	218	738	434
May 24.....	245	749	495
June 9.....	213	612	352
June 28.....	239	772	498
July 10.....	218	1,620	954
July 24.....	202	853	465
Aug. 15.....	186	560	281
Aug. 22.....	184	570	283
Sept. 5.....	354	2,880	2,750
Sept. 21.....	221	666	576
Oct. 2.....	188	764	388

DISMAL RIVER NEAR GEM, NEBR.

Oct. 6, 1950.....	304	640	525
Oct. 18.....	297	329	264
Nov. 1.....	291	489	384
Nov. 15.....	306	608	502
Nov. 28.....	303	759	621
Dec. 14.....	277	604	452
Dec. 27.....	308	1,460	1,210
Jan. 11, 1951.....	288	702	546
Jan. 24.....	258	982	684
Feb. 8.....	304	721	592
Feb. 22.....	295	728	580
Mar. 6.....	277	671	502
Mar. 21.....	267	792	571
Apr. 2.....	278	396	297
Apr. 19.....	275	557	414

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Periodic determinations of suspended sediment discharge, water year October 1950 to September 1951, continued			
Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
DISMAL RIVER NEAR GEM, NEBR.--Continued			
May 1, 1951	288	786	611
May 23	277	280	209
May 29	272	630	463
June 9	301	426	346
June 19	293	544	430
June 27	275	401	298
July 11	348	741	696
July 24	270	313	228
Aug. 7	268	326	236
Aug. 21	259	372	260
Sept. 6	275	787	584
Sept. 21	289	404	315
Oct. 2	260	506	355

DISMAL RIVER AT DUNNING, NEBR.

Oct. 6, 1950.....	333	760	683
Oct. 18.....	342	710	656
Nov. 1.....	330	870	775
Nov. 15.....	318	1,040	893
Nov. 28.....	327	1,490	1,320
Dec. 13.....	334	1,200	1,080
Dec. 27.....	336	1,160	1,050
Jan. 11, 1951.....	324	1,190	1,040
Jan. 25.....	303	895	732
Feb. 7.....	389	316	332
Feb. 22.....	339	1,340	1,230
Mar. 7.....	321	1,460	1,280
Mar. 14.....	318	1,440	1,240
Mar. 22.....	309	1,080	901
Apr. 3.....	312	965	830
Apr. 18.....	294	870	691
May 2.....	312	810	682
May 17.....	457	1,180	1,460
May 23.....	357	1,080	1,040
May 29.....	297	624	500
June 10.....	351	530	502
June 19.....	339	637	563
June 27.....	300	489	396
July 11.....	378	939	958
July 24.....	292	425	335
July 25.....	306	436	360
Aug. 8.....	297	495	397
Aug. 21.....	280	474	358
Sept. 6.....	321	532	461
Sept. 21.....	333	660	593

MIDDLE LOUP RIVER NEAR MILBURN, NEBR.

Oct. 3, 1950.....	825	845	1,880
Oct. 17.....	824	530	1,180
Oct. 31.....	813	1,020	2,240
Nov. 16.....	757	947	1,940
Nov. 30.....	843	1,460	3,320
Dec. 28.....	714	1,270	2,450
Jan. 10, 1951.....	813	1,780	3,910
Jan. 25.....	820	1,260	2,790
Feb. 6.....	813	319	700
Feb. 21.....	909	226	555
Mar. 6.....	846	1,530	3,490
Mar. 21.....	685	1,070	1,980
Apr. 3.....	748	1,070	2,160
Apr. 17.....	754	1,020	2,060
May 1.....	913	772	1,900

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued			
Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
MIDDLE LOUP RIVER NEAR MILBURN, NEBR.--Continued			
May 29, 1951	888	852	2,040
June 12	839	654	1,480
June 27	944	671	1,710
July 10	882	976	2,320
July 24	708	378	723
Aug. 7	866	472	1,100
Aug. 17	781	422	867
Aug. 22	784	478	1,010
Sept. 7	949	1,160	2,970
Sept. 18	768	3,670	7,610
Sept. 25	751	670	1,360

LILLIAN CREEK NEAR WALWORTH, NEBR.

Jan. 4, 1951	1.07	6	0.02
Jan. 17	1.12	15	.05
Feb. 14 .....	.75	5	.01
Feb. 27	1.09	650	1.9
Mar. 14 .....	.91	4	.01
Mar. 28 .....	.94	2	.01
Apr. 10	1.28	7	.02
Apr. 24	1.41	21	.08
May 15	52.8	832	119
July 3	5.92	142	2.3
July 17	1.24	140	.5
July 21	1.36	72	.3
July 31 .....	.75	110	.2
Aug. 13	45.2	330	40.3
Aug. 28	1.16	32	.1
Sept. 11	1.16	60	.2
Sept. 18	1.35	40	.1

MIDDLE LOUP RIVER AT ARCADIA, NEBR.

Oct. 4, 1950	985	814	2,160
Oct. 11	821	838	1,860
Oct. 17	787	560	1,190
Oct. 24	882	960	2,290
Nov. 1	779	465	978
Nov. 8	754	1,520	3,090
Nov. 15	985	1,990	5,290
Nov. 22	865	1,510	3,530
Nov. 30	979	1,870	4,940
Dec. 7	108	166	48
Dec. 14	1,330	240	862
Dec. 22	922	698	1,740
Dec. 29	790	490	1,050
Jan. 5, 1951	819	670	1,480
Jan. 11	912	640	1,580
Jan. 18	956	390	1,010
Jan. 26	855	417	963
Feb. 7	771	69	144
Feb. 15	687	132	245
Feb. 22	1,110	112	336
Feb. 28	1,570	2,730	11,600
Mar. 6	816	2,020	4,450
Mar. 15	822	1,130	2,510
Mar. 22	1,202	2,350	7,630
Mar. 27	647	1,030	2,360
Apr. 4	830	1,090	2,440
Apr. 11	928	1,280	3,210
Apr. 18	812	1,100	2,410
Apr. 24	838	832	2,110
May 2	1,035	930	2,600

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
MIDDLE LOUP RIVER AT ARCADIA, NEBR.--Continued			
May 8, 1951	722	1,080	2,110
May 15	3,298	2,880	25,600
May 21	1,423	1,180	4,530
May 30	771	756	1,570
June 6	787	806	1,710
June 12	956	1,110	2,870
June 19	856	964	2,230
June 26	938	1,150	2,910
July 10	975	903	2,380
July 17	812	667	1,460
July 24	738	442	881
July 31	691	392	731
Aug. 7	483	292	381
Aug. 14	1,138	1,160	3,560
Aug. 22	754	501	1,020
Aug. 27	738	483	962
Sept. 5	1,202	1,380	4,480
Sept. 11	856	494	1,140
Sept. 18	882	738	1,760

MIDDLE LOUP RIVER AT LOUP CITY, NEBR.

Oct. 4, 1950	942	710	1,800
Oct. 11	830	783	1,750
Oct. 17	914	654	1,610
Oct. 24	760	1,010	2,070
Nov. 2	830	1,320	2,960
Nov. 15	1,010	1,420	3,870
Nov. 22	1,010	1,500	4,090
Dec. 1	849	1,560	3,580
Dec. 7	59.2	25	4.0
Dec. 18	1,110	478	1,430
Dec. 29	740	1,050	2,100
Jan. 6, 1951	617	830	1,380
Jan. 19	1,020	563	1,550
Jan. 26	924	522	1,300
Feb. 2	353	90	86
Feb. 7	800	160	346
Feb. 15	781	77	162
Feb. 22	1,140	625	1,920
Feb. 27	1,260	2,800	9,530
Mar. 7	932	1,660	4,180
Mar. 15	1,030	2,660	7,400
Mar. 22	1,410	2,740	10,400
Mar. 27	900	1,360	3,300
Apr. 3	816	1,180	2,600
Apr. 11	956	2,800	7,230
Apr. 18	788	1,000	2,130
Apr. 24	858	1,080	2,500
May 2	956	708	1,830
May 9	858	737	1,700
May 15	3,110	3,010	25,300
May 22	1,380	1,480	5,510
May 30	816	544	1,200
June 6	774	589	1,230
June 13	844	616	1,400
June 20	900	510	1,240
June 27	984	792	2,100
July 3	2,190	2,700	16,000
July 11	1,290	938	3,270
July 18	858	550	1,270
July 24	695	484	908

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)

MIDDLE LOUP RIVER AT LOUP CITY, NEBR.--Continued

July 25, 1951.....	582	298	549
Aug. 1.....	656	457	809
Aug. 8.....	499	287	387
Aug. 13.....	2,930	2,500	19,800
Aug. 22.....	734	512	1,010
Aug. 29.....	760	348	714
Sept. 5.....	1,500	1,600	6,480
Sept. 11.....	998	668	1,800
Sept. 25.....	900	800	1,940

SOUTH LOUP RIVER NEAR CUMRO, NEBR.

Oct. 3, 1950.....	168	760	345
Oct. 17.....	135	344	125
Oct. 31.....	138	326	121
Nov. 14.....	146	322	127
Nov. 27.....	181	1,130	552
Dec. 11.....	162	190	83
Dec. 28.....	126	321	109
Jan. 10, 1951.....	166	964	432
Jan. 23.....	144	644	250
Feb. 6.....	142	128	49
Feb. 15.....	132	194	69
Feb. 21.....	166	342	153
Mar. 5.....	174	444	209
Mar. 13.....	121	404	132
Mar. 20.....	160	497	215
Apr. 2.....	160	462	200
Apr. 17.....	153	398	164
Apr. 30.....	185	778	369
May 15.....	245	1,740	1,150
May 18.....	1,490	5,390	21,700
May 22.....	376	1,370	1,390
May 28.....	204	980	540
May 31.....	781	7,680	16,200
June 4.....	196	1,040	550
June 14.....	456	4,420	5,440
June 20.....	200	1,110	599
June 26.....	256	1,980	1,370
July 9.....	157	529	224
July 23.....	222	2,190	1,310
Aug. 6.....	138	437	163
Aug. 20.....	129	410	143
Sept. 4.....	170	492	226
Sept. 18.....	152	347	142
Oct. 1.....	140	380	144
Dec. 29.....	144	85	33

OAK CREEK NEAR LOUP CITY, NEBR.

Apr. 30, 1951.....	13.2	27,100	966
Apr. 30.....	13.2	20,430	728
May 1.....	1.34	6,480	23
May 31.....	43.6	12,600	1,480
June 26.....	79.1	10,600	2,260
July 3.....	575	5,020	7,790
July 5.....	1.19	1,120	3.6
Aug. 27.....	3.01	838	6.8
Sept. 5.....	64.1	7,600	1,320

NORTH LOUP RIVER AT BREWSTER, NEBR.

Oct. 5, 1950.....	384	305	316
Oct. 18.....	360	260	253
Nov. 1.....	368	384	382
Dec. 28.....	325	770	676

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
NORTH LOUP RIVER AT BURWELL, NEBR.			
Oct. 9, 1950	461	288	358
Oct. 23	508	430	590
Nov. 2	488	585	771
Nov. 8	562	760	1,150
Nov. 21	565	837	1,280
Dec. 5	78.9	100	21.3
Jan. 4, 1951	453	514	629
Jan. 16	702	891	1,690
Feb. 14	536	243	352
Feb. 27	579	830	1,300
Mar. 13	443	950	1,140
Mar. 27	575	765	1,190
Apr. 10	624	982	1,650
Apr. 24	636	606	1,040
May 8	582	396	622
May 22	1,070	1,090	3,150
June 5	767	484	1,000
June 19	693	402	752
July 3	944	610	1,550
July 30	489	252	333
Aug. 13	618	538	898
Aug. 14	577	328	511
Aug. 28	637	386	664
Sept. 10	758	340	696
Sept. 17	663	438	784

CALAMUS RIVER NEAR BURWELL, NEBR.

Oct. 2, 1950	340	290	266
Oct. 9	298	235	189
Oct. 16	298	195	157
Oct. 25	289	250	195
Nov. 2	292	402	317
Nov. 8	318	345	296
Nov. 17	298	240	193
Nov. 21	302	315	257
Dec. 13	342	100	92
Dec. 27	270	360	262
Jan. 3, 1951	312	350	295
Jan. 9	305	775	638
Jan. 16	302	655	534
Jan. 31	234	180	114
Feb. 13	169	65	30
Feb. 27	326	440	387
Mar. 5	358	530	512
Mar. 14	328	500	443
Mar. 20	292	325	256
Mar. 27	329	335	298
Apr. 2	273	1,400	1,030
Apr. 16	295	285	227
Apr. 23	376	357	362
Apr. 30	429	896	1,040
May 8	332	162	145
May 14	362	315	308
May 22	476	310	398
May 28	336	188	171
June 11	347	210	197
June 19	343	173	160
June 25	354	203	194
July 3	362	261	255
July 9	308	204	170
July 23	270	159	116
Aug. 6	279	120	90
Aug. 13	531	551	790
Aug. 14	404	245	267
Aug. 20	326	754	664

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)

CALAMUS RIVER NEAR BURWELL, NEBR.--Continued

Aug. 27, 1951.....	384	160	166
Sept. 3.....	336	181	164
Sept. 24.....	388	148	155

NORTH LOUP RIVER AT ORD, NEBR.

Oct. 9, 1950.....	798	348	750
Oct. 25.....	824	278	618
Apr. 9, 1951.....	914	493	1,220
Apr. 23.....	1,030	544	1,510
May 21.....	1,520	569	2,340
June 4.....	1,350	538	1,960
June 19.....	1,340	434	1,570
July 2.....	1,110	354	1,080
Aug. 13.....	1,840	2,080	10,200
Aug. 14.....	1,080	1,530	4,460
Aug. 28.....	1,040	322	904
Sept. 11.....	1,820	424	1,510

NORTH LOUP RIVER NEAR COTESFIELD, NEBR.

Jan. 15, 1951.....	938	218	552
Feb. 12.....	940	161	409
Feb. 26.....	1,350	1,040	3,790
Mar. 20.....	1,110	801	2,400
Mar. 26.....	942	466	1,190
Apr. 9.....	1,040	502	1,410
May 7.....	942	278	707
May 21.....	1,590	494	2,120
June 4.....	1,540	569	2,370
June 11.....	1,220	354	1,170
June 18.....	1,710	2,320	10,760
June 25.....	1,300	385	1,350
July 2.....	1,260	365	1,240
July 16.....	834	272	612
July 21.....	3,410	4,270	39,300
July 23.....	951	727	1,870
July 30.....	951	402	1,030
Aug. 6.....	443	177	212
Aug. 13.....	3,640	5,640	55,400
Aug. 21.....	1,800	1,600	7,780
Aug. 27.....	1,190	520	1,670
Sept. 4.....	1,070	398	1,150
Sept. 10.....	1,240	454	1,520
Sept. 24.....	1,150	341	1,060

LOUP RIVER POWER CANAL NEAR GENOA, NEBR.

Oct. 4, 1950.....	2,950	1,180	9,400
Oct. 19.....	2,050	278	1,540
Nov. 30.....	1,710	433	2,000
Dec. 1.....	1,650	424	1,890
Mar. 29, 1951.....	2,600	1,170	8,210
May 7.....	2,320	638	4,000
May 16.....	2,830	1,360	10,400
June 29.....	2,600	1,580	11,100
July 20.....	2,340	1,800	11,400
Aug. 14.....	2,850	2,780	21,400
Aug. 31.....	2,390	364	2,350
Sept. 25.....	2,670	458	3,300

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
LOUP RIVER AT FULLERTON, NEBR. ^a			
Mar. 29, 1951	2,970	1,230	9,860
Mar. 30	2,600	1,180	8,140
Apr. 3	1,930	986	5,140
Apr. 4	2,030	793	4,350
Apr. 5	1,860	554	2,780
Apr. 9	2,190	956	5,650
Apr. 10	2,170	838	4,910
Apr. 11	2,370	1,040	6,650
Apr. 13	2,220	1,300	7,790
Apr. 16	2,070	1,060	5,920
Apr. 17	2,260	761	4,640
Apr. 18	1,740	598	2,810
Apr. 19	2,010	788	4,280
Apr. 20	2,500	1,030	6,950
Apr. 23	2,680	1,110	8,030
Apr. 24	2,400	725	4,700
Apr. 25	2,590	832	5,820
Apr. 26	2,820	867	6,600
Apr. 27	7,420	12,300	246,400
Apr. 30	3,340	1,720	15,520
May 1	4,000	2,920	31,540
May 3	3,270	1,510	13,330
May 4	2,790	1,420	10,700
May 7	2,550	929	6,400
May 8	2,250	866	5,260
May 9	2,160	864	5,040
May 10	2,400	1,210	7,840
May 11	2,430	906	5,940
May 14	2,200	734	4,360
May 15	2,510	1,320	8,950
May 15	7,160	8,090	156,000
May 16	7,050	5,610	107,000
May 16	6,080	3,580	58,770
May 17	7,800	4,110	86,560
May 17	7,900	4,040	86,170
May 18	6,360	4,040	69,400
May 18	--	3,520	--
May 21	--	1,500	--
May 21	4,670	2,560	32,280
May 22	4,700	1,960	24,870
May 23	3,800	1,920	19,700
May 24	2,970	1,280	10,300
May 25	3,120	2,470	20,800
May 29	2,000	955	5,160
May 31	--	11,600	--
May 31	--	12,200	--
May 31	11,550	10,800	337,000
May 31	11,550	10,900	340,000
May 31	11,550	10,400	324,000
June 1	7,830	6,940	147,000
June 4	3,720	1,850	18,600
June 5	3,030	1,480	12,100
June 6	2,880	1,220	9,490
June 8	2,260	1,560	9,520
June 11	2,840	1,790	13,700
June 14	3,120	3,450	29,100
June 26	4,740	8,800	113,000
Aug. 7	1,140	681	2,100
Aug. 13	8,610	9,540	222,000
Aug. 13	8,610	9,460	220,000
Aug. 13	8,610	8,640	201,000
Aug. 14	6,510	4,720	83,000
Aug. 31	1,880	492	2,500
Sept. 11	2,350	1,240	7,870
Sept. 19	2,220	666	3,990
Sept. 26	2,300	980	6,090

^a Field data at Loupe River at Fullerton, Nebr., collected by U. S. Bureau of Reclamation, Mar. 29 to Aug. 14, 1951.

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
ELKHORN RIVER AT EWING, NEBR.			
Oct. 9, 1950	421	132	150
Oct. 25	146	22	8.7
Nov. 9	103	11	3.1
Nov. 21	a 104	19	5.3
Dec. 20	a 88	4	1.0
Jan. 5, 1951	a 85	4	.9
Feb. 1	a 55	13	1.9
Feb. 15	a 78	5	1.0
Feb. 26	165	49	22
Mar. 20	a 187	136	61
Apr. 3	615	48	412
Apr. 12	500	210	284
Apr. 24	879	402	954
May 2	1,380	242	902
May 10	361	75	73
May 18	5,760	452	7,030
June 5	2,710	318	2,330
June 19	838	164	371
July 3	1,280	473	1,630
July 17	994	951	2,550
July 31	153	80	33
Aug. 16	618	283	472
Aug. 21	886	306	732
Aug. 31	305	110	91
Sept. 10	606	208	340
Sept. 25	426	134	154
Oct. 9	558	147	221
ELKHORN RIVER AT NELIGH, NEBR.			
Oct. 5, 1950	1,510	903	3,660
Oct. 11	740	385	769
Oct. 26	680	235	431

a Mean daily discharge.

PLATTE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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

PLUM CREEK NEAR SMITHFIELD, NEBR.

May 18, 1951	5:40 p.m.	54	--	3,900	6,950	--	70	--	78	--	98	100				SPWCM
May 18	6:30 p.m.	61.5	--	4,870	5,870	--	75	--	88	--	100	--				SPWCM
May 18	7:00 p.m.	57.9	--	4,220	6,160	--	86	--	92	--	100	--				SPWCM
June 9	12:10 p.m.	251	65	6,460	6,460	50	63	73	86	88	98	100				SPWCM
June 9	12:10 p.m.	251	65	6,460	6,420	44	59	71	79	88	98	100				SPN
June 24	5:00 p.m.	251	66	3,020	5,630	--	71	--	78	--	98	100				SPWCM
June 28	3:40 p.m.	285	--	3,400	7,210	--	74	--	80	--	97	100				SPWCM
July 13	12:45 p.m.	126	61	5,930	12,100	--	56	--	79	--	99	100				SPWCM
July 19	11:25 a.m.	20.1	--	1,680	3,980	--	92	--	97	--	100	--				SPWCM

PLATTE RIVER NEAR OVERTON, NEBR.

Oct. 19, 1950	6:30 p.m.	2,010	--	287							8	11	22	51	78	96	S
Oct. 30	4:15 p.m.	1,700	58	84							24	29	52	73	87	91	S
Nov. 27	12:35 p.m.	2,200	37	547							8	11	26	78	96	98	S
Dec. 4	3:30 p.m.	2,090	34	86							26	31	64	97	--	--	S
Mar. 20, 1951	10:45 a.m.	1,460	33	88							33	--	66	86	--	--	S

MIDDLE LOUP RIVER NEAR SENECA, NEBR.

Nov. 2, 1950	10:00 a.m.	194	46	520							14	61	98	100			S
Jan. 12, 1951	10:30 a.m.	199	41	610							14	46	92	100			S
Feb. 7	9:30 a.m.	191	--	480							16	51	100	--			S
Feb. 21	8:20 p.m.	202	50	605							17	51	86	100			S
Mar. 21	10:50 a.m.	178	44	650							17	49	95	100			S
May 1	6:25 p.m.	218	57	738							27	66	98	100			S
May 28	10:45 a.m.	239	61	772							29	96	95	100			S
June 8	1:30 p.m.	186	68	560							22	70	98	100			S
Sept. 21	9:40 a.m.	221	52	966							18	64	98	100			S

DISMAL RIVER NEAR GEM, NEBR.

Oct. 18, 1950.....	10:15 a.m.	297	53	329						21	61	95	100	100		S
Nov. 1.....	11:30 a.m.	291	46	489						16	59	96	99	100		S
Jan. 11, 1951.....	10:45 a.m.	288	35	702						12	20	66	100	100		S
Feb. 8.....	11:00 a.m.	304	--	721						26	61	96	100	100		S
Feb. 22.....	9:45 a.m.	295	41	728						22	64	97	100	100		S
Mar. 6.....	6:00 p.m.	277	42	671						24	61	96	100	100		S
Mar. 21.....	5:20 p.m.	287	--	792						25	67	97	100	100		S
May 1.....	2:25 p.m.	288	58	786						16	49	94	100	100		S
June 27.....	11:15 a.m.	275	70	401						26	53	95	100	100		S
July 24.....	3:30 p.m.	270	82	313						40	68	96	100	100		S
Aug. 7.....	6:00 p.m.	288	--	326						36	68	98	100	100		S
Aug. 21.....	2:15 p.m.	259	74	372						39	68	97	100	100		S
Oct. 2.....	3:15 p.m.	280	--	506						18	50	96	100	100		S

DISMAL RIVER AT DUNNING, NEBR.

Oct. 18, 1950.....	12:15 p.m.	342	58	710						16	46	91	100	100	--	S
Nov. 1.....	2:15 p.m.	330	47	870						13	43	88	100	100	--	S
Nov. 15.....	1:20 p.m.	318	43	1,040						16	45	89	99	100	100	S
Jan. 11, 1951.....	2:00 p.m.	324	33	1,190						16	48	92	100	100	--	S
Feb. 7.....	4:00 p.m.	389	--	316						22	50	92	100	100	--	S
Feb. 22.....	11:45 a.m.	339	41	1,340						16	47	92	100	100	--	S
Mar. 14.....	10:00 a.m.	318	33	1,440						9	33	92	100	100	--	S
May 2.....	11:35 a.m.	312	57	810						16	48	91	100	100	--	S
June 27.....	2:55 p.m.	300	73	489						23	57	95	100	100	--	S
July 24.....	6:00 p.m.	292	83	425						22	45	81	89	95	100	S
July 25.....	11:45 a.m.	306	77	436						23	58	96	100	100	--	S
Aug. 8.....	3:00 p.m.	297	75	495						16	48	94	100	100	--	S
Aug. 21.....	4:10 p.m.	280	76	474						19	51	--	--	--	--	S
Sept. 6.....	5:00 p.m.	321	73	532						32	58	94	100	100	--	S

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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	
MIDDLE LOUP RIVER NEAR MILBURN, NEBR.																	
Nov. 30, 1950.....	11:05 a.m.	843	33	1,460	8,550		4	5	7	11	22	42	98	99		BWCM	
Dec. 28.....	10:30 a.m.	714	33	1,270	7,550		2	2	3	4	4	28	86	100		BWCM	
Feb. 21, 1951.....	12:00 m.	909	--	226	--	--	--	--	--	--	42	58	87	100		S	
Apr. 3.....	10:45 a.m.	748	--	1,070	--	--	--	--	--	--	16	52	96	100		S	
May 1.....	2:10 p.m.	913	58	772	1,200	--	4	--	6	--	24	69	96	100		SPWCM	
July 10.....	12:40 p.m.	882	67	976	--	--	--	--	--	--	26	55	92	100		S	
Aug. 17.....	1:00 p.m.	761	80	422	--	--	--	--	--	--	48	53	94	100		S	
Aug. 22.....	12:20 p.m.	784	68	478	--	--	--	--	--	--	16	52	96	100		S	
Sept. 7.....	12:00 m.	949	--	1,160	--	--	--	--	--	--	25	48	92	100		S	
Sept. 25.....	11:45 a.m.	751	--	670	--	--	--	--	--	--	23	53	97	100		S	
MIDDLE LOUP RIVER AT ARCADIA, NEBR.																	
Dec. 14, 1950....	3:15 p.m.	1,330	32	240	--	--	--	--	--	--	25	51	88	97	100	S	
Dec. 29.....	12:15 p.m.	790	32	460	--	--	--	--	--	--	3	22	90	100	--	S	
Jan. 5, 1951.....	3:25 p.m.	619	32	670	--	--	--	--	--	--	26	53	91	98	100	S	
Feb. 7.....	11:45 a.m.	771	37	69	--	--	--	--	--	--	29	68	94	100	--	S	
Feb. 28.....	1:10 p.m.	1,570	37	2,730	--	--	--	--	--	--	29	68	94	100	--	S	
Mar. 15.....	11:55 a.m.	822	33	1,130	--	--	--	--	--	--	12	38	93	100	--	S	
May 2.....	9:30 a.m.	1,035	54	930	1,150	--	4	--	7	20	54	97	100	--		SPWCM	
June 6.....	10:10 a.m.	787	57	806	--	--	--	--	--	30	59	98	100	--		S	
July 6.....	3:30 p.m.	812	69	667	--	--	--	--	--	22	42	79	100	--		S	
July 17.....	2:30 p.m.	738	85	442	--	--	--	--	--	24	52	91	100	--		S	
July 24.....	3:40 p.m.	691	--	392	--	--	--	--	--	32	60	93	100	--		S	
July 31.....					--	--	--	--	--					--		S	
Aug. 14.....	10:30 a.m.	1,138	70	1,160	3,860	--	29	--	35	49	78	98	100	--		SPWCM	
Aug. 27.....	4:50 p.m.	738	78	483	--	--	--	--	--	17	41	86	100	--		S	
Sept. 11.....	5:30 p.m.	856	78	494	--	--	--	--	--	30	61	92	100	--		S	

MIDDLE LOUP RIVER AT LOUP CITY, NEBR.

Oct. 17, 1950....	1:30 p.m.	914	64	654	--	--	--	15	50	92	99	100	S
Dec. 29.....	4:10 p.m.	740	32	1,050	--	--	--	5	23	77	99	100	S
Jan. 19, 1951....	6:35 p.m.	1,020	32	563	--	--	--	10	28	82	99	--	S
Feb. 7.....	4:45 p.m.	800	32	1,600	--	--	--	19	34	85	--	--	S
Feb. 27.....	2:00 p.m.	1,260	--	2,800	--	--	--	15	50	88	98	100	S
Mar. 15.....	4:45 p.m.	1,030	33	2,660	2,410	3	5	12	29	67	94	100	SPWCM
May 15.....	5:15 p.m.	3,110	--	3,010	9,330	14	20	50	76	98	100	--	SPWCM
July 3.....	4:20 p.m.	2,130	76	2,700	1,940	29	45	54	65	93	99	--	BN
July 3.....	4:20 p.m.	2,130	76	2,700	1,600	46	56	70	--	--	--	--	SPWCM
July 24.....	10:22 a.m.	695	--	484	--	--	--	28	59	95	100	--	S
Aug. 1.....	11:00 a.m.	656	77	487	--	--	--	22	49	93	100	--	S
Aug. 8.....	12:30 p.m.	499	85	287	--	--	--	19	40	76	100	--	S
Sept. 5.....	4:30 p.m.	1,500	69	1,600	--	--	--	25	59	96	100	--	S
Sept. 25.....	12:30 p.m.	900	53	800	--	--	--	16	57	97	100	--	S

SOUTH LOUP RIVER NEAR CUMRO, NEBR.

Oct. 31, 1950....	5:30 p.m.	138	55	326	1,700	15	18	22	65	87	98	99	HWCM
Dec. 11.....	5:30 p.m.	162	32	190	1,060	--	19	23	64	81	95	99	HWCM
Jan. 23, 1951....	2:00 p.m.	144	32	644	--	--	--	--	51	92	99	100	S
Feb. 6.....	2:30 p.m.	142	32	128	--	--	--	--	72	100	--	--	S
Mar. 5.....	5:10 p.m.	174	46	444	1,910	14	--	23	74	96	99	100	SPWCM
Mar. 20.....	3:00 p.m.	160	41	497	1,900	17	--	26	59	97	100	--	SPWCM
Apr. 30.....	5:05 p.m.	185	66	778	1,640	21	--	32	88	100	--	--	SPWCM
May 18.....	3:30 p.m.	1,490	--	5,390	9,700	30	--	41	82	93	100	--	SPWCM
May 22.....	5:45 p.m.	376	69	1,370	3,660	24	--	38	86	100	--	--	SPWCM
June 14.....	1:40 p.m.	456	72	4,420	11,000	12	--	27	79	90	98	100	SPWCM
Aug. 6.....	5:10 p.m.	138	89	437	2,320	25	--	40	94	99	100	--	SPWCM
Aug. 20.....	4:45 p.m.	129	--	410	2,070	30	--	46	78	92	100	--	SPWCM
Sept. 4.....	6:00 p.m.	170	--	482	1,470	19	--	32	86	98	100	--	SPWCM
Sept. 18.....	2:50 p.m.	152	--	347	1,440	26	--	33	87	99	100	--	SPWCM
Oct. 1.....	3:40 p.m.	140	--	380	1,980	15	18	23	84	99	100	--	SPWCM

PLATTE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951.--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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
OAK CREEK NEAR LOUP CITY, NEBR.																
Apr. 30, 1951.....	1:30 p.m.	13.2	--	27,100	26,000	--	44	--	72	--	100					SPWCM
May 31.....	12:55 p.m.	43.6	65	12,600	24,100	--	63	--	84	--	98					SPWCM
July 5.....	2:50 p.m.	1.19	71	1,120	1,630	--	43	--	51	--	99					SPWCM
Sept. 5.....	6:15 p.m.	64.1	66	7,600	2,340	53	62	70	77	90	100					SPWCM
Sept. 5.....	6:15 p.m.	64.1	66	7,600	2,520	30	46	60	65	92	100					SPN
NORTH LOUP RIVER AT BURWELL, NEBR.																
Oct. 23, 1950.....	2:15 p.m.	508	46	430	--	--	--	11	--	--	15	45	90	100	--	S
Dec. 5.....	12:30 p.m.	78.9	32	514	560	--	--	--	15	17	27	42	65	100	--	BWCM
Jan. 4, 1951.....	10:45 a.m.	453	--	514	--	--	--	--	--	--	5	13	71	100	--	S
Feb. 14.....	11:00 a.m.	538	--	243	--	--	--	--	--	--	13	31	73	100	--	S
Mar. 13.....	5:30 p.m.	443	32	950	--	--	--	--	--	--	8	27	78	99	100	S
Apr. 10.....	10:20 a.m.	624	41	982	--	--	--	--	--	--	11	37	83	96	--	S
May 22.....	2:00 p.m.	1,070	67	1,090	1,000	4	--	--	4	--	14	41	78	96	--	SPWCM
July 3.....	11:25 a.m.	944	--	610	--	--	--	--	--	--	22	53	89	--	--	S
Aug. 14.....	7:05 p.m.	328	78	328	--	--	--	--	--	--	32	68	96	--	--	S
Aug. 28.....	11:15 a.m.	637	69	386	--	--	--	--	--	--	17	43	83	99	100	S
Sept. 10.....	2:45 p.m.	758	71	340	--	--	--	--	--	--	19	50	87	100	--	S
CALAMUS RIVER NEAR BURWELL, NEBR.																
Jan. 16, 1951.....	5:30 p.m.	302	--	655	--	--	--	--	--	--	6	15	58	96	100	S
Feb. 27.....	9:30 a.m.	326	40	440	--	--	--	--	--	--	16	48	84	100	--	S
Mar. 14.....	10:00 a.m.	328	32	500	--	--	--	--	--	--	9	28	83	99	100	S
Apr. 30.....	6:30 p.m.	429	64	896	--	--	--	--	--	--	8	16	35	92	99	S
June 25.....	3:10 p.m.	354	79	203	--	--	--	--	--	--	35	55	88	100	--	S
July 9.....	3:45 p.m.	308	79	204	--	--	--	--	--	--	29	50	100	--	--	S
Aug. 6.....	4:20 p.m.	279	87	120	--	--	--	--	--	--	43	58	90	100	--	S
Aug. 13.....	2:30 p.m.	531	73	551	--	--	--	--	--	--	24	44	91	100	--	S
Aug. 14.....	2:00 p.m.	404	76	245	--	--	--	--	--	--	22	50	87	100	--	S
Sept. 3.....	1:40 p.m.	336	63	181	--	--	--	--	--	--	20	49	92	99	100	S
Sept. 24.....	1:50 p.m.	484	--	144	--	--	--	--	--	--	23	55	93	100	--	S

NORTH LOUP RIVER AT ORD, NEBR.

Apr. 9, 1951	6:40 p.m.	914	52	493	--	--	--	21	49	90	100	--	S
May 21	5:15 p.m.	1,320	74	569	867	9	9	27	41	90	100	100	SPWCM
Aug. 13	2:30 p.m.	1,640	78	2,580	6,320	25	32	71	66	98	100	100	SPWCM
Aug. 28	2:30 p.m.	1,590	72	1,322	--	--	--	24	34	75	99	100	S
Sept. 11	11:20 a.m.	1,320	58	424	--	--	--	31	50	81	100	--	S
Oct. 8	2:00 p.m.	1,010	58	445	--	--	--	45	67	94	100	--	S
Oct. 22	3:30 p.m.	1,140	47	404	--	--	--	19	46	93	100	--	S
					--	--	--	22	53	93	100	--	S

NORTH LOUP RIVER NEAR COTESFIELD, NEBR.

Feb. 12, 1951	5:15 p.m.	940	32	161	--	--	--	32	46	100	--	--	S
Mar. 20	1:30 p.m.	1,110	32	801	--	--	--	21	42	77	98	100	S
May 21	12:30 p.m.	1,590	69	494	--	--	20	44	65	92	100	--	SPWCM
June 25	5:40 p.m.	1,300	79	385	--	--	--	46	65	91	100	--	S
July 21	9:30 p.m.	3,400	--	4,270	4,870	41	55	79	90	98	100	--	SPWCM
July 21	9:30 p.m.	3,400	--	4,270	3,010	23	32	61	83	97	99	--	BN
Aug. 6	1:45 p.m.	444	90	177	--	--	--	51	61	81	99	100	S
Aug. 21	4:45 p.m.	1,600	76	1,600	6,660	24	32	65	77	91	100	--	SPWCM
Sept. 10	2:00 p.m.	1,240	--	454	--	--	--	38	57	90	100	--	S
Sept. 24	11:15 a.m.	1,150	--	341	--	--	--	34	49	87	100	--	S

LOUP RIVER POWER CANAL NEAR GENOA, NEBR.

Oct. 4, 1950	4:25 p.m.	2,950	--	1,180	3,830	56	--	75	100	--	--	--	SPWCM
Oct. 19	3:30 p.m.	2,050	--	278	786	35	44	63	81	93	--	--	HWCM
Nov. 30	8:00 p.m.	1,710	34	433	1,380	23	--	53	71	100	--	--	SPWCM
Dec. 1	8:30 p.m.	2,600	--	424	1,320	29	--	35	98	100	--	--	SPWCM
Mar. 25, 1951	10:30 a.m.	2,600	--	1,170	6,970	25	--	37	89	--	--	--	SPWCM
May 7	1:30 p.m.	2,320	--	638	2,010	24	--	31	95	100	--	--	SPWCM
June 29	9:15 p.m.	2,600	69	1,580	5,570	41	--	56	98	98	--	--	SPWCM
July 20	4:30 p.m.	2,340	--	1,800	2,630	62	--	73	100	--	--	--	SPWCM

PLATTE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)		Concentration of suspension analysed (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	
LOUP RIVER POWER CANAL NEAR GENOA, NEBR.--Continued																
Aug. 14, 1951...	12:30 p.m.	2,850	73	2,780	2,050		48	63	78	92	97	98	99			BN
Aug. 14.....	12:30 p.m.	2,850	73	2,780	3,980		--	70	81	93	99	100	--			SPWCM
Aug. 14.....	7:15 p.m.	2,380	70	364	902		29	42	42	99	96	98	--			SPWCM
Sept. 25.....	1:30 p.m.	2,670	53	458	1,290		8	--	22	--	91	99	100			SPWCM
LOUP RIVER AT FULLERTON, NEBR. ^a																
Mar. 29, 1951...	2:35 p.m.	2,970	--	1,230	1,680	7	10	12	16	25	52	69	93	100		SPWCM
Apr. 3.....	5:10 p.m.	1,930	48	986	1,250	7	8	8	10	16	35	56	92	100		SPWCM
Apr. 10.....	2:00 p.m.	2,170	44	838	1,610	--	8	--	14	--	44	64	92	100		SPWCM
Apr. 17.....	3:30 p.m.	2,260	46	761	1,590	--	--	--	15	--	62	64	90	100		SPWCM
Apr. 23.....	3:00 p.m.	2,680	51	1,110	1,900	--	9	--	12	--	43	68	96	100		SPWCM
Apr. 27.....	6:00 p.m.	7,420	58	12,300	22,400	--	38	--	59	--	92	96	99	--		SPWCM
May 7.....	3:00 p.m.	2,550	57	929	1,680	--	12	--	17	--	41	62	90	--		SPWCM
May 15.....	4:45 p.m.	2,510	62	1,320	2,380	--	10	--	20	--	58	72	98	100		SPWCM
May 15.....	11:40 p.m.	7,160	--	8,090	19,200	--	9	--	18	--	82	92	98	100		SPWCM
May 16.....	3:30 a.m.	7,050	65	5,610	16,400	--	11	--	18	--	82	91	98	100		SPWCM
May 18.....	12:20 p.m.	6,360	65	4,080	3,590	--	23	--	36	--	77	86	100	--		SPWCM
May 18.....	12:20 p.m.	6,360	65	4,080	3,800	--	21	--	32	--	81	85	98	100		SPWCM
May 23.....	2:30 p.m.	3,800	66	1,920	4,000	--	18	--	27	--	56	70	91	100		SPWCM
May 31.....	10:20 a.m.	12,960	69	11,600	37,600	--	26	--	39	--	82	90	97	100		SPWCM
May 31.....	4:30 p.m.	11,550	71	10,900	9,630	--	33	40	48	61	71	81	90	95		BWCM
May 31.....	4:30 p.m.	11,550	71	10,900	10,300	--	25	34	43	50	61	76	87	93		BN
June 5.....	1:45 p.m.	3,030	60	1,480	2,770	--	21	--	30	--	56	76	99	100		SPWCM
June 14.....	1:15 p.m.	3,120	67	3,480	11,400	--	34	--	55	--	80	84	99	100		SPWCM
June 26.....	11:30 a.m.	4,740	72	8,800	17,300	--	50	--	74	--	95	97	100	--		SPWCM
Aug. 13.....	4:35 p.m.	6,610	--	5,940	8,690	13	18	24	34	52	87	94	99	100		SPWCM
Aug. 13.....	4:35 p.m.	8,610	--	9,540	9,380	18	24	30	39	60	86	94	100	--		SPWCM
Aug. 13.....	9:15 p.m.	8,610	--	8,640	6,990	16	23	30	40	55	83	90	97	100		SPWCM
Aug. 13.....	9:15 p.m.	8,610	--	8,640	6,990	24	30	37	44	60	85	91	97	100		SPWCM
Aug. 31.....	5:50 p.m.	1,880	75	1,492	1,810	--	22	--	26	--	63	80	98	--		SPWCM

^a Field data collected by U.S. Bureau of Reclamation, Mar. 29 to Aug. 13, 1951.

LOUP RIVER AT FULLERTON, NEBR.--Continued ^a

Sept. 11, 1951...	4:40 p. m.	2,350	79	1,240	1,640	--	14	--	18	--	41	54	90	100	SPWCM
Sept. 26.....	11:00 a. m.	2,300	63	980	1,140	--	8	--	13	--	32	46	86	100	SPWCM

ELKHORN RIVER AT EWING, NEBR.

Nov. 21, 1950....	2:00 p. m.	b 104	33	19	84			19	27	36	45	63	95	100	HWCM
Feb. 26, 1951....	10:30 a. m.	b 165	38	49							52	75	100	--	S
Mar. 20.....	5:10 p. m.	b 167	--	136							25	37	88	100	S
May 2.....	4:30 p. m.	1,380	--	242							17	34	80	98	S
July 3.....	3:30 p. m.	1,280	70	473							10	19	57	100	S
July 31.....	5:20 p. m.	153	84	80							92	100	--	--	S
Aug. 16.....	3:45 p. m.	618	--	283							30	46	85	100	S
Aug. 21.....	2:30 p. m.	886	70	306							13	33	81	100	S
Aug. 31.....	11:30 a. m.	305	76	110							63	79	97	100	S
Sept. 10.....	3:30 p. m.	606	68	208							42	56	84	100	S
Oct. 9.....	4:30 p. m.	558	55	147							21	37	89	100	S

^a Field data collected by U. S. Bureau of Reclamation, Mar. 29 to Aug. 13, 1951.^b Mean daily discharge.

PLATTE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1950 to September 1951
(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 of collection	Number of sampling points	Instantaneous discharge (cfs)	Water temperature (° F)	Deposited sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
NORTH LOUP RIVER NEAR BURWELL, NEBR.																	
Nov. 2, 1950	3	488						0	1	24	66	77	85	94	S		
Aug. 14, 1951....	3	577						1	3	21	67	86	93	98	S		
CALANUS RIVER NEAR BURWELL, NEBR.																	
Nov. 2, 1950	3	292							0	9	59	82	91	97	S		
Aug. 14, 1951....	3	404						0	1	18	62	78	86	94	S		
LOUP RIVER AT FULLERTON, NEBR. ^a																	
Apr. 17, 1951 ..	3	2,300					3	8	48	95	98	98	99		S		
June 11.....	3	2,800					11	23	73	99	100	--	--		S		
June 14.....	3	3,100					12	27	73	99	100	--	--		S		
June 28.....	3	4,700					1	4	48	93	98	99	100		S		
Aug. 13	3	8,600					2	5	53	97	100	--	--		S		
Aug. 14	2	6,500					2	4	41	96	99	100	--		S		
Aug. 31	3	1,900					1	2	31	74	90	95	98		S		
Sept. 11	3	2,400					1	4	45	89	97	99	99		S		

^a Field data at Loup River at Fullerton, Nebr., collected by U. S. Bureau of Reclamation, Apr. 17 to Aug. 14, 1951.

MISSOURI RIVER MAIN STEM
/ MISSOURI RIVER AT NEBRASKA CITY, NEBR.

LOCATION --at gaging station at Wabonsie Highway Bridge at Nebraska City, Otoe County.

DRAINAGE AREA 414,400 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: May to September 1951.

Water temperatures: May to September 1951.

EXTREMES: Maximum 272 ppm Jan. 4-31; minimum 180 ppm Aug. 1-31.

Hardness: Maximum 272 ppm Jan. 4-31; minimum 180 ppm Aug. 1-31.

Specific conductance: Maximum daily, 870 micromhos Jan. 7, Feb. 8; minimum daily, 361 micromhos Mar. 29.

Water temperatures (May to September 1951): Maximum, 83° F. July 19-21, 27.

REMARKS --Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples for the period January to September 1951 available in the regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, January to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
Jan. 4-31, 1951..	20,750	22	0.10	67	26	67	5.7	228	190	24	0.5	3.5	0.13	532	0.72	29,810	272	85	34	798	8.1	5
Feb. 1-28.....	21,440	21	.02	66	22	60	5.1	220	185	24	.6	3.6	.10	514	.70	29,750	256	76	33	747	7.9	5
Mar. 1-24.....	28,490	21	.02	61	19	51	5.5	202	151	20	.4	4.6	.10	456	.82	35,080	232	66	32	659	7.9	5
Mar. 25-26.....	61,200	8	.06	54	14	30	6.4	182	88	11	.2	5.7	.06	332	.45	54,860	192	43	25	505	7.8	10
Mar. 27-29.....	140,700	3	.06	55	11	20	6.2	182	68	7.0	.1	6.3	.10	280	.38	106,400	184	35	18	442	7.8	15
Mar. 30-Apr. 17.	118,200	13	.02	49	15	34	5.1	164	100	9.0	.3	5.3	.09	348	.47	111,100	184	50	28	488	7.9	30
Apr. 18-20.....	91,100	13	.04	56	15	39	4.8	188	119	9.5	.4	5.5	.06	382	.52	93,960	202	48	29	555	7.5	10
Apr. 21-29.....	64,320	15	.04	58	15	40	5.3	192	118	13	.3	5.8	.07	410	.56	71,200	206	49	29	569	7.7	3
Apr. 30-May 3....	90,750	16	.04	65	15	28	6.4	224	89	9.5	.3	4.0	.08	378	.51	92,620	224	40	21	545	7.3	7
May 4-31.....	60,450	19	.10	64	18	48	6.3	208	248	13	.3	5.8	.08	428	.58	69,860	234	63	30	652	7.6	7
June 1-2.....	133,500	14	.04	58	12	28	6.4	193	76	11	.4	3.3	.08	316	.43	113,900	194	36	23	478	7.5	8
June 3-5.....	105,900	16	.10	56	13	36	6.1	182	106	10	.3	6.6	.08	346	.47	98,930	193	44	28	533	7.4	8
June 6-8.....	98,200	17	.10	61	16	42	6.3	188	140	12	.3	6.2	.13	396	.54	99,650	219	65	29	589	7.3	8
June 9-19.....	81,920	17	.10	53	15	48	6.4	180	128	11	.3	5.8	.09	374	.51	82,720	192	44	34	575	7.7	9
June 20-22.....	94,870	15	.10	52	13	30	5.9	178	88	9.0	.3	6.9	.06	314	.43	80,430	182	36	26	483	7.6	9
June 23-28.....	75,730	15	.04	57	14	37	6.4	174	123	11	.3	6.2	.08	356	.48	72,790	199	56	28	547	7.4	9
June 29-July 31..	72,240	19	.02	57	14	40	5.8	189	115	12	.4	5.5	.09	369	.50	71,970	200	45	30	560	7.6	7
Aug. 1-31.....	63,270	17	.02	51	13	36	5.3	168	106	12	.4	5.0	.04	338	.46	57,740	180	42	30	519	7.7	8
Sept. 1-30.....	63,200	16	.02	56	16	47	5.3	186	133	12	.5	4.0	.08	395	.54	67,400	207	54	32	602	7.7	8
Weighted average ^a	60,400	17	0.04	57	16	42	5.7	187	122	13	0.4	5.1	0.08	384	0.52	62,620	208	55	30	575	--	--

^a For period of daily sampling only. Represents 86 percent of runoff for water year October 1950 to September 1951.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.--Continued

Temperature (°F) of water, May to September 1951
 /Once-daily temperature measurement at approximately 2 p. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	74	70	--	75
2								--	67	71	82	73
3								--	62	71	81	--
4								--	64	70	79	--
5								--	60	70	80	--
6								--	60	--	81	78
7								--	--	74	81	73
8								62	65	74	82	70
9								--	65	74	80	69
10								58	66	73	79	74
11								58	--	74	80	71
12								64	68	--	79	70
13								66	67	70	77	67
14								--	72	--	76	--
15								64	--	75	72	65
16								--	72	76	--	63
17								65	75	79	72	63
18								66	76	79	81	74
19								66	75	83	73	64
20								68	74	83	74	66
21								67	69	83	73	63
22								66	70	--	73	63
23								68	72	82	73	61
24								--	71	80	72	59
25								67	74	81	75	58
26								65	73	82	74	66
27								65	75	83	75	59
28								64	73	82	75	56
29								70	72	82	78	56
30								72	71	82	79	60
31								74	--	--	76	--
Average								--	70	77	77	66

NEMAHA RIVER BASIN

NEMAHA RIVER AT FALLS CITY, NEBR.

LOCATION.--At gaging station at bridge on U.S. Highway 73, 1 mile south of Falls City, Richardson County, and about 13 miles upstream from mouth.
DRAINAGE AREA.--340 square miles, approximately.
REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, October 1950 to July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 18, 1950	251	17	0.02	108	23	40		392	88	25	0.2	3.0	512	0.70	512	0.70	364	43	19	791	8.1	0.001
Dec. 28	104	14	.04	130	30	66		458	113	64	.4	6.4	672	.91	672	.91	446	70	24	829	8.0	.000
Jan. 22, 1951	126	12	.08	114	26	66		397	110	64	.4	5.7	622	.85	622	.85	392	66	27	981	8.0	.000
Feb. 23	147	14	.04	80	16	30		280	70	17	.2	5.9	380	.52	267	.37	267	37	20	607	8.0	.000
Mar. 19	329	15	.04	98	18	35		335	86	18	.2	8.8	450	.61	350	.45	320	45	19	698	8.0	.000
Apr. 17	299	15	.01	103	22	33		359	90	17	.5	8.7	480	.65	480	.65	348	54	17	745	8.1	.000
May 29	649	12	.03	82	17	25		278	70	12	.4	11	378	.51	378	.51	274	46	16	594	7.7	.000
June 26	15,200	17	.24	36	9.0	14		158	18	4.5	.5	1.2	182	.25	182	.25	127	0	19	284	7.3	.000
July 24	3,410	8.6	.04	40	6.8	12		140	27	3.5	.3	5.7	186	.25	186	.25	128	13	16	283	7.5	.000

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, approximately, of which about 1,330 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: April 1950 to September 1951 (discontinued).

Sediment records: March 1947 to September 1951 (discontinued).

EXTREMES, 1950-51.--Water temperatures: Maximum, 84°F July 13.

Sediment concentrations: Maximum daily, 14,000 ppm May 15; minimum daily, not determined.

Sediment loads: Maximum daily, 37,400 tons Sept. 7; minimum daily, less than 0.50 ton on several days during December and July to September.

EXTREMES, 1947-51.--Water temperatures (April 1950 to September 1951): Maximum, 93°F Aug. 15, 1950.

Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on several days during 1947, 1949, 1950.

Sediment loads: Maximum daily, 90,000 tons June 16, 1948; minimum daily, 0 ton on several days during 1947, 1949, 1950.

REMARKS.--Flow affected by ice Nov. 10, Nov. 24-26, Dec. 1-15, 29-30, Jan. 3 to Feb. 19.

Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, water year October 1950 to September 1951

/Once-daily temperature measurement between 6 a. m. and 11 a. m.

Prior to Dec. 22 reading obtained between 12 m. and 7 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	53	44	--	--	--	40	48	54	64	--	--
2	63	45	41	33	--	--	--	50	45	62	--	66
3	65	48	42	--	35	34	--	52	52	66	70	63
4	62	57	42	--	--	34	41	55	52	65	70	62
5	70	59	34	--	--	34	45	--	55	66	70	60
6	--	53	33	--	33	--	40	--	61	69	69	66
7	--	55	33	--	--	--	41	46	57	71	70	62
8	--	40	--	--	35	--	44	50	60	71	68	64
9	72	34	--	--	33	--	37	55	59	68	65	60
10	69	45	--	35	35	--	--	50	59	66	65	59
11	70	45	49	--	41	--	--	57	55	60	62	64
12	74	40	--	--	--	--	34	--	55	58	--	--
13	75	40	--	--	--	--	--	--	63	84	--	63
14	80	46	41	--	--	35	45	56	64	78	70	--
15	78	46	--	--	--	38	38	57	67	68	--	66
16	70	45	--	--	--	38	36	61	68	70	--	--
17	--	50	--	34	--	--	44	60	67	71	67	--
18	70	55	--	34	--	--	46	59	70	70	--	60
19	65	45	45	--	35	33	47	60	69	73	--	--
20	65	50	45	--	--	--	46	71	64	72	65	59
21	70	50	41	33	35	38	--	59	67	70	64	--
22	55	50	36	--	--	39	--	55	60	69	61	59
23	62	35	36	34	--	36	46	58	61	65	63	60
24	59	40	37	33	43	35	46	63	60	70	67	59
25	65	55	38	--	42	49	45	62	67	70	67	60
26	70	50	34	--	35	40	45	60	65	77	65	60
27	60	53	--	--	36	44	49	64	69	71	--	60
28	60	49	--	--	--	36	56	67	62	74	72	--
29	70	49	--	--	--	--	64	66	62	78	--	--
30	65	42	--	--	--	--	51	63	58	80	--	55
31	65	--	--	--	--	40	--	65	--	74	--	--
Average	67	47	--	--	--	--	--	58	61	70	--	--

KANSAS RIVER BASIN--Continued

ARIKAREE RIVER AT HAIGLER, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	13	128	4	16	240	a 10	12	99	3
2-----	16	193	8	19	166	8	15	99	4
3-----	20			19			7.0	99	2
4-----	22			24			6.8	106	2
5-----	23			20	145	8	4.4	102	1
6-----	18			17			1.2	92	
7-----	19	170	9	18			1.9	64	
8-----	19			22			1.1	--	(t)
9-----	18			18			1.0	--	
10-----	20			20	248	13	.9	--	
11-----	18			17			5.3		
12-----	17			18			16		
13-----	15			30	1,000	sa 90	17		
14-----	15			26	490	34	25		
15-----	18			28	300	29	21	154	7
16-----	18			19			20		
17-----	19	170	8	20			20		
18-----	19			22			22		
19-----	16			18			17		
20-----	16			16			15		
21-----	15			16	37	2	19	202	10
22-----	15			14			14		
23-----	12			9.3			15		
24-----	12			7.5			17	144	6
25-----	17			8.5			18		
26-----	24			14	350	13	13		
27-----	24	116	5	17	280	13	6.8		
28-----	22			13	270	9	8.0		
29-----	14			11	99	3	12	--	e 2
30-----	17			12	99	3	15		
31-----	15			--	--	--	12		
Total-	546	--	223	529.3	--	337	379.4	--	133
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	8.7			1.7			26	--	e 18
2-----	11	45		1.8			29	--	e 16
3-----	4.6			2.8	--	e 1	27	170	12
4-----	7.9	43		3.8			25	480	a 32
5-----	7.5			7.1			28	370	28
6-----	9.5	--	e 1	13	75	3	20		
7-----	9.9	--		23	--	e 12	15		
8-----	7.6	--		20	140	a 7	12		
9-----	6.7	52		18	360	17	12		
10-----	6.6	77		12	460	15	16	--	e 9
11-----	8.0			8.2	530	12	17		
12-----	8.5			5.1	--	e 6	12		
13-----	9.2			1.8	--	e 1	12		
14-----	11			2.3	--	e 1	31	--	e 40
15-----	11			3.0	--	e 1	18	440	19
16-----	11			6.2	--	e 2	15	380	16
17-----	14	154	5	16	--	e 18	14	360	14
18-----	16			38	--	e 70	9.3	300	8
19-----	14			60	680	110	14	--	e 11
20-----	13			52	--	e 200	14	--	e 8
21-----	12			72	1,510	294			
22-----	13			54	--	e 120			
23-----	15	100	4	38	--	e 60		251	10
24-----	18	145	7	40	700	76	15		
25-----	18	--	e 6	38	380	39			
26-----	16	--	e 5	32	340	29			
27-----	5.1			28	330	25	16		
28-----	4.2	--	e 1	23	--	e 19	12		
29-----	2.7			--	--	--	8.0	160	6
30-----	2.1			--	--	--	12		
31-----	1.7			--	--	--	17		
Total-	303.5	--	97	620.8	--	1,142	521.3	--	380

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

ARIKAREE RIVER AT HAIGLER, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	17	130	6	13	380	13	47	--	e 1,300
2-----	14	100	4	15	320	13	41	6,100	sa 750
3-----	18	126	6	16	420	a 18	24	2,020	131
4-----	19	110	6	19	530	s 31	23	1,110	69
5-----	37	--	e 100	18	--	e 32	19	870	45
6-----	58	1,110	174	28	--	e 50	27	850	sa 70
7-----	410	42	35	610	58	86	4,900	sa 1,200	
8-----	29	310	24	35	620	58	81	--	e 2,000
9-----	27	440	a 32	35	440	42	424	--	e 12,000
10-----	43	--	e 150	35	400	38	423	--	e 13,000
11-----	45	--	e 160	38	440	45	707	--	e 27,000
12-----	28	940	71	35	340	a 32	136	2,300	s 900
13-----	27	550	a 40	50	--	e 550	115	1,140	354
14-----	23	280	17	95	--	e 750	98	790	209
15-----	19	195	10	519	14,000	sa 24,000	85	650	149
16-----	20	201	11	70	3,170	s 695	68	510	94
17-----	22	208	12	54	1,490	217	50	490	66
18-----	19	183	9	72	--	e 700	34	580	51
19-----	17	180	8	75	2,100	sa 460	29	410	32
20-----	19	130	a 7	52	700	98	27	280	19
21-----	28	--	e 22	64	--	e 320	27	340	25
22-----	28	--	e 24	140	5,100	sa 2,300	904	11,000	sa 34,000
23-----	27	250	18	70	1,700	321	488	--	e 12,000
24-----	24	186	12	52	960	135	185	5,800	sa 3,100
25-----	25	196	13	41	430	48	112	2,530	765
26-----	24	220	14	32	390	34	109	1,430	421
27-----	183	9,500	sa 6,300	27	330	24	95	1,140	292
28-----	34	2,140	s 202	22	260	15	72	690	134
29-----	26	820	58	17	260	12	52	640	90
30-----	17	470	22	20	260	14	64	1,100	190
31-----	--	--	--	16	220	10	--	--	--
Total-	955	--	7,574	1,810	--	31,133	4,652	--	110,456
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	52	570	80	1.2	--	e 2	2.4	63	(t)
2-----	43	620	72	3.6	--	e 12	258	--	e 7,600
3-----	34	490	45	60	3,500	sa 650	429	10,000	sa 13,000
4-----	34	430	39	25	600	40	613	7,800	s 20,700
5-----	34	380	35	13	130	4	82	1,250	277
6-----	25	300	20	8.0	130	3	70	420	79
7-----	18	180	9	8.7	120	3	1,340	6,800	s 37,400
8-----	17	120	6	16	1,900	sa 120	60	1,600	259
9-----	15	160	6	8.0	190	4	41	470	52
10-----	19	--	e 85	27	--	e 200	31	440	37
11-----	45	2,100	sa 280	35	1,360	s 161	26	46	3
12-----	56	780	118	8.7	--	e 8	19	46	a 2
13-----	48	360	47	4.1	--	2	17	60	3
14-----	27	280	20	3.2	110	1	16	70	a 3
15-----	23	180	11	25	--	e 160	15	73	3
16-----	22	280	17	10	--	e 19	14	75	a 3
17-----	20	870	47	2.4	220	a 1	11	68	2
18-----	29	1,200	a 95	.7	170	(t)	9.3	38	1
19-----	29	350	27	.6	120	(t)	8.7	36	a 1
20-----	22	330	20	7.0	202	s 4	8.0	38	1
21-----	16	--	e 40	10	290	8	11	30	a 1
22-----	37	--	e 260	11	120	4	23	57	4
23-----	38	880	90	12	170	a 5	20	92	5
24-----	51	--	e 1,000	6.8	75	1	19	75	4
25-----	54	5,200	s 806	8.0	--	e 4	20	48	2
26-----	19	1,200	62	10	152	4	20	7	(t)
27-----	10	480	13	6.2	--	e 1	18	4	(t)
28-----	5.1	950	a 13	7.4	102	2	18	7	(t)
29-----	2.1	350	2	6.2	--	e 1	14	10	(t)
30-----	.7	180	(t)	3.6	--	e 1	12	31	1
31-----	.6	70	(t)	5.6	--	e 1	--	--	--
Total-	845.5	--	3,365	354.0	--	1,428	3,245.4	--	79,445
Total discharge for year (cfs-days)									14,762.2
Total load for year (tons)									235,711

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
ARIKAREE RIVER AT HAIGLER, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350		0.500	1.000
Apr. 27, 1951 ..	8:00 a. m.	250	49	11,600	8,020	--	45	--	65	--	91	95	99		100	SPWCM
May 15	6:35 a. m.	651	--	15,100	5,420	--	42	--	60	--	90	98	100		100	SPWCM
May 15	7:30 a. m.	687	57	16,900	4,100	--	39	--	52	--	80	92	98		100	SPWCM
May 15	8:45 a. m.	748	--	18,000	11,100	28	35	42	49	59	77	87	97		100	SPWCM
May 15	8:45 a. m.	748	--	18,000	9,960	3	6	29	47	59	81	90	98		100	SPN
May 15	6:30 p. m.	225	--	8,520	4,230	37	47	56	61	69	83	89	96		100	SPWCM
May 15	6:30 p. m.	225	--	8,520	4,380	5	12	44	54	62	79	86	94		100	SPN
May 16	7:30 a. m.	172	59	3,430	2,190	--	46	--	56	--	87	98	99		100	SPWCM
May 22	7:30 a. m.	172	55	6,190	3,340	--	31	--	46	--	70	81	92		100	SPWCM
June 2	8:00 a. m.	50	43	7,100	3,750	--	73	--	77	--	80	83	94		100	SPWCM
June 5	1:25 p. m.	17	75	878	1,880	--	84	--	92	--	98	100	--		--	SPWCM
June 7	7:30 a. m.	123	57	6,250	3,520	--	61	--	75	--	90	96	100		--	SPWCM
June 9	7:30 a. m.	350	59	7,070	3,760	--	52	--	72	--	92	97	100		--	SPWCM
June 10	7:30 a. m.	533	59	11,500	7,300	--	44	--	63	--	86	94	99		100	SPWCM
June 11	7:45 a. m.	972	55	11,900	6,440	--	43	--	58	--	87	96	100		--	SPWCM
June 11	10:00 a. m.	522	54	9,300	6,610	--	50	--	67	--	91	98	99		100	SPWCM
June 11	2:40 p. m.	276	80	7,290	5,240	--	44	--	57	--	79	89	98		100	SPWCM
June 22	8:00 a. m.	1,920	80	13,600	3,200	--	32	--	37	--	67	81	92		96	SPWCM
June 22	11:00 a. m.	1,380	83	12,700	2,670	--	38	--	45	--	73	84	93		100	SPWCM
June 22	1:30 p. m.	1,040	87	13,400	2,770	--	38	--	43	--	70	83	95		100	SPWCM
July 11	6:30 a. m.	58	80	2,620	2,000	--	66	--	86	--	100	--	--		--	SPWCM
July 24	6:30 a. m.	24	70	3,380	1,800	--	90	--	96	--	100	--	--		--	SPWCM
Sept. 3	11:00 a. m.	544	68	8,720	6,540	--	49	--	68	--	100	--	--		--	SPWCM
Sept. 4	2:05 a. m.	2,060	63	18,000	8,520	--	41	--	61	--	100	--	--		--	SPWCM
Sept. 4	3:25 a. m.	2,060	--	12,200	5,460	--	49	--	69	--	100	--	--		--	SPWCM
Sept. 4	4:00 a. m.	1,930	--	14,400	8,800	--	33	--	46	--	70	78	89		100	SPWCM
Sept. 4	7:00 a. m.	930	62	9,360	5,840	--	48	--	68	--	100	--	--		--	SPWCM
Sept. 7	9:00 a. m.	4,370	62	12,000	4,430	--	37	--	48	--	59	77	92		100	SPWCM
Sept. 7	11:00 a. m.	4,880	62	9,610	5,130	--	56	--	75	--	89	94	98		100	SPWCM

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT STRATTON, NEBR.

LOCATION.--At county highway bridge a quarter of a mile upstream from gage, about half a mile south of Stratton, Hitchcock County, 10 miles upstream from Trenton Dam, and 19 miles downstream from South Fork Republican River.

DRAINAGE AREA.--7,940 square miles, approximately, of which about 4,740 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: December 1950 to September 1951 (discontinued). Sediment records: December 1950 to September 1951 (discontinued).

EXTREMES, December 1950 to September 1951.--Water temperatures: Maximum, 94°F July 20, Aug. 2.

Sediment concentrations: Maximum daily, 19,400 ppm Sept. 3; minimum daily, 30 ppm Feb. 4.

Sediment loads: Maximum daily, 485,000 tons Sept. 3; minimum daily, 3 tons Feb. 4.

REMARKS.--Flow affected by ice Dec. 27 to Feb. 11, Feb. 13-14, Mar. 8-14. Records of water discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, December 1950 to September 1951
 /Once-daily temperature measurement generally between 9 a. m. and 6 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	--	--	36	37	61	58	66	86	81
2			--	--	--	40	a34	54	51	77	94	63
3			--	--	--	35	65	64	55	a66	72	62
4			--	35	--	36	40	73	a51	62	85	62
5			--	--	35	46	38	60	72	72	89	65
6			--	--	35	44	43	54	62	80	85	66
7			32	--	33	39	46	63	a56	a85	88	66
8			--	--	37	37	49	67	a63	80	85	a64
9			--	--	38	35	55	65	69	81	86	68
10			--	--	36	34	48	68	a66	66	81	75
11			--	--	38	34	40	67	61	a60	63	68
12			--	--	32	34	37	64	73	a59	a69	70
13			--	--	33	35	57	a55	72	77	70	66
14			--	--	33	37	54	57	77	77	72	68
15			--	--	36	37	47	54	82	72	82	65
16			--	--	36	56	60	a58	78	85	76	70
17			--	37	35	49	66	a60	78	82	83	72
18			--	--	36	34	65	a61	78	a68	85	69
19			--	--	34	43	67	66	84	82	86	71
20			--	--	41	41	48	67	68	94	a66	72
21			38	--	41	57	46	61	70	--	67	55
22			38	--	38	62	52	72	64	68	62	67
23			39	--	36	53	59	76	66	80	78	69
24			37	--	48	45	57	70	60	a78	87	68
25			42	--	40	47	66	79	81	a72	89	70
26			31	--	51	58	67	68	82	a82	81	55
27			34	--	45	49	50	69	76	82	87	65
28			32	--	46	44	76	77	76	77	84	--
29			33	--	--	48	58	71	66	69	82	--
30			31	--	--	57	57	a63	64	84	84	--
31			33	--	--	40	--	75	--	--	82	--
Average			--	--	38	43	53	65	69	75	80	67

a Reading obtained before 9 a. m.

KANSAS RIVER BASIN--Continued
 REPUBLICAN RIVER AT STRATTON, NEBR.--Continued
 Suspended sediment, December 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----							--	--	--
2-----							--	--	--
3-----							--	--	--
4-----							--	--	--
5-----							--	--	--
6-----							--	--	--
7-----							--	--	--
8-----							--	--	--
9-----							--	--	--
10-----							--	--	--
11-----							--	--	--
12-----							--	--	--
13-----							--	--	--
14-----							--	--	--
15-----							--	--	--
16-----							--	--	--
17-----							--	--	--
18-----							--	--	--
19-----							--	--	--
20-----							--	--	--
21-----							133	580	206
22-----							167	1,100	a 500
23-----							147	1,090	433
24-----							152	950	390
25-----							152	1,180	474
26-----							142	970	372
27-----							153	860	355
28-----							135	870	317
29-----							150	950	a 380
30-----							166	1,200	a 550
31-----							175	580	274
Total-							1,672	--	4,263
January			February			March			
1-----	160	460	199	29	158	12	236	2,230	1,420
2-----	153	510	211	32	108	9	262	1,000	707
3-----	142	520	199	34	154	14	243	2,100	a 1,400
4-----	106	610	174	33	30	3	200	3,120	1,680
5-----	90	700	a 170	46	47	6	195	1,810	953
6-----	80	--	e 150	56	103	16	256	1,180	816
7-----	55	530	79	67	100	18	256	--	e 550
8-----	46	310	38	105	120	34	192	200	104
9-----	87	220	52	173	--	e 800	103	750	208
10-----	105	210	60	238	--	e 950	64	540	93
11-----	107	260	75	238	--	e 1,800	40	--	e 60
12-----	102	250	69	200	2,000	a 1,100	148	--	e 850
13-----	113	270	82	52	380	53	262	--	e 2,400
14-----	99	260	69	34	160	15	204	--	e 3,100
15-----	121	260	85	95	200	51	189	3,220	1,640
16-----	146	360	a 140	269	390	s 291	206	1,880	1,040
17-----	153	670	277	406	1,300	a 1,400	156	1,260	531
18-----	144	720	280	467	1,500	a 1,900	138	1,400	a 500
19-----	167	650	293	406	1,900	a 2,100	138	1,520	566
20-----	116	320	100	297	2,890	2,320	87	1,200	282
21-----	74	270	54	230	2,900	a 1,800	110	1,830	544
22-----	93	380	a 95	256	2,100	1,450	167	2,010	906
23-----	126	1,100	a 380	304	1,880	1,540	189	1,350	699
24-----	130	1,100	a 390	243	1,760	1,150	172	580	269
25-----	128	1,240	428	224	1,430	865	178	730	351
26-----	85	950	a 220	206	1,100	612	189	620	316
27-----	11	540	16	224	2,160	1,310	183	650	321
28-----	10	460	12	250	2,510	1,690	183	790	390
29-----	19	550	28	--	--	--	183	1,230	608
30-----	24	160	a 10	--	--	--	161	1,650	717
31-----	32	196	17	--	--	--	152	1,670	685
Total-	3,024	--	4,442	5,214	--	23,309	5,442	--	24,696

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT STRATTON, NEBR.--Continued

Suspended sediment, December 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	178	1,560	750	138	770	287	152	600	246
2-----	189	1,350	689	123	590	196	200	--	e 1,300
3-----	156	870	366	123	470	156	183	1,570	776
4-----	161	510	222	123	520	173	167	1,200	a 550
5-----	243	570	374	123	330	110	147	850	337
6-----	276	830	618	119	330	106	156	1,200	sa 600
7-----	256	770	532	119	350	112	691	12,000	sa 26,000
8-----	211	789	449	110	500	148	467	5,000	6,300
9-----	217	770	451	103	300	83	576	--	e 18,000
10-----	236	900	573	95	220	56	738	--	e 27,000
11-----	269	1,280	930	91	170	42	3,800	18,400	s 232,000
12-----	236	1,360	868	95	170	44	641	15,000	a 26,000
13-----	178	1,380	683	119	--	e 340	364	4,300	4,230
14-----	172	880	409	3,960	--	e 220,000	334	1,460	1,320
15-----	161	520	226	5,060	18,000	s 300,000	276	1,750	1,300
16-----	156	620	261	1,290	8,710	s 31,300	256	1,900	a 1,300
17-----	167	500	225	602	6,200	a 10,000	256	1,800	a 1,200
18-----	189	560	286	467	11,000	a 14,000	224	1,670	1,010
19-----	195	560	295	493	15,000	a 20,000	206	2,000	1,110
20-----	189	320	163	723	--	e 31,000	156	1,780	750
21-----	156	420	177	763	7,600	sa 20,000	161	1,170	508
22-----	167	820	370	863	4,200	a 9,800	3,090	--	a 220,000
23-----	183	680	336	422	3,100	3,530	1,240	11,100	s 39,600
24-----	189	510	260	334	1,760	1,590	898	10,000	sa 25,000
25-----	200	550	297	282	1,180	898	414	5,500	s 6,370
26-----	243	--	e 1,100	206	800	445	334	2,590	2,340
27-----	498	--	e 16,000	156	670	--	282	1,860	1,420
28-----	304	6,400	sa 5,500	167	380	a 170	269	1,900	a 1,200
29-----	217	1,410	826	178	400	192	243	1,440	945
30-----	163	920	454	189	470	240	224	1,360	762
31-----	--	--	--	152	400	a 160	--	--	--
Total--	6,375	--	34,668	17,788	--	665,460	17,145	--	649,584
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	243	1,050	689	96	180	18	34	700	sa 120
2-----	250	970	655	30	140	11	732	--	e 21,000
3-----	224	1,090	659	139	--	e 360	7,410	19,400	s 485,000
4-----	200	950	513	217	3,000	a 1,800	7,780	19,000	s 410,000
5-----	200	1,380	745	110	1,580	s 490	1,260	9,080	s 32,400
6-----	217	1,030	603	76	630	129	711	4,020	s 8,050
7-----	189	650	a 340	58	380	60	4,830	15,700	s 319,000
8-----	167	620	280	49	210	28	2,200	13,000	sa 90,000
9-----	138	340	127	38	300	31	714	4,470	s 9,170
10-----	123	315	s 121	76	670	s 170	439	1,670	1,980
11-----	195	13,000	a 8,800	3,590	--	e 190,000	364	840	826
12-----	1,080	10,000	s 51,800	398	4,900	5,260	319	790	680
13-----	667	7,900	s 14,600	278	3,400	2,530	289	470	367
14-----	414	4,000	s 4,640	276	3,500	sa 3,000	276	380	283
15-----	319	1,500	1,290	156	640	s 279	250	600	405
16-----	230	900	559	152	650	sa 320	206	740	412
17-----	624	--	e 29,000	195	780	411	206	460	256
18-----	952	12,000	sa 36,000	142	430	165	206	540	300
19-----	297	2,900	s 2,510	110	350	104	178	480	231
20-----	183	600	296	103	270	75	167	360	162
21-----	133	2,100	a 750	123	--	3 220	178	310	149
22-----	663	--	e 32,000	147	1,000	a 400	156	420	177
23-----	467	8,400	a 11,000	138	320	119	147	410	163
24-----	276	3,030	s 2,380	114	480	a 150	156	360	152
25-----	183	1,450	s 760	99	--	e 300	161	360	156
26-----	172	900	418	152	1,800	sa 800	172	320	149
27-----	123	970	322	110	1,300	386	167	360	162
28-----	84	680	154	76	590	121	161	400	a 170
29-----	67	380	69	58	300	47	140	420	a 160
30-----	49	170	22	41	250	28	130	430	151
31-----	49	260	34	34	220	20	--	--	--
Total--	9,178	--	200,104	7,319	--	207,832	30,139	--	1,382,231

Total discharge for period Dec. 21, 1950, to Sept. 30, 1951 (cfs-days) 103,296
 Total load for period Dec. 21, 1950, to Sept. 30, 1951 (tons) 3,196,589

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT STRATTON, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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. 27, 1951	8:45 a. m.	613	50	10,300	6,730	--	8	--	17	--	81	93	99	--	SPWCM
Apr. 28	4:30 p. m.	262	76	4,600	6,840	--	67	--	81	--	94	98	100	--	SPWCM
May 15	3:15 a. m.	10,200	--	24,600	13,600	18	23	28	34	44	71	89	98	--	SPWCM
May 15	3:45 a. m.	9,280	--	25,600	9,640	18	24	29	34	43	66	80	89	--	SPWCM
May 15	3:25 p. m.	3,020	61	16,400	6,620	23	30	36	43	51	72	81	90	--	SPWCM
May 15	3:25 p. m.	3,020	61	16,400	6,360	1	4	29	41	50	72	80	90	--	SPN
May 15	5:10 p. m.	3,100	62	9,770	6,200	--	41	--	57	--	88	93	96	--	SPWCM
May 15	10:00 p. m.	2,480	58	11,400	9,430	--	35	--	49	--	82	90	98	--	SPWCM
May 21	9:30 a. m.	531	61	6,080	2,880	--	26	--	38	--	62	73	94	--	SPWCM
May 22	3:30 p. m.	907	72	4,640	2,940	--	33	--	46	--	82	88	98	--	SPWCM
June 5	2:50 p. m.	142	72	800	1,130	--	53	--	63	--	75	78	92	--	SPWCM
June 11	11:10 a. m.	8,960	--	22,100	12,000	2	4	29	47	56	86	95	98	--	SPN
June 11	11:10 a. m.	7,960	--	22,100	12,700	28	36	42	48	59	85	94	100	--	SPWCM
June 11	1:00 p. m.	7,080	--	20,700	5,160	4	9	44	53	64	87	95	98	--	SPN
June 11	1:00 p. m.	7,080	--	20,700	5,050	33	39	46	53	63	86	94	100	--	SPWCM
June 23	9:30 a. m.	1,140	66	11,200	6,880	--	37	--	47	--	74	82	89	--	SPWCM
June 24	9:35 a. m.	1,180	60	14,000	6,930	--	41	--	50	--	81	89	95	--	SPWCM
July 11	7:45 a. m.	1,183	60	19,600	12,100	--	43	--	70	--	96	99	100	--	SPWCM
July 12	4:10 p. m.	3,710	--	19,500	2,700	--	12	--	20	--	78	92	99	--	SPWCM
July 17	12:30 p. m.	2,430	82	35,900	9,740	--	10	--	17	--	78	96	100	--	SPWCM
July 23	6:55 p. m.	341	80	6,120	4,270	--	69	--	83	--	96	100	--	--	SPWCM
July 24	8:20 a. m.	304	--	3,420	6,090	--	69	--	84	--	95	100	--	--	SPWCM
Aug. 11	6:40 a. m.	4,930	54	14,800	8,110	--	32	--	46	--	82	88	96	--	SPWCM
Aug. 11	10:40 a. m.	3,050	63	11,000	5,250	--	45	--	61	--	90	94	98	--	SPWCM
Sept. 3	9:05 a. m.	10,000	61	23,200	6,810	--	24	--	35	--	78	92	97	--	SPWCM

KANSAS RIVER BASIN--Continued
REPUBLICAN RIVER AT STRATTON, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- centage (° F)	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
Sept. 3, 1951.....	10:05 a. m.	12,200	62	36,100	8,340	--	18	--	27	--	60	74	89	--	100	--	SPWCM
Sept. 3.....	11:15 a. m.	13,300	61	31,200	6,540	--	20	--	28	--	59	70	84	--	100	--	SPWCM
Sept. 3.....	2:00 p. m.	13,900	62	31,200	5,630	--	19	--	27	--	57	75	89	--	100	--	SPWCM
Sept. 3.....	3:05 p. m.	12,800	--	20,000	4,950	--	28	--	40	--	74	82	92	--	100	--	SPWCM
Sept. 3.....	4:15 p. m.	10,800	66	22,400	9,870	19	24	28	32	40	63	73	85	--	94	98	SPWCM
Sept. 3.....	4:15 p. m.	10,800	66	22,400	9,510	2	4	23	30	37	60	71	82	--	92	97	SPN
Sept. 4.....	6:45 a. m.	11,800	61	20,800	6,560	--	26	--	37	--	77	89	96	--	100	--	SPWCM
Sept. 4.....	9:00 a. m.	18,200	60	19,600	4,850	--	25	--	36	--	71	80	89	--	100	--	SPWCM
Sept. 4.....	3:20 p. m.	4,100	61	21,400	4,700	--	24	--	33	--	73	87	95	--	100	--	SPWCM
Sept. 5.....	9:30 a. m.	1,280	65	9,340	4,980	--	27	--	32	--	63	74	84	--	93	98	SPWCM
Sept. 7.....	4:45 p. m.	9,650	66	23,400	5,190	--	23	--	30	--	63	72	87	--	95	99	SPWCM
Sept. 7.....	7:45 p. m.	9,600	65	22,600	5,940	--	27	--	37	--	82	91	96	--	100	--	SPWCM

REPUBLICAN RIVER AT TRENTON, NEBR.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, October 1950
 [Once-daily temperature measurement at approximately 5 p. m.]

[illegible]

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Suspended sediment October 1950

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	83	600	a 130						
2-----	89	614	148						
3-----	86	663	154						
4-----	80	825	178						
5-----	89	771	185						
6-----	86	731	170						
7-----	80	650	a 140						
8-----	80	550	a 120						
9-----	72	513	100						
10-----	66	454	81						
11-----	61	380	a 60						
12-----	61	300	a 50						
13-----	56	239	36						
14-----	58	190	a 30						
15-----	61	150	a 25						
16-----	58	141	22						
17-----	54	200	29						
18-----	56	187	28						
19-----	54	100	a 15						
20-----	54	78	11						
21-----	54	200	29						
22-----	52	220	31						
23-----	49	148	20						
24-----	52	240	a 34						
25-----	49	300	a 40						
26-----	49	384	51						
27-----	49	513	68						
28-----	45	--	e 55						
29-----	42	--	e 24						
30-----	47	175	22						
31-----	45	265	32						
Total-	1,917	--	2,118						

Total discharge for period Oct. 1-31, 1950 (cfs-days) 1,917

Total load for period Oct. 1-31, 1950 (tons) 2,118

e Estimated.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
RED WILLOW CREEK NEAR RED WILLOW, NEBR.

LOCATION.--At gaging station at bridge on U. S. Highways 6 and 34, three-quarters of a mile north of Red Willow, Red Willow County, and 2½ miles upstream from mouth.

DRAINAGE AREA.--710 square miles, approximately, of which about 400 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

Water temperatures: January 1950 to September 1951.

Sediment records: January 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 86° F Aug. 5; minimum, freezing point on Dec. 15, Jan. 20.

Sediment concentrations: Maximum daily, 41,300 ppm July 18; minimum daily, 180 ppm Jan. 22.

EXTREMES, 1950-51.--Water temperatures: Maximum daily, 86° F Aug. 5; minimum, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 41,300 ppm July 18; minimum daily, 180 ppm Jan. 22.

REMARKS.--Flow affected by ice Nov. 10-12, 23-29, Dec. 13-18, Jan. 5-18, Jan. 21 to Feb. 18, Mar. 10-14. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium	Non-magnesium			
Oct. 31, 1950	32	54	0.04	71	16	25	305	10	18	6.5	0.8	2.2	0.10	372	0.51	243	0	18	532	8.2
Dec. 6	17	50	.04	83	21	29	384	0	24	8.0	1.0	.8	.10	428	.58	292	0	18	634	7.8
Jan. 4, 1951	34	45	.20	70	16	32	288	13	23	16	.9	3.9	.10	366	.50	241	0	22	518	8.4
Feb. 5	31	46	.20	62	18	32	276	12	37	6.0	.9	4.0	.10	360	.48	229	0	23	502	8.3
Mar. 3	47	40	.04	61	17	28	314	0	23	8.0	.7	3.9	.10	340	.46	220	0	22	510	7.6
Apr. 3	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	235	0	--	538	7.5
May 3	50	38	.08	64	18	32	307	0	29	8.0	.9	6.0	--	352	.48	232	0	23	551	7.5
June 5	66	35	.02	57	15	30	268	0	32	6.0	.7	6.7	--	328	.45	203	0	25	485	7.3
July 5	52	27	.02	54	14	26	260	0	23	5.0	.7	5.5	--	298	.41	194	0	23	453	7.5
July 31	34	--	--	--	--	--	283	0	--	--	--	--	--	--	--	214	0	--	488	7.6
Sept. 4	310	26	.02	44	6.8	12	186	0	5.0	2.7	.4	.7	--	196	.27	138	0	15	310	7.1

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Temperature (°F) of water, water year October 1950 to September 1951

/Once-daily temperature measurement generally between 1 p. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	54	52	38	34	--	39	44	59	a60	69	a73	68
2	a50	50	35	36	--	39	46	60	56	a65	83	70
3	55	44	35	34	--	37	51	61	58	a66	a73	68
4	54	46	a35	35	--	41	50	64	60	69	76	63
5	a56	50	--	--	34	45	--	66	58	a66	86	68
6	--	47	33	33	35	42	49	59	61	a65	82	68
7	a52	48	--	35	--	41	48	58	70	a72	84	64
8	57	37	--	37	35	37	51	62	59	77	79	70
9	59	a33	34	34	--	35	a51	64	68	a68	a67	70
10	60	33	34	34	39	36	44	63	a60	a67	70	64
11	58	--	--	34	39	--	41	63	--	61	70	71
12	63	36	35	35	--	35	45	61	a57	a60	79	64
13	64	37	36	33	--	34	54	64	a64	a59	a79	a61
14	63	39	36	36	--	35	55	66	a65	a62	a69	63
15	65	41	32	39	--	41	50	65	a66	a81	77	60
16	62	37	38	39	--	43	48	a64	76	a71	80	61
17	63	40	35	36	37	39	53	67	a71	a74	78	61
18	65	44	36	37	36	40	58	62	70	73	79	64
19	60	--	a34	35	40	38	59	a61	a66	a69	81	67
20	59	44	35	32	41	38	46	a65	67	a70	a72	68
21	59	45	37	34	42	51	44	61	a63	a76	69	54
22	49	42	39	35	41	54	56	66	a64	70	63	58
23	51	--	40	36	42	50	62	68	a65	67	69	a59
24	52	--	35	34	51	48	50	68	a64	a74	80	57
25	--	34	39	37	46	53	54	--	a66	a71	76	59
26	53	34	--	37	44	53	51	70	a68	a74	79	68
27	56	35	35	--	42	55	59	71	a69	a76	a64	56
28	55	35	36	--	41	44	62	71	a64	a75	a71	a48
29	55	35	35	--	--	43	--	--	74	84	a79	58
30	52	36	36	--	--	45	62	70	a62	a75	83	70
31	55	--	36	--	--	49	--	a66	--	a75	75	--
Average	57	40	36	--	--	43	52	64	65	70	76	63

a Reading obtained between 7 a. m. and 12 m.

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	23	305	19	32			36	1,490	145
2-----	24	700	a 46	32			35	1,420	134
3-----	24	390	25	32	405	35	34	940	86
4-----	24	360	23	32			28	1,300	98
5-----	25	376	25	32			20	--	e 70
6-----	25	392	26	32			20	--	e 55
7-----	25	392	26	32	500	43	26	--	e 60
8-----	25	357	24	32			27	--	e 42
9-----	26	351	25	32			30	440	36
10-----	26	360	25	28	750	57	30	440	36
11-----	26	360	25	30	1,010	82	35	390	37
12-----	26	352	25	34	1,130	104	35	570	54
13-----	26	329	23	33	900	80	35	680	64
14-----	27	325	24	33			34	1,050	96
15-----	27	329	24	33			36	790	77
16-----	27	328	24	33			33	970	86
17-----	27	345	25	33	740	66	39	650	68
18-----	28	356	27	34			40	680	100
19-----	28	366	28	34			40	2,900	a 320
20-----	28	350	26	34	800	73	36	2,150	209
21-----	29	353	28	34	750	69	35	1,790	169
22-----	29	348	27	35	840	79	35	1,950	184
23-----	29	337	26	30	--	e 70	34	1,770	162
24-----	30	337	27	20	--	e 34	34	1,500	138
25-----	30	345	28	27	350	26	34	1,720	158
26-----	30	340	28	32	1,020	88	33	1,580	141
27-----	31	361	30	38	1,300	133	33	1,320	118
28-----	31	379	32	45	1,210	147	34	1,110	102
29-----	32	395	34	40	1,250	135	34	1,710	157
30-----	32	382	33	39	1,800	a 190	35	2,360	223
31-----	32	410	35	--	--	--	36	2,820	274
Total--	852	--	843	987	--	2,118	1,026	--	3,699
Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	36	2,220	218	25			50	7,000	a 950
2-----	33	1,520	135	25	--	e 30	52	6,160	865
3-----	35	1,290	122	26			49	5,150	681
4-----	34	2,000	184	28			48	5,100	661
5-----	32	--	e 160	29	590	46	46	4,800	596
6-----	25	990	67	25	470	32	44	3,900	463
7-----	18	530	26	28	380	a 28	44	3,580	425
8-----	16	320	14	28	270	20	43	3,310	384
9-----	22	260	15	34	--	e 24	41	3,900	a 440
10-----	26	250	18	39	890	94	35	2,910	275
11-----	28	220	17	45	2,200	a 260	34	--	e 200
12-----	28	260	20	31			31	780	65
13-----	32	250	22	25			35	880	83
14-----	34	240	22	20			45	1,210	147
15-----	42	250	28	28	--	e 38	46	4,900	608
16-----	42	420	48	30			41	6,100	675
17-----	43	820	95	31	2,560	214	36	3,860	375
18-----	43	1,950	226	44	3,610	429	36	3,200	311
19-----	37	3,200	a 320	47	6,150	780	36	3,570	347
20-----	38	2,400	a 240	42	4,960	562	36	3,250	316
21-----	31	550	a 46	43	4,200	488	31	2,250	188
22-----	29	180	14	43	4,410	512	32	3,000	259
23-----	27	460	34	43	4,860	564	34	2,890	265
24-----	26	430	30	44	5,540	658	35	2,880	272
25-----	40	1,180	127	46	6,100	758	37	2,920	292
26-----	41	3,200	a 360	46	5,640	700	38	3,050	313
27-----	25			46	5,380	668	38	3,540	363
28-----	20			46	5,170	642	38	3,330	342
29-----	20	--	e 20	--	--	--	38	2,600	267
30-----	20			--	--	--	38	2,380	244
31-----	25			--	--	--	37	2,400	240
Total--	948	--	2,706	987	--	7,789	1,224	--	11,912

e Estimated.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	36	2,250	219	54	3,950	576	77	13,000	sa 2,800
2-----	34	2,110	194	54	4,180	609	70	12,400	2,340
3-----	33	2,180	194	52	3,930	552	69	9,100	1,700
4-----	33	2,030	181	49	3,500	463	66	8,100	1,420
5-----	35	2,740	259	46	3,190	396	65	8,100	1,420
6-----	36	2,740	266	43	2,560	297	66	7,900	1,410
7-----	37	2,630	263	41	2,270	251	66	8,500	1,510
8-----	38	2,630	270	40	1,940	210	491	35,000	s 58,500
9-----	38	2,660	273	38	2,220	228	202	28,800	s 16,200
10-----	44	3,900	463	36	1,960	181	123	16,200	5,380
11-----	47	3,910	496	36	1,760	171	90	9,900	2,400
12-----	44	3,430	407	35	1,740	164	78	7,700	1,620
13-----	42	3,110	353	34	1,590	146	101	11,900	s 3,330
14-----	39	3,030	319	49	--	e 1,200	102	11,400	3,140
15-----	37	2,290	229	350	38,500	s 42,900	81	7,700	1,680
16-----	35	2,070	196	240	28,400	s 20,900	67	5,700	1,030
17-----	34	2,000	184	428	37,600	s 46,700	67	8,100	1,460
18-----	33	2,110	188	416	31,200	s 36,800	215	22,200	s 17,700
19-----	32	1,910	165	278	24,500	18,400	97	14,200	s 3,990
20-----	34	2,110	194	243	--	e 17,000	71	5,700	1,080
21-----	35	2,150	203	581	35,000	s 60,600	69	5,800	1,040
22-----	34	2,020	185	175	16,200	s 7,890	97	15,000	sa 4,200
23-----	34	2,160	198	122	9,500	3,130	113	15,000	a 4,600
24-----	35	1,970	186	103	9,300	2,580	131	16,100	s 5,880
25-----	35	2,090	197	141	13,000	a 5,000	129	14,100	4,910
26-----	35	1,910	180	132	10,300	3,670	122	11,500	3,790
27-----	237	29,400	s 28,800	96	6,200	1,610	121	11,100	3,630
28-----	168	25,500	s 13,400	82	6,000	1,330	209	18,700	10,600
29-----	60	7,600	s 1,260	87	11,000	sa 2,900	156	16,100	6,780
30-----	52	4,400	618	69	8,800	1,640	113	12,300	3,750
31-----	--	--	--	62	7,500	1,260	--	--	--
Total--	1,466	--	50,540	4,212	--	279,764	3,524	--	177,300
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	86	7,700	1,790	32	2,410	208	207	16,000	sa 15,000
2-----	69	5,600	1,040	32	2,270	196	196	21,400	s 12,300
3-----	66	7,800	1,390	30	2,600	211	130	15,000	sa 6,800
4-----	58	4,500	705	29	1,810	142	309	23,000	sa 21,000
5-----	52	3,600	505	27	1,840	134	115	10,400	3,230
6-----	47	3,300	419	26	1,850	130	182	15,600	s 7,980
7-----	44	3,200	380	26	1,500	105	404	23,700	s 26,900
8-----	42	2,700	306	26	1,600	112	386	24,300	s 25,700
9-----	38	2,000	205	41	--	e 900	220	18,700	11,100
10-----	34	1,800	165	38	--	e 600	159	14,400	6,180
11-----	244	19,100	s 20,900	33	3,410	304	122	9,500	3,130
12-----	166	20,300	s 9,640	32	2,250	194	91	5,800	1,420
13-----	93	8,500	2,130	31	2,200	184	73	4,370	861
14-----	82	6,200	1,370	32	4,100	a 360	67	3,220	582
15-----	75	5,300	1,070	31	2,870	240	62	3,220	539
16-----	69	4,700	876	30	2,270	184	58	2,600	407
17-----	66	5,290	s 994	29	2,080	163	56	2,590	392
18-----	418	41,300	48,100	28	2,160	163	53	2,430	348
19-----	121	16,600	s 6,090	28	1,950	147	47	2,020	267
20-----	71	7,200	1,380	32	--	e 420	46	1,810	225
21-----	61	5,300	873	38	6,800	sa 750	44	1,370	163
22-----	187	24,000	sa 13,000	31	3,460	290	42	1,200	136
23-----	101	14,100	s 3,970	30	2,700	219	41	1,250	138
24-----	75	6,600	1,340	29	2,690	211	40	1,120	121
25-----	61	5,000	823	92	--	e 4,900	38	1,100	113
26-----	56	4,900	741	36	4,200	408	37	1,270	127
27-----	52	4,800	674	54	8,100	sa 1,300	37	1,050	105
28-----	47	3,790	481	37	3,000	300	36	880	86
29-----	41	3,140	348	37	2,900	290	36	900	87
30-----	38	3,020	310	36	2,700	262	34	1,020	94
31-----	34	2,280	209	34	2,600	239	--	--	--
Total--	2,692	--	122,224	1,067	--	14,266	3,370	--	145,531
Total discharge for year (cfs-days)									22,355
Total load for year (tons)									818,692

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Apr. 27, 1951...	12:30 p. m.	442	59	50,600	9,420	--	22	--	38	--	94	99	100	--	--	SPWCM
Apr. 27	7:00 p. m.	308	--	46,500	8,580	--	20	--	34	--	95	100	--	--	--	SPWCM
Apr. 28	9:00 a. m.	209	--	29,200	10,400	--	21	--	33	--	97	100	--	--	--	SPWCM
Apr. 28	7:00 p. m.	93	62	16,300	5,210	--	32	--	47	--	96	100	--	--	--	SPWCM
Apr. 29	12:20 p. m.	58	61	7,060	4,980	--	37	--	56	--	92	100	--	--	--	SPWCM
May 15	9:45 a. m.	165	60	28,900	8,860	--	23	--	34	--	98	100	--	--	--	SPWCM
May 15	1:00 p. m.	238	62	27,700	5,770	--	17	--	26	--	96	100	--	--	--	SPWCM
May 15	7:30 p. m.	820	61	51,800	9,490	--	20	--	31	--	88	100	--	--	--	SPWCM
May 16	2:00 p. m.	174	--	21,800	7,340	--	25	--	37	--	96	100	--	--	--	SPWCM
May 17	1:35 p. m.	527	--	39,800	8,930	9	12	16	23	38	93	100	--	--	--	SPWCM
May 17	1:35 p. m.	527	--	39,800	8,770	2	5	12	19	36	92	100	--	--	--	SPN
May 17	6:30 p. m.	576	--	39,200	6,390	--	14	--	22	--	88	99	100	--	--	SPWCM
May 21	6:30 a. m.	842	--	39,000	6,650	--	18	--	31	--	90	100	--	--	--	SPWCM
June 1	12:00 m.	95	60	18,600	6,760	--	21	--	33	--	95	100	--	--	--	SPWCM
June 5	5:40 p. m.	65	61	8,420	7,820	9	13	18	24	41	89	99	100	--	--	SPWCM
June 5	5:40 p. m.	65	61	8,420	7,520	--	1	5	19	40	84	100	--	--	--	SPN
June 8	7:15 a. m.	816	44	44,800	7,600	--	14	--	25	--	83	100	--	--	--	SPWCM
June 8	5:30 p. m.	786	64	52,800	9,470	--	21	--	36	--	93	100	--	--	--	SPWCM
June 9	7:15 a. m.	184	60	30,600	5,720	--	25	--	41	--	93	100	--	--	--	SPWCM
June 18	7:30 a. m.	85	67	15,700	5,380	--	27	--	38	--	94	100	--	--	--	SPWCM
June 18	1:00 p. m.	498	--	43,800	7,250	--	21	--	35	--	93	99	100	--	--	SPWCM
June 24	11:15 a. m.	180	64	21,800	7,900	--	21	--	32	--	89	99	100	--	--	SPWCM
June 26	10:10 a. m.	132	--	11,200	6,380	--	16	--	27	--	88	100	--	--	--	SPWCM
June 28	7:30 a. m.	236	64	23,100	7,920	--	15	--	24	--	98	99	100	--	--	SPWCM
July 3	7:15 a. m.	69	66	9,340	5,610	--	18	--	32	--	86	100	--	--	--	SPWCM

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951.--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- centage (° F)	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	0.350	0.500		1.000
July 11, 1951	7:45 a. m.	744	59	44,600	6,540	--	20	--	--	--	--	88	100	--	--	--	SPWCM
July 12	7:00 a. m.	192	59	31,600	9,070	--	21	--	32	--	--	93	100	--	--	--	SPWCM
July 12	1:20 p. m.	212	--	20,600	10,200	--	19	--	31	--	--	90	100	--	--	--	SPWCM
July 12	1:20 p. m.	212	--	20,600	9,780	--	13	--	28	--	--	88	100	--	--	--	SPN
July 18	7:30 a. m.	493	69	43,100	6,330	--	22	--	36	--	--	90	99	100	--	--	SPWCM
July 18	5:00 p. m.	522	73	42,000	12,000	--	21	--	33	--	--	90	99	100	--	--	SPWCM
July 18	8:15 p. m.	354	73	39,600	13,400	--	25	--	39	--	--	90	100	--	--	--	SPWCM
July 22	8:00 a. m.	151	66	16,200	4,980	--	26	--	38	--	--	86	100	--	--	--	SPWCM
July 22	12:00 m.	226	68	26,800	8,960	--	24	--	39	--	--	92	100	--	--	--	SPWCM
July 24	9:45 a. m.	75	--	5,860	6,470	--	22	--	41	--	--	88	99	100	--	--	SPWCM
Sept. 1	12:45 p. m.	140	70	29,800	10,800	--	12	--	20	--	--	92	100	--	--	--	SPWCM
Sept. 1	5:15 p. m.	484	68	30,700	8,800	--	24	--	40	--	--	95	100	--	--	--	SPWCM
Sept. 4	7:10 a. m.	449	62	19,600	14,700	--	23	--	35	--	--	89	100	--	--	--	SPWCM
Sept. 4	7:45 a. m.	175	64	16,200	11,400	--	26	--	42	--	--	92	100	--	--	--	SPWCM
Sept. 7	7:45 a. m.	246	64	21,000	7,420	--	16	--	26	--	--	92	99	100	--	--	SPWCM
Sept. 7	7:30 p. m.	610	64	30,200	10,800	--	16	--	23	--	--	87	100	--	--	--	SPWCM

LOCATION.--At bridge south of Cambridge, Furnas County, on State Highway 47, 1 mile upstream from gaging station at Cambridge, a quarter of a mile upstream from confluence with Medicine Creek, and 2.3 miles upstream from Cambridge Diversion Dam.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.

Water temperatures: December 1950 to September 1951.

EXTREMES, December 1950 to September 1951.--Dissolved solids: Minimum, 224 ppm June 18-19.

Hardness: Minimum, 132 ppm June 18-19.

Specific conductance: Minimum daily, 319 microhos Sept. 2.

Water temperatures: Maximum, 93°F July 27; freezing point on several days December to March.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Water discharge calculated by subtracting discharge of Medicine Creek at Cambridge from that of Republican River at Cambridge. Records of discharge for the Republican River at Cambridge and Medicine Creek at Cambridge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Color		
														Parts per million	Tons per acre-foot	Tons per day	Calcium					Non-carbonate	
Dec. 22-31, 1950.	273	49	0.01	65	19	34	12	301	0	59	9.0	0.9	6.0	0.02	412	0.56	304	239	0	23	573	8.0	6
Jan. 1-31, 1951.	217	45	.01	64	20	34	13	304	0	61	10	.9	5.8	.00	424	.58	248	242	0	22	581	8.0	5
Feb. 1-8, 1951.	142	46	.01	67	20	33	13	316	0	60	11	.9	6.5	.00	420	.57	161	251	0	21	606	7.9	4
Feb. 9-10, 1951.	240	34	.02	49	13	26	8.4	213	0	40	7.5	6	6.3	.01	294	.40	191	174	0	23	430	7.8	5
Feb. 11-12, 1951.	1,190	36	.02	55	13	28	11	243	0	51	8.0	8	5.5	.04	342	.47	1,100	192	0	23	488	7.8	6
Feb. 13-28, 1951.	403	40	.01	57	18	35	12	264	0	58	9.0	9	5.9	.12	366	.50	398	214	0	25	539	7.9	5
Mar. 1-31, 1951.	333	42	.01	60	19	34	13	285	0	58	10	.9	4.6	.05	398	.54	358	227	0	23	562	8.1	6
Apr. 1-12, 1951.	338	--	--	82	16	40	13	--	--	65	8.0	--	2.9	--	--	--	--	270	--	23	--	--	--
Apr. 13-14, 1951.	361	62	.04	64	18	40	13	284	11	64	10	1.0	5.3	.08	442	.60	431	234	0	26	614	8.3	7
Apr. 15-27, 1951.	241	--	--	55	17	42	14	--	--	68	12	--	2.7	--	--	--	--	207	--	29	--	--	--
Apr. 28, 1951.	787	42	.10	57	13	30	14	276	0	44	7.0	8	6	.10	354	.48	752	186	0	23	499	7.5	8
Apr. 29-May 2, 1951.	338	43	.03	54	13	33	14	234	0	64	9.0	1.1	5.2	.09	360	.49	329	186	0	26	526	7.9	9
May 3-9, 1951.	189	--	--	68	17	42	17	--	--	78	12	--	1.0	--	--	--	--	240	--	26	--	--	--
May 10-14, 1951.	213	56	.03	54	18	41	15	280	0	71	12	1.1	4.2	.10	410	.56	336	210	0	28	591	8.1	9
May 15-16, 1951.	4,200	44	.14	48	12	24	12	248	0	13	6	7	3.0	.08	288	.39	3,270	170	0	22	424	7.5	9
May 17-21, 1951.	2,200	36	.04	48	10	24	14	220	0	40	5.5	7	3.6	.10	294	.40	1,750	181	0	23	438	7.5	11
May 22-25, 1951.	1,780	34	.03	47	8.9	34	15	206	0	45	6.5	6	5.4	.09	296	.40	1,420	154	0	23	432	7.5	9
May 26-June 7, 1951.	454	41	.03	59	14	34	15	267	0	61	9.0	9	5.5	.12	372	.51	456	206	0	25	555	7.9	10
June 8-17, 1951.	1,280	35	.02	46	10	21	13	218	0	35	5.0	6	3.9	.08	282	.38	975	158	0	21	423	7.6	13
June 11 a, 1951.	1,900	30	.02	62	11	19	15	261	0	39	5.5	6	2.9	.10	316	.43	1,620	201	0	16	491	7.4	10
June 18-19, 1951.	1,850	33	.14	40	7.7	12	12	186	0	20	2.0	6	1.5	.07	224	.30	1,120	132	0	15	335	7.4	15
June 20-22, 1951.	609	34	.05	53	10	25	15	226	0	47	7.0	7	7.0	.10	318	.43	523	174	0	22	476	7.7	10
June 23-July 5, 1951.	701	37	.03	52	10	24	14	230	0	42	6.0	8	5.2	.13	306	.42	579	171	0	22	458	7.8	12

a Not included in weighted average.

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Chemical analyses, in parts per million, December 1950 to September 1951--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Col- or
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
July 6-10, 1951...	318	47	0.03	58	15	37	14	273	0	55	9.5	1.0	3.5	0.18	378	0.51	325	208	0	26	556	8.0	8
July 11-18.....	1,750	35	.12	41	48	20	11	241	0	27	4.5	.6	2.2	.09	306	.48	166	166	0	20	346	7.7	19
July 20-Aug. 10..	1,409	34	.06	49	11	25	11	222	0	37	4.5	.6	2.2	.09	306	.48	166	166	0	20	346	7.8	17
Aug. 11-15.....	1,840	32	.05	48	10	21	12	215	0	34	5.5	.6	1.5	.09	278	.38	1,380	161	0	23	415	7.7	16
Aug. 16-Sept. 1..	270	41	.05	56	13	33	16	250	0	60	9.0	1.0	3.3	.13	372	.51	271	164	0	25	528	8.0	9
Sept. 2-11.....	4,120	24	.04	43	7.7	19	14	189	0	33	3.5	.6	2.2	.09	244	.33	2,710	139	0	21	375	7.7	17
Sept. 12-30.....	470	39	.04	62	16	37	16	278	0	69	9.5	1.0	2.7	.12	410	.56	520	222	0	25	591	8.0	8
Weighted average	681	36	0.05	51	12	26	13	c 234	--	42	6.4	0.7	3.5	0.09	301	0.41	553	177	0	23	462	--	--

b For period of sampling only. Includes estimates where data are missing. Represents 92 percent of runoff for water year October 1950 to September 1951.

c Includes carbonate as bicarbonate.

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Temperature (°F) of water, December 1950 to September 1951
 /Once-daily measurement between 9 a. m. and 1 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	35	32	39	a 45	a 64	63	a 72	a 86	77
2			--	34	33	37	43	a 71	54	a 74	a 87	a 71
3			--	34	34	35	46	54	57	a 80	a 78	67
4			--	36	a 34	a 42	46	a 72	65	a 72	a 84	65
5			--	33	a 34	38	42	a 74	62	a 69	a 89	a 68
6			--	33	33	34	45	a 63	a 64	a 82	a 88	a 69
7			--	36	a 32	34	45	50	a 78	a 86	a 89	67
8			--	34	33	32	49	a 73	a 68	a 84	a 83	a 76
9			--	35	32	33	a 48	a 69	73	77	a 82	70
10			--	32	34	34	42	a 70	68	67	a 77	a 74
11			--	34	34	32	41	a 76	73	64	a 77	75
12			--	a 35	32	34	50	a 75	69	63	a 78	a 68
13			--	34	34	35	a 60	a 74	74	69	a 80	a 70
14			--	35	33	35	54	60	a 80	64	a 75	a 69
15			--	36	a 33	38	a 55	63	77	75	a 77	64
16			--	36	a 35	43	40	66	80	84	a 83	55
17			--	36	36	38	45	65	72	a 85	80	57
18			--	a 39	34	a 42	50	65	a 70	a 79	79	a 69
19			--	37	36	38	49	64	a 78	a 87	a 85	a 74
20			--	34	39	36	47	72	a 70	a 88	a 74	a 73
21			--	a 35	40	43	42	63	a 75	a 88	a 75	51
22			--	34	36	42	54	49	a 70	a 77	73	a 65
23			--	34	35	42	49	a 66	a 74	69	a 83	a 76
24			--	32	35	48	48	a 50	a 74	64	a 84	a 66
25			--	33	35	46	a 58	59	73	a 77	a 86	74
26			--	33	a 38	44	a 58	a 56	69	a 80	a 90	87
27			--	34	a 33	44	a 52	69	a 75	a 82	a 93	a 83
28			--	35	a 32	43	a 45	66	68	a 73	62	85
29			--	a 34	32	--	a 48	65	67	a 70	a 88	79
30			--	34	32	--	a 52	a 66	67	a 77	a 87	a 74
31			--	36	32	--	a 52	--	a 75	--	a 85	79
Average			--	35	37	42	51	68	71	79	80	66

a Reading obtained between 2 p. m. and 8 p. m.

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Periodic determinations of suspended-sediment discharge May to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
May 16, 1951	3,680	22,800	227,000
May 16	3,320	18,300	164,000
May 18	1,970	10,400	55,300
May 25	1,850	4,710	23,500
June 8	4,170	34,200	399,000
June 11	3,690	22,800	227,000
June 23	2,180	14,500	85,300
July 11	3,110	21,600	181,000
Aug. 11	4,810	28,800	374,000
Aug. 14	4,480	19,800	240,000
Sept. 2	4,740	18,400	235,000
Sept. 4	10,500	21,300	604,000
Sept. 4	7,010	17,700	335,000
Sept. 5	7,640	16,200	334,000
Sept. 6	3,620	7,080	69,200
Sept. 12	1,380	2,300	8,570

KANSAS RIVER BASIN--Continued
 REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Particle-size analyses of suspended sediment, May to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350		0.500	1.000
May 16, 1951	12:40 a. m.	3,680	--	22,800	4,400	--	36	--	53	--	78	91	98		100	SPWCM
May 18	2:05 p. m.	1,970	65	10,400	9,890	--	26	--	38	--	85	94	98		100	SPWCM
June 8	12:45 p. m.	4,170	55	34,200	6,130	15	18	21	27	36	63	77	90		100	SPWCM
June 8	12:45 p. m.	4,170	55	34,200	6,130	1	5	18	24	34	61	76	90		98	SPN
July 11	3:25 p. m.	3,110	--	21,600	8,900	--	26	--	37	--	80	86	90		97	SPWCM
July 11	3:25 p. m.	3,110	--	21,600	8,800	--	19	--	37	--	78	87	90		97	SPN
July 24	12:00 p. m.	1,080	--	14,060	6,190	--	51	--	63	--	85	92	98		99	SPWCM
Aug. 14	3:10 p. m.	4,480	--	19,800	5,620	24	28	34	41	53	82	93	97		100	SPWCM
Aug. 14	3:10 p. m.	4,480	--	19,800	5,570	6	16	31	38	52	82	94	98		100	SPN
Sept. 4	8:15 a. m.	10,500	--	21,300	3,350	--	30	--	39	--	74	87	93		98	SPWCM
Sept. 5	9:55 a. m.	7,640	--	16,200	8,990	27	32	33	37	51	80	92	97		100	SPWCM
Sept. 5	9:55 a. m.	7,640	--	16,200	8,350	2	5	6	34	53	80	93	98		100	SPN

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.

LOCATION.--At bridge on U. S. Highway 83, 150 feet upstream from gaging station, a quarter of a mile east of Maywood, Frontier County, and 5 miles upstream from Brushy Creek.
DRAINAGE AREA.--207 square miles, of which 82 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: April to September 1951.

Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Water temperatures: Maximum, 80°F Aug. 1.

Sediment concentrations: Maximum daily, 20,000 ppm July 12; minimum daily, 200 ppm Sept. 21.

Sediment loads: Maximum daily, 22,700 tons May 20; minimum daily, 11 tons Aug. 18, Aug. 21, Sept. 20-22.

REMARKS.--Records of discharge for period April to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, April to September 1951

Once-daily temperature measurement generally between 8 a. m. and 11 a. m.⁷

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	56	a 60	62	a 80	64
2							--	a 61	55	--	--	63
3							--	53	55	--	72	67
4							--	57	55	a 66	a 76	64
5							--	58	58	--	76	65
6							--	52	59	66	75	a 68
7							--	a 63	57	a 78	73	63
8							--	54	56	75	71	64
9							--	58	68	71	76	68
10							--	--	64	52	77	a 68
11							--	--	67	60	65	62
12							--	a 64	62	58	a 74	60
13							--	a 63	66	a 69	73	55
14							--	56	67	67	a 75	56
15							--	59	68	--	71	a 61
16							--	--	69	74	a 75	54
17							--	a 65	71	a 78	72	57
18							--	62	65	72	a 77	a 63
19							--	60	72	a 78	72	59
20							--	64	69	78	a 69	60
21							--	53	70	a 79	65	--
22							--	58	62	67	a 63	a 60
23							--	59	65	a 75	a 66	59
24							a 48	a 72	a 68	a 77	65	54
25							--	63	a 74	a 79	71	53
26							a 50	62	a 74	78	68	54
27							a 55	61	70	a 78	68	a 56
28							a 62	62	--	71	70	47
29							--	64	65	77	70	60
30							--	62	a 66	77	a 70	a 64
31							--	a 66	--	a 78	a 71	--
Average							--	60	65	72	70	60

a Reading obtained between 1 p. m. and 7 p. m.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	26	540	38	155	1,520	s 685
2-----	--	--	--	27	460	34	56	1,780	118
3-----	--	--	--	26	400	28	32	474	41
4-----	--	--	--	31	452	38	26	320	22
5-----	--	--	--	26	320	22	22	272	16
6-----	--	--	--	24	270	18	25	2,300	sa 650
7-----	--	--	--	23	250	16	81	5,920	s 2,950
8-----	--	--	--	23	270	17	181	14,900	s 10,800
9-----	--	--	--	23	305	19	102	4,740	1,310
10-----	--	--	--	22	300	18	55	3,000	s 464
11-----	--	--	--	22	275	16	36	1,400	136
12-----	--	--	--	23	275	17	35	1,400	sa 140
13-----	--	--	--	23	360	22	42	13,600	sa 1,140
14-----	--	--	--	91	6,000	sa 1,800	34	2,600	sa 280
15-----	--	--	--	120	8,530	s 3,370	23	1,020	63
16-----	--	--	--	104	3,080	865	21	820	47
17-----	--	--	--	98	2,080	s 576	20	880	48
18-----	--	--	--	80	1,390	225	58	9,000	sa 2,100
19-----	--	--	--	51	1,080	149	72	2,000	389
20-----	--	--	--	193	9,930	s 22,700	50	1,300	176
21-----	--	--	--	280	3,720	s 2,920	101	15,000	sa 20,000
22-----	--	--	--	112	1,720	s 544	214	8,820	s 6,150
23-----	--	--	--	44	1,600	190	161	2,500	sa 1,200
24-----	25	240	16	33	560	50	108	1,800	a 500
25-----	22	240	a 14	25	430	29	54	910	133
26-----	35	--	e 1,800	23	320	20	32	580	50
27-----	162	7,100	sa 4,600	22	232	14	35	540	51
28-----	49	1,340	s 186	21	650	sa 40	30	650	a 50
29-----	33	950	a 85	30	900	73	25	720	49
30-----	28	850	a 65	65	--	e 4,100	20	740	40
31-----	--	--	--	311	8,530	s 5,440	--	--	--
Total--	354	--	6,766	2,002	--	43,408	1,906	--	52,798
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	20	670	36	23	2,640	164	50	7,400	s 1,220
2-----	17	550	a 26	19	2,200	a 120	177	8,130	sa 4,700
3-----	19	430	22	19	2,420	124	82	5,380	1,180
4-----	19	370	19	45	--	e 650	84	5,400	sa 1,300
5-----	19	360	18	36	1,310	s 134	63	1,740	296
6-----	19	350	18	23	618	38	45	1,480	180
7-----	15	320	13	20	400	22	57	5,280	s 1,020
8-----	15	340	14	20	256	14	48	2,580	s 379
9-----	16	570	25	19	288	15	32	1,500	a 130
10-----	251	10,100	s 10,300	18	384	19	28	800	61
11-----	52	1,920	342	19	880	45	24	438	28
12-----	128	20,000	sa 9,700	20	680	37	35	--	e 300
13-----	50	1,460	s 197	18	356	17	28	2,100	a 160
14-----	31	900	75	18	328	16	24	432	28
15-----	26	610	43	18	310	15	22	310	18
16-----	20	550	30	18	310	15	22	320	19
17-----	20	2,500	sa 140	17	270	12	22	272	16
18-----	59	4,600	sa 770	16	254	11	21	294	17
19-----	38	1,980	204	17	274	13	21	276	16
20-----	28	800	60	17	252	12	20	210	11
21-----	36	2,200	sa 240	17	250	11	20	200	a 11
22-----	61	5,200	a 850	19	800	sa 44	20	210	11
23-----	38	1,530	157	22	680	40	21	240	14
24-----	24	3,250	211	25	1,200	a 80	21	250	14
25-----	21	2,520	143	25	870	59	21	264	15
26-----	19	800	41	31	3,400	sa 550	22	240	14
27-----	19	1,150	59	42	4,100	sa 550	21	220	a 12
28-----	35	7,770	s 928	27	780	57	20	220	12
29-----	33	3,760	335	23	486	30	21	280	16
30-----	28	1,550	117	20	370	20	22	320	19
31-----	37	7,500	sa 1,100	19	380	20	--	--	--
Total--	1,213	--	26,233	690	--	2,954	1,114	--	11,227

Total discharge for period Apr. 24 to Sept. 30, 1951 (cfs-days) 7,279
 Total load for period Apr. 24 to Sept. 30, 1951 (tons) 143,386

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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		0.350	0.500	1.000
Apr. 27, 1951...	5:35 a. m.	215	40	7,320	6,760	--	37	--	52	--	92	100	--	SPWCM	
Apr. 27,	5:35 a. m.	215	40	7,320	6,980	--	31	--	49	--	92	100	--	SPN	
May 14,	5:15 a. m.	161	56	9,940	7,790	--	25	--	42	--	96	100	--	SPWCM	
May 15,	10:20 a. m.	174	59	21,200	7,120	--	17	--	30	--	94	100	--	SPWCM	
May 15,	11:20 a. m.	247	--	26,600	8,420	--	19	--	34	--	94	100	--	SPWCM	
May 20,	7:15 p. m.	2,000	48	89,100	7,160	--	16	--	28	--	83	99	100	SPWCM	
May 21,	1:15 p. m.	275	--	2,570	3,030	--	51	--	58	--	92	99	100	SPWCM	
May 30,	11:30 p. m.	576	63	27,600	5,190	--	32	--	49	--	97	100	--	SPWCM	
May 31,	12:00 m.	623	--	4,660	3,900	--	36	--	45	--	91	--	--	SPWCM	
May 31,	1:00 p. m.	576	66	3,540	2,700	--	48	--	56	--	94	99	--	SPWCM	
June 7,	12:25 a. m.	316	68	43,300	6,920	--	19	--	32	--	93	100	--	SPWCM	
June 7,	1:40 a. m.	307	--	21,500	6,060	--	26	--	46	--	96	100	--	SPWCM	
June 8,	6:00 a. m.	655	--	33,800	10,100	16	22	29	38	58	94	100	--	SPWCM	
June 8,	6:00 a. m.	655	--	33,800	10,000	6	14	26	36	58	94	100	--	SPN	
June 13,	8:35 p. m.	83	66	192,000	6,760	--	12	--	20	--	79	99	--	SPWCM	
June 13,	9:42 p. m.	219	66	32,300	6,570	--	26	--	44	--	96	100	--	SPWCM	
June 18,	1:50 a. m.	143	65	54,600	11,500	--	20	--	34	--	93	100	--	SPWCM	
June 21,	11:55 p. m.	716	60	29,800	5,190	--	28	--	44	--	95	100	--	SPWCM	
June 22,	12:50 a. m.	449	60	20,200	9,440	20	27	35	43	61	93	100	100	SPWCM	
June 22,	12:50 a. m.	449	60	20,200	9,430	6	17	30	41	60	93	100	100	SPN	
July 10,	5:10 a. m.	922	52	43,800	7,810	--	21	--	34	--	93	100	--	SPWCM	
July 12,	6:00 a. m.	307	57	24,600	9,750	--	22	--	39	--	96	100	--	SPWCM	
July 31,	1:10 p. m.	72	--	37,800	10,200	--	26	--	40	--	93	100	--	SPWCM	
Aug. 26,	9:45 p. m.	66	64	12,700	8,230	--	29	--	54	--	97	100	--	SPWCM	
Sept. 1,	3:00 a. m.	30	82	20,800	3,190	--	28	--	45	--	96	100	--	SPWCM	
Sept. 1,	11:55 p. m.	260	64	17,800	6,260	--	22	--	32	--	95	100	--	SPWCM	
Sept. 2,	12:45 a. m.	457	63	25,200	9,260	--	27	--	46	--	98	100	--	SPWCM	

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR MAYWOOD, NEBR.

LOCATION.--At bridge on U. S. Highway 83, 150 feet upstream from gaging station, 2 miles south of Maywood, Frontier County, 2½ miles upstream from Frazier Creek, and 5 miles upstream from mouth.

DRAINAGE AREA.--130 square miles, of which 72 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: April to September 1951.

Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Sediment concentrations: Maximum daily, 22,700 ppm June 8; minimum daily, no flow on several days during September.

Sediment loads: Maximum daily, 58,000 tons Sept. 2; minimum daily, 0 ton on several days during September.

REMARKS.--Records of discharge for period April to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, April to September 1951

[Once-daily temperature measurement generally between 6 a. m. and 10 a. m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	54	56	--	--	65
2							--	a 63	--	62	69	64
3							--	52	52	--	--	--
4							--	53	--	60	66	64
5							--	58	54	--	--	--
6							--	49	--	64	67	61
7							--	66	59	--	--	59
8							--	50	56	66	64	--
9							--	57	61	--	--	63
10							--	--	62	54	61	--
11							--	--	--	--	--	--
12							--	--	56	58	65	--
13							--	--	--	--	--	52
14							--	50	62	64	67	--
15							--	59	--	--	--	54
16							--	--	61	66	60	--
17							--	60	69	--	--	--
18							--	--	65	70	60	a 65
19							--	--	--	--	a 87	--
20							--	--	61	68	66	54
21							--	a 63	61	71	65	--
22							--	a 64	60	--	62	48
23							--	a 70	a 64	65	--	--
24							--	a 48	59	--	63	57
25							--	--	--	65	--	a 63
26							--	a 52	a 66	62	--	a 65
27							--	42	--	70	64	--
28							--	a 63	a 67	59	69	--
29							--	--	a 66	--	68	--
30							--	--	60	57	--	70
31							--	--	63	--	68	--
Average							--	--	--	--	--	--

a Observations made after 12 m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	1.2	188	1	1.6	800	3
2-----	--	--	--	.6	--	--	1.0	--	e 1
3-----	--	--	--	.6	--	--	.8	78	(t)
4-----	--	--	--	.4	34	(t)	.5	68	(t)
5-----	--	--	--	.5	--	--	.3	62	(t)
6-----	--	--	--	.4	18	--	.5	--	(t)
7-----	--	--	--	.6	6	--	7.2	3,790	s 111
8-----	--	--	--	.6	11	--	232	22,700	s 32,700
9-----	--	--	--	.7	5	(t)	3.4	--	e 36
10-----	--	--	--	.7	--	--	7.1	4,500	sa 130
11-----	--	--	--	.7	--	--	1.0	396	.1
12-----	--	--	--	.7	--	--	.5	216	--
13-----	--	--	--	.8	--	--	1.2	--	--
14-----	--	--	--	76	14,900	s 8,050	1.3	82	(t)
15-----	--	--	--	92	22,400	s 7,590	1.0	--	--
16-----	--	--	--	4.4	--	e 50	1.0	42	--
17-----	--	--	--	10	6,100	s 311	1.6	125	1
18-----	--	--	--	6.1	2,600	43	29	8,930	s 1,550
19-----	--	--	--	4.0	--	e 5	1.3	--	e 2
20-----	--	--	--	50	--	e 4,100	.7	111	(t)
21-----	--	--	--	15	6,880	s 729	87	--	e 20,000
22-----	--	--	--	.9	320	a 1	314	19,000	sa 38,000
23-----	--	--	--	.8	223	(t)	22	7,600	sa 1,100
24-----	--	--	--	.8	92	(t)	5.9	2,600	s 69
25-----	0.6	21	(t)	.5	--	(t)	1.6	--	e 1
26-----	87	--	e 16,000	.3	--	--	1.5	77	--
27-----	220	18,000	sa 37,000	.3	--	--	1.2	--	--
28-----	1.1	1,520	4	.3	24	(t)	1.0	44	(t)
29-----	1.1	360	a 1	17	9,000	sa 900	1.3	--	--
30-----	1.2	280	a 1	26	--	e 6,600	1.0	42	--
31-----	--	--	--	184	12,700	s 22,200	--	--	--
Total--	311.0	--	53,006	496.9	--	50,581	729.5	--	93,709
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1.3	--	--	0.6	--	--	37	7,200	sa 3,200
2-----	1.2	50	--	.6	29	--	412	18,000	sa 58,000
3-----	1.1	--	--	.7	--	--	9.8	--	e 5
4-----	.9	8	--	.5	12	--	33	10,600	s 2,010
5-----	.9	--	(t)	.6	--	--	4.4	--	e 14
6-----	1.0	9	--	.6	17	--	3.3	160	a 1
7-----	1.0	--	--	.6	--	--	77	10,700	s 5,350
8-----	.9	16	--	.5	35	--	3.3	--	e 8
9-----	.9	--	--	.6	--	--	2.1	--	e 22
10-----	158	16,000	sa 17,000	.5	22	--	2.4	--	e 20
11-----	2.8	--	e 22	.5	--	(t)	1.1	65	(t)
12-----	101	15,300	s 8,910	.5	18	--	9.0	--	e 150
13-----	1.9	340	a 2	.5	--	--	1.1	550	2
14-----	.8	123	--	.9	28	--	.6	--	--
15-----	1.0	52	(t)	.8	--	--	.6	29	--
16-----	.9	33	--	.8	22	--	.6	--	(t)
17-----	7.4	2,600	sa 260	.7	--	--	.6	--	--
18-----	27	9,900	sa 1,000	.8	18	--	.6	2	--
19-----	1.1	540	2	.7	--	--	.6	--	--
20-----	.9	395	1	.6	17	--	.6	0	0
21-----	12	6,100	sa 380	.6	14	--	.6	--	0
22-----	5.0	--	e 38	1.2	51	(t)	.7	0	0
23-----	1.0	424	1	.9	--	(t)	.6	--	0
24-----	.8	--	--	1.1	450	1	.5	0	0
25-----	.7	50	--	.7	--	(t)	.7	6	--
26-----	.7	58	(t)	48	8,650	s 6,510	.6	--	--
27-----	.7	67	--	18	3,300	sa 380	.4	--	--
28-----	5.7	1,500	sa 42	1.2	296	1	.4	--	(t)
29-----	1.1	403	1	1.4	--	(t)	.5	--	--
30-----	.8	--	(t)	.9	37	(t)	.4	--	--
31-----	.6	32	(t)	.8	--	(t)	--	--	--
Total--	341.1	--	27,661	87.4	--	6,894	605.1	--	68,782

Total discharge for period Apr. 25 to Sept. 30, 1951 (cfs-days) 2,571.0

Total load for period Apr. 25 to Sept. 30, 1951 (tons) 300,633

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- centage (° F)	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	0.350	0.500		1.000
Apr. 27, 1951	3:55 a. m.	320	42	37,400	7,320	--	22	--	39	--	89	100	--	--	--	SPWCM
May 14	1:00 a. m.	16	--	5,400	5,400	--	22	--	36	--	87	99	100	--	--	SPWCM
May 14	5:00 a. m.	528	56	58,900	9,540	--	16	--	27	--	83	99	100	--	--	SPWCM
May 14	6:20 a. m.	284	--	35,400	6,620	--	18	--	32	--	88	99	100	--	--	SPWCM
May 15	5:25 a. m.	163	59	32,400	6,920	18	25	32	39	55	92	100	--	--	--	SPWCM
May 15	5:25 a. m.	163	59	32,400	6,770	2	5	24	35	53	88	100	--	--	--	SPN
May 15	10:05 a. m.	183	59	36,200	5,110	--	16	--	26	--	82	94	95	97	--	SPWCM
May 15	11:00 a. m.	167	--	35,000	6,260	--	19	--	28	--	87	99	100	--	--	SPWCM
May 17	10:45 a. m.	40	61	20,300	3,540	14	19	24	32	50	86	100	--	--	--	SPWCM
May 17	10:45 a. m.	40	61	20,300	3,070	4	10	20	28	48	87	100	--	--	--	SPN
May 31	12:40 a. m.	1,340	64	66,700	5,940	--	17	--	29	--	85	99	100	--	--	SPWCM
May 31	3:00 a. m.	793	--	29,000	6,730	20	26	32	39	52	87	99	100	--	--	SPWCM
May 31	3:00 a. m.	793	--	29,000	6,580	5	13	25	34	50	87	99	100	--	--	SPN
June 7	3:00 a. m.	24	--	7,660	5,890	--	25	--	40	--	81	90	90	93	--	SPWCM
June 8	6:15 a. m.	1,290	57	63,500	4,780	--	18	--	29	--	78	99	100	--	--	SPWCM
June 8	8:25 a. m.	766	56	35,100	5,310	--	21	--	38	--	85	99	100	--	--	SPWCM
June 18	4:45 a. m.	155	--	29,300	8,500	--	32	--	52	--	93	99	100	--	--	SPWCM
June 21	10:10 p. m.	643	61	76,100	6,430	--	14	--	21	--	81	99	100	--	--	SPWCM
June 22	2:40 a. m.	1,310	54	18,600	5,840	--	30	--	46	--	88	98	98	--	--	SPWCM
July 10	6:30 a. m.	813	53	22,400	4,480	--	21	--	33	--	90	99	100	--	--	SPWCM
July 10	7:45 a. m.	820	--	37,700	6,670	15	20	24	32	49	92	100	--	--	--	SPWCM
July 10	7:45 a. m.	820	--	37,700	6,500	4	10	18	26	44	88	100	--	--	--	SPN
July 12	6:10 a. m.	506	--	48,600	8,320	--	18	--	28	--	83	99	100	--	--	SPWCM
July 21	6:50 a. m.	54	71	14,400	4,950	--	42	--	60	--	89	98	100	--	--	SPWCM
Aug. 26	8:10 p. m.	76	67	15,100	5,650	--	32	--	50	--	96	100	--	--	--	SPWCM

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Aug. 26, 1951...	9:10 p. m.	442	--	91,400	7,340	--	16	--	26	--	79	99	100	--	--	--	SPWCM
Aug. 26	9:23 p. m.	534	--	60,200	17,100	--	17	--	28	--	83	99	100	--	--	--	SPWCM
Aug. 27	8:10 a. m.	25	64	2,700	3,320	--	72	--	84	--	94	100	--	--	--	--	SPWCM
Sept. 1	9:45 a. m.	66	65	16,000	7,020	23	30	37	45	61	90	99	100	--	--	--	SPWCM
Sept. 1	9:45 a. m.	66	65	16,000	6,970	6	13	31	41	58	88	99	100	--	--	--	SPN
Sept. 2	3:20 a. m.	462	--	33,800	11,400	--	19	--	31	--	89	100	--	--	--	--	SPWCM
Sept. 4	8:30 a. m.	102	--	47,600	12,800	--	16	--	23	--	72	99	--	--	--	--	SPWCM
Sept. 4	3:55 p. m.	128	--	4,980	8,860	--	96	--	71	--	92	99	100	--	--	--	SPWCM
Sept. 7	7:30 a. m.	154	59	33,100	10,400	--	19	--	30	--	90	100	--	--	--	--	SPWCM
Sept. 7	9:00 a. m.	377	--	46,600	11,400	--	18	--	28	--	84	100	--	--	--	--	SPWCM

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.

LOCATION.--At bridge on State Highway 23 N, 50 feet downstream from gaging station, half a mile upstream from mouth, and 1 mile east of Curtis, Frontier County.

DRAINAGE AREA.--77 square miles.

RECORDS AVAILABLE.--Water temperatures: April to September 1951.

Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Water temperatures: Maximum, 75°F Aug. 6.

Sediment concentrations: Maximum daily, 37,600 ppm June 8; minimum daily, 16 ppm

Sept. 27.

Sediment loads: Maximum daily, 131,000 tons May 31; minimum daily, less than 0.50 ton

Sept. 22, 23, 26-29.

REMARKS.--Records of discharge for period March to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, April to September 1951

[Once-daily temperature measurement generally between 7 a. m. and 1 p. m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	71	--	59	68	71
2							--	--	53	60	71	--
3							44	58	54	--	68	62
4							--	58	54	62	67	62
5							a 48	59	--	63	73	65
6							55	53	--	63	75	87
7							--	a 63	--	63	72	60
8							--	53	--	69	68	63
9							--	60	a 71	69	--	65
10							--	--	--	58	63	69
11							a 45	a 67	--	58	62	70
12							a 52	a 68	--	58	62	61
13							a 51	57	67	--	67	63
14							--	57	65	67	68	64
15							--	59	63	62	63	54
16							--	63	64	60	64	55
17							a 62	60	65	72	66	64
18							52	a 60	a 67	70	64	58
19							54	59	64	69	70	67
20							47	60	62	71	67	--
21							--	57	63	73	62	52
22							--	a 67	62	67	61	--
23							a 64	56	61	65	60	57
24							--	61	59	68	62	54
25							--	61	64	68	62	55
26							a 53	65	64	70	67	63
27							--	a 60	64	73	65	--
28							57	59	60	68	74	51
29							--	64	63	74	68	63
30							--	a 68	58	72	--	62
31							--	a 64	--	69	--	--
Average							--	61	--	66	66	61

a Reading obtained between 2 p. m. and 6 p. m.

KANSAS RIVER BASIN--Continued
FOX CREEK AT CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Apr. 27, 1951.....	2:20 a. m.	918	--	70,700	15,200	--	20	--	32	--	92	99	100		SPWCM
Apr. 27.....	8:35 a. m.	71	--	19,400	9,120	23	31	40	52	74	98	100	--		SPWCM
Apr. 27.....	8:35 a. m.	71	--	19,400	9,380	4	8	34	50	74	98	100	--		SPN
May 4.....	4:20 a. m.	98	--	21,500	5,710	--	21	--	36	--	97	100	--		SPWCM
May 14.....	5:10 a. m.	151	--	20,500	5,130	--	23	--	37	--	96	99	100		SPWCM
May 14.....	5:30 a. m.	158	--	24,600	10,100	--	19	--	32	--	94	100	--		SPWCM
May 14.....	9:00 a. m.	54	57	12,800	8,530	--	33	--	57	--	98	100	--		SPWCM
May 15.....	12:50 p. m.	162	61	31,500	11,600	--	20	--	32	--	93	99	100		SPWCM
May 15.....	3:45 p. m.	110	--	25,400	9,380	--	26	--	45	--	96	99	100		SPWCM
May 30.....	11:25 p. m.	3,080	--	44,800	8,460	--	20	--	36	--	96	99	100		SPWCM
May 31.....	2:10 a. m.	3,300	--	31,800	6,140	--	30	--	48	--	96	99	100		SPWCM
May 31.....	5:10 a. m.	3,160	--	33,300	7,360	20	24	32	42	60	93	99	100		SPWCM
May 31.....	5:10 a. m.	3,160	--	33,300	7,200	4	10	28	41	60	94	99	100		SPN
June 7.....	7:00 a. m.	405	--	46,900	8,320	--	22	--	36	--	93	99	100		SPWCM
June 8.....	7:00 a. m.	2,130	--	60,200	8,700	--	18	--	28	--	92	100	--		SPWCM
June 13.....	9:45 p. m.	399	51	48,900	10,300	--	16	--	27	--	92	100	--		SPWCM
June 14.....	12:45 a. m.	648	--	73,400	15,900	12	15	20	27	46	92	100	--		SPWCM
June 14.....	12:45 a. m.	648	--	73,400	16,100	1	2	13	24	44	92	100	--		SPN
June 18.....	8:50 a. m.	384	--	60,500	10,300	--	20	--	34	--	93	100	--		SPWCM
June 21.....	10:45 p. m.	557	--	63,400	5,790	--	14	--	24	--	94	100	--		SPWCM
June 22.....	3:00 a. m.	1,440	--	55,400	4,010	--	19	--	29	--	91	99	100		SPWCM
June 23.....	8:30 p. m.	220	--	47,200	8,060	--	21	--	36	--	94	100	--		SPWCM
July 10.....	5:15 a. m.	357	--	60,400	9,980	--	14	--	22	--	91	100	--		SPWCM
July 12.....	7:20 a. m.	133	58	26,000	9,760	--	19	--	31	--	92	99	100		SPWCM
July 16.....	8:05 a. m.	163	60	39,800	6,430	--	20	--	38	--	96	100	--		SPWCM
Sept. 2.....	12:25 a. m.	212	--	43,800	9,720	--	13	--	20	--	84	99	100		SPWCM

KANSAS RIVER BASIN--Continued

DRY CREEK NEAR CURTIS, NEBR.

LOCATION.--At gaging station at highway bridge, 2½ miles upstream from mouth and 3½ miles east of Curtis, Frontier County.

DRAINAGE AREA.--20 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 95,000 tons June 8; minimum daily, 0 ton on many days.

REMARKS.--Records of discharge for period March to September 1951 given in Water-Supply Paper 1210.

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	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	0	--	0
2-----	0		0	0		0	0	--	0
3-----	0		0	0	--	0	0	--	0
4-----	0		0	0		0	0	--	0
5-----	0		0	0	--	0	0	--	0
6-----	0		0	0		0	.1	--	e 4
7-----	0		0	0	--	0	34	17,400	s 6,550
8-----	0		0	0		0	468	--	e 95,000
9-----	0		0	0	--	0	3.3	2,980	s 133
10-----	0		0	0	--	0	16	5,910	s 503
11-----	0		0	0	--	0	0	--	0
12-----	0		0	0	--	0	0	--	0
13-----	0		0	0	--	0	59	8,800	sa 12,000
14-----	0		0	1.2	5,200	sa 100	69	9,250	sa 4,040
15-----	0		0	66	16,200	s 8,280	7.8	--	e 42
16-----	0		0	.1	--	(t)	0	--	0
17-----	0		0	0	--	0	0	--	0
18-----	0		0	0	--	0	71	16,700	s 8,490
19-----	0		0	0	--	0	0	--	0
20-----	0		0	282	19,000	sa 55,000	0	--	0
21-----	0		0	10	6,420	s 327	162	5,300	sa 34,000
22-----	0		0	0	--	0	152	12,700	s 16,100
23-----	0		0	0	--	0	3.0	--	e 11
24-----	0		0	0	--	0	.6	--	e 2
25-----	0		0	0	--	0	8.5	2,460	s 1,400
26-----	0		0	0	--	0	46	11,300	s 4,820
27-----	53	17,000	sa 7,400	0	--	0	0	0	0
28-----	0		0	0	--	0	0	--	0
29-----	0		0	.2	--	e 6	0	--	0
30-----	0		0	131	9,840	s 29,300	0	--	0
31-----	--	--	--	117	20,000	s 18,900	--	--	--
Total--	53	--	7,400	607.5	--	111,913	1,100.3	--	183,095

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

DRY CREEK NEAR CURTIS, NEBR.--Continued

Suspended sediment, April to September 1951--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	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	1.4	2,700	sa 55
2-----	0	--	0	0	--	0	12	7,000	sa 1,100
3-----	0	--	0	0	--	0	0	--	0
4-----	0	--	0	0	--	0	23	9,200	sa 1,300
5-----	0	--	0	0	--	0	0	--	0
6-----	0	--	0	0	--	0	0	--	0
7-----	0	--	0	0	--	0	5.5	--	e 220
8-----	0	--	0	0	--	0	0	--	0
9-----	0	--	0	0	--	0	0	--	0
10-----	114	20,500	sa 17,000	0	--	0	0	--	0
11-----	.4	--	e 3	0	--	0	0	--	0
12-----	68	12,700	sa 6,950	0	--	0	0	--	0
13-----	.4	700	sa 2	0	--	0	0	--	0
14-----	0	--	0	0	--	0	0	--	0
15-----	0	--	0	0	--	0	0	--	0
16-----	64	--	e 8,900	0	--	0	0	--	0
17-----	7.7	3,400	sa 380	0	--	0	0	--	0
18-----	59	18,000	sa 4,000	0	--	0	0	--	0
19-----	4.0	--	e 95	0	--	0	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	0	--	0	0	--	0	0	--	0
22-----	21	--	e 900	0	--	0	0	--	0
23-----	0	--	0	0	--	0	0	--	0
24-----	0	--	0	0	--	0	0	--	0
25-----	0	--	0	0	--	0	0	--	0
26-----	0	--	0	4.1	2,980	sa 170	0	--	0
27-----	0	--	0	.1	--	e 2	0	--	0
28-----	5.9	6,230	sa 168	0	--	0	0	--	0
29-----	0	--	0	0	--	0	0	--	0
30-----	0	--	0	0	--	0	0	--	0
31-----	0	--	0	0	--	0	--	--	--
Total-	344.4	--	38,378	4.2	--	172	41.9	--	2,675

Total discharge for period Apr. 1 to Sept. 30, 1951 (cfs-days)..... 2,151.3

Total load for period Apr. 1 to Sept. 30, 1951 (tons)..... 343,633

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

DRY CREEK NEAR CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951.
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Apr. 27, 1951...	12:05 a. m.	37.0	--	29,200	8,950	--	16	--	33	--	96	100	--	--	--	SPWCM
Apr. 27,	12:46 a. m.	163	--	67,100	3,480	--	16	--	27	--	93	100	--	--	--	SPWCM
Apr. 27,	11:30 a. m.	4.4	57	5,800	4,220	--	72	--	90	--	98	100	--	--	--	SPWCM
May 14,	8:45 a. m.	20.0	--	11,000	6,230	38	53	69	84	94	97	99	100	--	--	SPWCM
May 14,	8:45 a. m.	20.0	--	11,000	6,050	4	9	56	83	94	98	99	100	--	--	SPN
May 15,	7:35 a. m.	10.0	--	9,780	8,460	--	62	--	93	--	99	100	--	--	--	SPWCM
May 15,	9:47 a. m.	149	59	55,300	14,200	--	17	--	28	--	91	99	100	--	--	SPWCM
May 15,	11:45 a. m.	420	--	58,400	7,010	--	17	--	29	--	88	99	100	--	--	SPWCM
May 15,	12:50 p. m.	298	60	34,600	18,400	16	22	28	37	56	90	99	100	--	--	SPWCM
May 15,	12:50 p. m.	298	60	34,600	18,400	1	2	16	36	55	87	99	100	--	--	SPN
May 20,	7:45 p. m.	3,000	--	87,500	15,000	--	15	--	27	--	84	99	100	--	--	SPWCM
May 30,	11:45 p. m.	2,340	--	66,000	6,430	--	18	--	32	--	90	99	100	--	--	SPWCM
June 7,	2:15 a. m.	287	--	158,000	6,210	--	11	--	21	--	83	99	100	--	--	SPWCM
June 13,	10:45 p. m.	590	--	96,000	6,320	--	15	--	28	--	90	99	100	--	--	SPWCM
June 18,	2:28 a. m.	386	--	89,200	13,800	--	15	--	26	--	88	100	--	--	--	SPWCM
June 21,	11:35 p. m.	3,370	--	57,400	5,810	--	22	--	36	--	96	100	--	--	--	SPWCM
June 26,	12:20 a. m.	333	--	71,300	5,410	--	19	--	34	--	90	99	99	--	100	SPWCM
July 10,	5:00 a. m.	719	59	72,000	3,100	--	17	--	30	--	90	98	99	--	100	SPWCM
July 12,	3:55 a. m.	415	57	58,200	3,560	--	19	--	32	--	91	100	--	--	--	SPWCM
July 18,	2:50 a. m.	179	--	40,600	6,740	--	24	--	39	--	95	99	99	--	100	SPWCM
July 28,	10:55 a. m.	17.5	--	13,300	9,080	--	44	--	80	--	100	--	--	--	--	SPWCM
Aug. 26,	7:10 p. m.	12.0	64	12,000	8,280	--	25	--	46	--	98	100	--	--	--	SPWCM
Aug. 26,	8:30 p. m.	37.7	--	25,300	4,190	--	28	--	47	--	97	100	--	--	--	SPWCM
Sept. 2,	1:30 a. m.	58	75	60,300	15,200	--	13	--	31	--	94	100	--	--	--	SPWCM
Sept. 4,	6:30 a. m.	86.5	61	41,000	11,400	--	21	--	34	--	90	99	100	--	--	SPWCM

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.

LOCATION.--At gaging station, 3½ miles southeast of Stockville and 13½ miles upstream from Harry Strunk Lake Dam, Frontier County.

RECORDS AVAILABLE.--Sediment records: April to September 1951.

EXTREMES, April to September 1951.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 490,000 tons June 22; minimum daily, 44 tons Sept. 25.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Suspended sediment, April to September 1951

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	55	--	e 150	70	1,640	310	391	--	e 21,000
2-----	53	1,000	140	68	1,500	a 280	223	5,240	s 3,420
3-----	53	750	a 110	66	1,200	214	111	1,500	450
4-----	53	--	e 110	64	1,110	192	90	1,100	267
5-----	62	--	e 360	66	--	e 150	83	862	193
6-----	73	--	e 550	66	650	a 120	79	1,170	250
7-----	77	2,350	488	62	630	105	324	--	e 25,000
8-----	64	1,800	a 310	60	700	a 110	2,660	46,300	s 438,000
9-----	60	1,290	209	61	815	134	353	15,000	sa 17,000
10-----	60	1,000	a 160	61	800	a 130	239	--	e 7,400
11-----	59	870	138	59	--	e 120	106	3,800	1,090
12-----	59	810	129	58	700	110	80	--	e 600
13-----	56	770	116	59	690	110	76	--	e 650
14-----	58	700	a 110	183	8,800	sa 9,900	451	--	e 45,000
15-----	55	550	a 80	690	--	e 110,000	111	--	e 2,500
16-----	53	500	72	352	23,200	s 30,700	86	--	e 950
17-----	53	570	82	152	8,500	a 3,500	73	--	e 500
18-----	55	580	86	158	--	e 3,600	342	--	e 22,000
19-----	53	600	a 85	119	5,800	a 1,900	242	--	e 8,700
20-----	59	--	e 110	967	--	e 210,000	108	4,260	1,240
21-----	62	--	e 130	3,830	--	e 410,000	87	--	e 600
22-----	63	800	a 140	312	9,600	sa 8,700	3,110	--	e 490,000
23-----	59	850	135	150	--	e 1,600	389	16,000	s 17,100
24-----	58	750	a 120	97	1,400	a 360	455	20,000	sa 26,000
25-----	55	690	102	80	1,200	a 260	298	4,500	3,620
26-----	55	700	a 100	68	--	e 220	178	7,500	sa 3,600
27-----	832	--	e 110,000	64	--	e 200	100	2,190	591
28-----	210	12,200	s 7,650	62	--	e 190	91	1,360	334
29-----	91	3,600	a 900	135	--	e 3,800	82	1,100	244
30-----	74	1,870	374	83	--	e 950	79	905	193
31-----	--	--	--	2,300	--	e 360,000	--	--	--
Total-	2,729	--	123,246	10,622	--	1,157,965	11,097	--	1,136,492

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, April to September 1951--Continued

	July			August			September		
1-----	76	780	160	68	--	e 320	267	18,000	sa 16,000
2-----	75	800	a 160	61	1,600	264	1,470	--	e 220,000
3-----	70	900	a 170	64	1,800	a 320	348	12,000	sa 12,000
4-----	63	530	90	63	2,100	a 360	370	18,000	sa 20,000
5-----	66	380	68	80	2,550	551	191	7,900	sa 4,800
6-----	68	460	a 85	72	1,720	334	103	4,400	1,220
7-----	68	--	e 160	63	1,070	182	249	--	e 13,000
8-----	58	560	88	59	721	115	202	8,900	sa 5,700
9-----	56	1,700	a 260	58	702	110	101	2,280	s 685
10-----	1,230	40,000	sa 180,000	54	620	90	105	4,400	sa 1,400
11-----	376	13,900	s 17,400	53	625	89	75	1,440	292
12-----	453	--	e 45,000	53	614	88	68	1,220	224
13-----	222	--	e 12,000	54	622	91	79	1,400	a 300
14-----	115	--	e 1,900	54	600	a 85	67	1,240	224
15-----	108	--	e 950	53	800	a 110	61	760	125
16-----	274	--	e 20,000	51	569	78	61	612	101
17-----	90	4,720	1,150	51	500	69	61	550	90
18-----	315	24,000	sa 21,000	49	463	61	59	560	89
19-----	124	7,200	sa 2,900	47	650	a 80	55	420	62
20-----	79	1,400	299	49	500	a 65	54	430	63
21-----	71	1,800	s 400	49	588	78	51	380	52
22-----	178	--	e 7,200	55	716	106	51	385	53
23-----	111	5,830	s 1,880	60	464	75	51	340	47
24-----	73	2,290	451	70	--	e 400	51	330	45
25-----	64	950	164	142	--	e 5,400	51	320	a 44
26-----	62	950	159	70	2,400	a 460	53	--	e 50
27-----	61	800	132	153	11,900	s 5,150	52	--	e 50
28-----	70	2,600	a 500	83	4,200	sa 1,000	52	--	e 50
29-----	77	2,530	526	67	1,170	212	52	--	e 50
30-----	77	2,130	443	61	1,180	194	53	360	a 50
31-----	70	1,800	a 340	59	1,210	193	--	--	--
Total-	4,900	--	316,035	2,025	--	16,730	4,563	--	296,866
Total discharge for period Apr. 1 to Sept. 30, 1951 (cfs-days)									35,936
Total load for period Apr. 1 to Sept. 30, 1951 (tons)									3,047,334

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Particle-size analyses of suspended sediment, April to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
Apr. 28, 1951...	12:10 p. m.	190	--	11,800	9,920	--	28	--	45	--	92	99	100			SPWCM
May 14,	5:00 p. m.	472	--	36,600	13,200	9	12	16	23	50	88	98	100		--	SPWCM
May 14,	5:00 p. m.	472	--	36,600	13,400	1	2	9	20	73	88	99	100		--	SPN
May 16,	2:15 a. m.	682	--	47,800	11,100	14	19	25	32	53	90	98	99		100	SPWCM
May 16,	2:15 a. m.	682	--	47,800	10,900	3	6	20	28	49	90	99	99		100	SPN
May 16,	5:40 a. m.	429	59	35,200	16,800	--	24	--	39	--	93	100	--		--	SPWCM
May 16,	8:25 a. m.	344	60	25,700	12,000	--	26	--	43	--	93	100	--		--	SPWCM
May 16,	3:20 p. m.	210	67	13,000	12,708	--	29	--	46	--	90	99	100		--	SPWCM
May 31,	8:55 a. m.	5,120	--	58,500	10,600	--	20	--	32	--	88	99	100		--	SPWCM
June 8,	10:00 a. m.	5,560	58	53,000	8,530	--	22	--	35	--	91	99	100		--	SPWCM
June 8,	10:45 a. m.	5,620	58	62,500	9,260	--	18	--	31	--	89	99	100		--	SPWCM
June 8,	2:15 p. m.	4,130	--	57,300	8,720	15	20	25	31	49	88	98	100		--	SPN
June 8,	2:15 p. m.	4,130	--	57,300	8,740	3	4	20	29	49	88	99	100		--	SPWCM
June 9,	4:30 p. m.	236	62	10,400	8,200	--	36	--	53	--	91	98	100		--	SPWCM
June 14,	2:50 p. m.	314	--	22,900	14,600	--	32	--	52	--	96	100	--		--	SPWCM
June 22,	4:20 p. m.	1,820	--	46,600	15,900	--	21	--	33	--	89	99	100		--	SPWCM
June 24,	12:50 p. m.	475	--	21,700	7,750	--	25	--	37	--	91	99	100		--	SPWCM
July 22,	4:20 p. m.	208	69	16,000	9,110	--	27	--	43	--	91	100	--		--	SPWCM
Sept. 1,	10:45 a. m.	393	69	27,900	7,970	--	21	--	36	--	92	100	--		--	SPWCM
Sept. 2,	11:30 a. m.	1,880	69	58,200	7,310	--	16	--	24	--	80	93	94		100	SPWCM
Sept. 2,	4:10 p. m.	1,580	--	44,000	8,360	16	20	24	31	47	90	99	100		--	SPWCM
Sept. 2,	4:10 p. m.	1,580	--	44,000	8,150	4	7	20	28	46	85	99	100		--	SPN

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.

LOCATION.--At highway bridge, 100 feet downstream from gaging station, three-quarters of a mile north of Cambridge, Furnas County, 2 $\frac{1}{2}$ miles upstream from mouth, and 7 $\frac{1}{2}$ miles downstream from Harry Strunk Lake. (Prior to December 1949, sampling station at location 2 miles downstream.)

DRAINAGE AREA.--1,070 square miles, approximately, of which about 680 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: March to September 1951.

Sediment records: November 1945 to December 1949, March to September 1951.

EXTREMES, March to September 1951.--Water temperatures: Maximum, 89°F Aug. 7.

Sediment concentrations: Maximum daily, 9,800 ppm Sept. 2; minimum daily, not determined.

Sediment loads: Maximum daily, 23,000 tons Sept. 2; minimum daily, less than 0.50 ton Sept. 21-30.

EXTREMES, 1945-49, 1951.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 3,700,000 tons June 22, 1947; minimum daily, less than 0.50 ton on many days August to December 1949, September 1951.

REMARKS.--Flow affected by ice Dec. 22 to Jan. 5, Jan. 7 to Feb. 19, Mar. 3, 7-13. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, March to September 1951
 /Once-daily temperature measurement between 4 p. m. and 8 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	43	59	62	--	85	76
2						--	53	63	66	71	84	73
3						--	57	63	63	77	78	70
4						--	55	--	64	71	84	69
5						--	44	66	61	68	85	--
6						--	53	63	62	77	81	69
7						--	48	65	70	80	89	67
8						40	53	68	69	77	88	76
9						--	56	61	69	74	83	a 70
10						33	45	69	a 63	66	70	71
11						--	43	72	67	a 65	81	73
12						--	50	70	71	66	83	68
13						--	59	65	71	74	84	68
14						41	55	65	71	75	82	70
15						--	51	64	75	70	81	67
16						49	55	65	79	74	83	--
17						--	63	66	74	--	81	--
18						--	59	64	71	77	83	--
19						--	58	73	75	83	82	73
20						--	46	72	69	81	73	--
21						--	52	62	73	81	75	--
22						a 38	58	67	73	79	66	--
23						--	63	67	a 68	80	73	--
24						50	46	68	70	82	84	--
25						--	60	70	74	82	83	--
26						--	52	70	74	85	--	--
27						49	65	71	73	85	83	--
28						42	65	69	73	80	82	--
29						46	62	68	69	85	86	--
30						53	59	71	73	83	86	--
31						53	--	67	--	--	78	--
Average						--	54	67	70	77	81	71

a Reading obtained between 8 a. m. and 1 p. m.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, March to September 1951

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----							--	--	--
2-----							--	--	--
3-----							--	--	--
4-----							--	--	--
5-----							--	--	--
6-----							--	--	--
7-----							--	--	--
8-----							--	--	--
9-----							--	--	--
10-----							--	--	--
11-----							--	--	--
12-----							--	--	--
13-----							--	--	--
14-----							--	--	--
15-----							--	--	--
16-----							--	--	--
17-----							--	--	--
18-----							--	--	--
19-----							--	--	--
20-----							--	--	--
21-----							--	--	--
22-----							--	--	--
23-----							--	--	--
24-----							--	--	--
25-----							--	--	--
26-----							--	--	--
27-----							39	677	71
28-----							44	1,050	125
29-----							39	644	68
30-----							38	630	65
31-----							37	564	56
Total-							197	--	385
	April			May			June		
1-----	39	625	66	101	2,610	712	531	5,700	a 8,200
2-----	38	602	62	96	2,260	586	515	5,010	6,960
3-----	38	531	54	92	2,400	596	461	4,120	5,130
4-----	37	461	46	88	2,130	506	416	3,550	3,990
5-----	42	682	77	84	1,830	415	382	3,410	3,520
6-----	45	1,120	136	81	1,760	385	349	3,030	2,850
7-----	47	1,290	164	74	1,590	318	328	2,670	2,360
8-----	47	1,200	152	71	2,290	439	415	5,200	sa 6,500
9-----	44	686	81	71	1,870	358	653	6,700	a 12,000
10-----	48	865	112	69	1,270	237	624	4,970	8,370
11-----	47	830	a 110	65	949	166	560	4,150	6,270
12-----	50	771	104	61	968	159	496	3,780	5,080
13-----	44	569	68	59	1,020	162	445	3,110	3,740
14-----	44	658	78	65	1,020	179	428	3,300	a 3,800
15-----	44	545	65	84	2,130	483	417	3,310	3,730
16-----	42	432	49	122	3,080	1,010	384	2,420	2,510
17-----	42	479	54	134	3,340	1,210	354	2,180	2,080
18-----	42	573	65	137	2,730	1,010	334	2,120	1,910
19-----	39	324	34	134	3,010	1,090	334	1,630	1,470
20-----	41	465	51	176	--	e 2,900	312	1,720	1,450
21-----	44	583	69	570	8,500	sa 14,000	285	1,440	1,110
22-----	42	475	54	692	9,310	17,400	410	3,900	sa 4,600
23-----	42	367	42	614	8,710	14,400	584	3,460	5,460
24-----	44	432	51	564	8,240	12,500	558	2,930	4,410
25-----	42	404	46	499	7,240	9,750	525	2,400	3,400
26-----	41	362	40	442	6,190	7,390	478	2,170	2,800
27-----	52	1,100	s 177	404	5,220	5,690	433	1,880	2,200
28-----	95	3,360	862	366	4,380	4,330	390	1,550	1,630
29-----	103	3,100	862	352	3,470	3,300	354	1,430	1,370
30-----	103	2,530	704	331	3,110	2,780	324	1,220	1,070
31-----	--	--	--	384	5,000	sa 5,600	--	--	--
Total-	1,468	--	4,535	7,082	--	110,061	13,079	--	119,950

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, March to September 1951--Continued

	July			August			September		
1-----	296	900	a 700	135	303	110	215	2,100	sa 2,000
2-----	268	768	556	129	303	106	748	9,800	sa 23,000
3-----	252	732	498	124	282	94	651	3,800	6,680
4-----	230	749	465	117	243	77	664	4,250	7,620
5-----	212	738	422	111	264	79	614	4,000	a 6,600
6-----	201	586	318	109	367	108	566	3,860	5,900
7-----	190	666	342	114	420	a 130	537	3,050	4,420
8-----	180	621	302	106	231	66	523	3,270	4,620
9-----	167	505	228	100	201	54	505	2,440	3,330
10-----	205	--	e 1,200	96	190	49	476	1,710	2,200
11-----	342	2,410	2,220	96	181	47	459	1,540	1,910
12-----	366	1,580	1,560	89	177	42	447	1,450	1,750
13-----	380	1,540	1,580	88	186	44	438	1,230	1,450
14-----	356	1,360	1,310	86	173	40	437	1,240	1,460
15-----	331	1,320	1,180	83	170	38	314	1,400	a 1,200
16-----	307	901	747	76	148	30	25	--	e 28
17-----	308	--	e 950	74	135	27	17	--	e 3
18-----	292	1,400	a 1,100	70	150	28	14	24	a 1
19-----	286	918	709	68	135	25	12	23	1
20-----	262	881	623	71	178	34	10	22	1
21-----	246	857	569	66	150	27	8.8	18	(t)
22-----	230	854	530	69	260	48	8.4	--	
23-----	222	782	469	67	184	33	8.0	--	
24-----	213	655	377	66	127	23	7.6	10	
25-----	199	548	294	68	182	33	7.2	8	
26-----	186	471	236	70	173	33	6.6	12	
27-----	176	454	216	70	161	30	6.0	16	
28-----	168	481	219	74	255	51	5.7	--	
29-----	159	342	147	75	216	44	5.4	--	
30-----	152	343	141	72	168	33	5.4	--	
31-----	144	334	130	72	181	35	--	--	--
Total-----	7,526	--	20,337	2,711	--	1,618	7,741.1	--	74,177

Total discharge for period Mar. 27 to Sept. 30, 1951 (cfs-days)..... 39,804.1

Total load for period Mar. 27 to Sept. 30, 1951 (tons)..... 331,063

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

Periodic determinations of suspended-sediment discharge, December 1950 to March 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
Dec. 22, 1950	a 5.0	18	0.3
Dec. 27	4.4	21	.2
Jan. 3, 1951	1.9	24	.2
Jan. 10	5.4	68	.9
Jan. 17	a 5.1	74	1.0
Jan. 18	6.9	94	1.4
Jan. 25	5.1	111	1.3
Feb. 5	a 5.3	15	.2
Feb. 7	5.1	23	.3
Feb. 15	a 17	45	2.1
Feb. 16	18	64	3.3
Feb. 21	27	193	14
Feb. 28	39	350	37
Mar. 6	44	365	43
Mar. 8	35	530	50
Mar. 9	29	190	15
Mar. 10	33	401	36
Mar. 14	39	780	82
Mar. 15	38	717	74
Mar. 16	37	702	70
Mar. 19	41	1,130	125
Mar. 22	39	603	63
Mar. 22	39	673	71
Mar. 22	38	932	96
Mar. 24	37	716	72

a Mean daily discharge.

KANSAS RIVER BASIN--Continued
 MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Particle-size analyses of suspended sediment, May 1951
 (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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
May 15, 1951.....	5:40 p. m.	95	64	2,420	1,520	--	27	--	34	--	80	--	--	--	--	SPWCM
May 21.....	12:30 p. m.	592	61	11,900	5,810	--	14	--	22	--	80	94	96	--	--	SPWCM
May 21.....	5:25 p. m.	736	62	8,960	5,800	--	13	--	21	--	85	98	100	100	100	SPWCM
May 23.....	5:50 p. m.	678	67	8,340	4,670	--	10	--	16	--	80	98	100	100	100	SPWCM
May 25.....	2:00 p. m.	478	69	6,800	3,400	--	10	--	15	--	73	98	100	100	100	SPWCM
May 28.....	5:30 p. m.	358	--	3,180	2,660	5	8	10	12	24	67	96	100	100	100	SPWCM
May 29.....	5:30 p. m.	358	--	3,180	2,480	5	7	9	14	24	64	96	100	100	100	SPN

KANSAS RIVER BASIN--Continued
 REPUBLICAN RIVER NEAR ORLEANS, NEBR.

LOCATION.--At gaging station at bridge on State Highway 89, 100 feet downstream from Chicago, Burlington & Quincy Railroad bridge, 2 miles west of Orleans, Harlan County, 2 1/4 miles upstream from Sappa Creek, and 23 miles upstream from Harlan County Dam.
 RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1951.
 Sediment records: October 1947 to September 1948.
 REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Oct. 30, 1950.....	143	41	0.04	63	16	37		286		51	10	0.8	1.1	0.15	362	0.49	224	0	26	549	8.1
Dec. 5.....	219	42	.04	75	19	44		333		64	13	1.0	3.5	.15	434	.59	287	0	27	653	7.9
Jan. 4, 1951.....	275	41	.04	68	18	38		301		57	10	.9	3.4	.10	394	.54	242	0	26	585	8.0
Feb. 19.....	520	32	.04	53	14	31		238		44	7.5	.7	3.4	.08	314	.43	188	0	27	478	8.1
Mar. 20.....	376	35	.04	60	15	36		266		50	8.5	.8	4.4	.06	350	.48	210	0	27	524	7.9
Apr. 16.....	429	--	--	--	--	--		289		--	--	--	--	--	--	--	231	0	--	582	7.7
May 26.....	1,860	--	--	--	--	--		221		--	--	--	--	--	--	--	159	0	--	415	7.5
July 5.....	635	--	--	--	--	--		228		--	--	--	--	--	--	--	171	0	--	440	7.7
Aug. 2.....	313	--	--	--	--	--		230		--	--	--	--	--	--	--	174	0	--	487	7.6
Sept. 4.....	8,460	25	.04	44	8.8	26		211		21	4.5	.4	1.0	.03	276	.38	146	0	28	360	7.2

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR BEAVER CITY, NEBR.

LOCATION.--At bridge on U.S. Highway 283, 200 feet upstream from gaging station and 7 miles southwest of Beaver City, Furnas County.

DRAINAGE AREA.--1,500 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1949.

Water temperatures: January 1949 to September 1951.

Sediment records: April 1947 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 89°F Aug. 29; minimum, freezing point on several days during December to February.

Sediment concentrations: Maximum daily, 14,200 ppm June 8; minimum daily, not determined.

Sediment loads: Maximum daily, 33,000 tons Aug. 14; minimum daily, less than 0.50 ton on some days.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum 89°F Aug. 29, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 14,500 ppm June 18, 1948; minimum daily, not determined.

Sediment loads: Maximum daily, 42,700 tons June 22, 1947; minimum daily, less than 0.50 ton on many days each year.

REMARKS.--Flow affected by ice Nov. 24 to Feb. 21, Mar 8-14. Records of discharge for water year October 1950 to September 1951 given in Water-Supply

Paper 1210.

Chemical analyses, in parts per million, July 1950 and July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 23° C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
July 26, 1950.....	1,120	19	0.04	34	2.6	9.0	7.4	128		5.0	0.6	0.3	3.5		146	0.20	96	0	17	212	7.9
July 15, 1951.....	1,660	18	.10	34	3.2			128		2.0	.5	.3	7.1		153	.21	98	0	14	238	7.2

a Mean daily discharge.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement generally between 1 p. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	53	36	37	32	40	44	56	a 60	69	a 72	a 69
2	56	49	34	37	32	a 39	50	a 53	a 56	70	a 72	a 69
3	55	42	36	34	35	41	54	a 48	60	70	a 72	69
4	56	47	36	32	34	39	54	a 55	a 54	70	a 73	67
5	60	51	33	34	34	42	48	65	a 58	69	--	67
6	60	42	33	33	35	42	49	57	62	68	a 74	67
7	a 57	52	33	34	34	43	48	a 49	a 60	70	a 76	66
8	57	42	35	35	35	33	48	a 54	53	75	a 75	68
9	a 52	36	34	36	35	34	52	a 59	67	a 70	a 78	68
10	a 52	36	35	34	37	33	45	a 54	72	a 68	74	69
11	59	42	37	35	34	33	47	67	65	68	70	70
12	60	41	34	37	32	34	48	69	69	62	a 70	65
13	a 60	40	38	34	33	34	51	65	73	66	69	65
14	66	43	38	36	33	35	59	a 61	70	69	71	64
15	64	43	36	35	34	35	50	67	71	76	69	61
16	62	40	36	37	34	43	49	--	74	81	73	66
17	65	a 39	33	35	38	a 37	56	a 62	74	80	74	61
18	69	46	38	37	37	35	58	a 62	72	80	72	a 60
19	61	36	35	34	a 38	37	49	73	73	79	a 72	--
20	64	39	35	33	35	36	48	71	68	79	a 72	66
21	61	45	35	36	38	35	50	60	69	80	a 68	55
22	53	44	36	35	37	50	51	--	68	a 70	65	80
23	53	34	37	36	40	48	58	67	65	a 70	a 64	80
24	56	34	36	34	45	51	50	67	67	a 73	a 67	a 64
25	55	37	36	38	38	56	55	65	73	78	a 69	a 54
26	54	40	34	39	42	58	54	69	78	80	76	a 55
27	58	35	32	33	44	51	65	67	74	a 75	78	a 54
28	55	35	35	32	43	43	69	68	73	76	a 70	54
29	a 59	39	a 34	32	--	49	65	70	67	a 73	89	--
30	58	35	35	32	--	49	63	65	70	a 75	a 73	a 65
31	a 59	--	36	32	--	a 41	--	a 66	--	a 73	75	--
Average	59	41	35	35	36	41	53	62	67	73	72	64

a Reading obtained between 7 a. m. and 12 m.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	12	110	3	8.1	31	1	10	23	1
2-----	10			6.6			12		
3-----	10			6.6			13		
4-----	9.0			6.9			10		
5-----	11			5.8			10		
6-----	16	64	1	6.0	19	1	10		
7-----	9.0			7.5			9		
8-----	8.4			7.5			8		
9-----	7.5			7.8			7		
10-----	7.5			9.0			7		
11-----	6.9	53	1	10	9	(t)	7		
12-----	7.8			9.8			7		
13-----	7.2			9.0			7		
14-----	8.4			9.4			7		
15-----	8.4			10			8		
16-----	6.6	53	1	12	9	(t)	8		
17-----	6.0			9.8			8		
18-----	6.3			11			8		
19-----	6.9			13			8		
20-----	7.2			11			8		
21-----	7.8	53	1	9.8	9	(t)	9		
22-----	8.4			9.0			9		
23-----	8.4			9.0			9		
24-----	8.1			9			9		
25-----	8.4			9			10		
26-----	9.0	53	1	9	9	(t)	10		
27-----	12			9			9		
28-----	8.7			11			9		
29-----	7.5			10			9		
30-----	7.5			10			9		
31-----	7.8			--			9		
Total-	285.7	--	51	271.6	--	22	273	--	31
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	8	30	1	5	22	(t)	20	42	1
2-----	8			5			14		
3-----	8			5			11		
4-----	8			6			14		
5-----	7			6			16		
6-----	7	30	1	6	70	3	12		
7-----	7			7			10		
8-----	6			7			9		
9-----	6			7			8		
10-----	6			8			7		
11-----	6	30	1	8	70	3	7		
12-----	7			8			7		
13-----	7			9			7		
14-----	7			9			8		
15-----	7			10			9.0		
16-----	8	30	1	12	70	3	8.4	25	1
17-----	8			15			8.0		
18-----	8			18			8.0		
19-----	9			20			8.8		
20-----	10			20			8.4		
21-----	10	30	1	18	70	3	9.0		
22-----	10			16			9.2		
23-----	9			16			9.0		
24-----	9			15			7.8		
25-----	9			15			9.0		
26-----	9	30	1	16	70	3	8.4		
27-----	8			15			8.4		
28-----	7			16			9.2		
29-----	6			--			13		
30-----	5			--			11		
31-----	5			--			9.0		
Total-	235	--	31	318	--	90	303.6	--	31

t Less than 0.50 ton.

a Computed from partly estimated graph.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	7.8			9.8			36	1,080	105
2-----	9.6			8.4			26	800	56
3-----	9.6			7.8			23	590	37
4-----	8.4			8.4			18	530	26
5-----	8.8			8.8			17	420	19
6-----	9.2	24	1	9.2	35	1	22	450	27
7-----	9.0			8.8			18	380	18
8-----	9.2			9.2			482	14,200	s 25,300
9-----	9.2			8.0			176	9,320	s 4,810
10-----	9.6			7.4			86	5,500	1,280
11-----	10			7.4			88	3,200	760
12-----	12			7.8			74	3,500	699
13-----	12			7.6			46	2,500	310
14-----	11			7.8			168	5,640	s 3,400
15-----	9.6			12	245	8	379	5,900	6,040
16-----	9.0	30	1	11	147	4	268	4,200	3,040
17-----	9.2			14	80	3	231	3,530	2,200
18-----	9.8			11	63	2	189	2,480	1,260
19-----	10			10	65	2	187	2,430	1,230
20-----	9.6			53	--	e 2,000	148	1,790	715
21-----	9.4			240	9,000	sa 8,100	95	1,720	441
22-----	9.2			32	2,130	181	447	12,400	s 16,100
23-----	9.2			46	1,000	sa 220	514	8,080	11,200
24-----	10			286	4,780	3,690	569	7,300	12,000
25-----	9.6			289	3,780	2,950	544	5,700	8,370
26-----	9.0	32	1	370	4,600	4,600	608	5,400	8,860
27-----	9.4			288	3,250	2,530	674	5,100	9,280
28-----	11			167	2,470	1,110	733	5,300	10,500
29-----	11			102	1,650	509	461	4,780	5,950
30-----	11			64	1,420	245	224	3,660	2,330
31-----	--	--	--	46	1,290	160	--	--	--
Total-	291.4	--	30	2,157.4	--	26,328	7,561	--	136,363
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	160	2,400	1,040	118	700	223	32	490	42
2-----	130	1,810	635	105	620	176	31	380	32
3-----	135	1,530	558	105	630	178	28	310	23
4-----	139	1,350	507	94	150	129	102	1,730	s 829
5-----	103	900	250	84	490	111	605	8,780	14,300
6-----	86	720	167	73	590	116	768	6,400	13,300
7-----	76	750	154	69	480	89	1,010	5,370	14,600
8-----	70	650	123	66	390	69	1,170	3,150	9,950
9-----	74	800	a 160	60	380	62	1,120	3,520	10,600
10-----	62	550	a 90	104	--	e 2,600	961	3,890	10,100
11-----	168	4,550	s 2,230	451	13,800	s 20,000	426	4,570	5,260
12-----	603	10,600	s 17,800	204	5,500	3,030	256	3,470	2,400
13-----	640	7,700	13,300	626	13,200	s 24,900	186	2,600	1,310
14-----	792	8,420	18,000	1,210	10,100	33,000	168	1,650	748
15-----	1,670	3,020	12,900	921	7,070	s 15,900	147	1,020	405
16-----	2,000	2,000	10,800	344	6,800	6,320	133	760	273
17-----	1,690	2,030	9,260	244	4,510	2,970	122	660	217
18-----	1,310	2,420	8,560	203	3,140	1,720	113	550	168
19-----	596	7,920	s 12,000	165	2,400	1,070	107	490	142
20-----	311	5,680	4,770	107	1,840	532	100	399	108
21-----	252	3,800	2,580	88	1,220	290	94	368	93
22-----	220	2,460	1,460	77	1,200	249	89	321	77
23-----	203	1,850	1,010	74	900	180	84	294	67
24-----	212	2,400	a 1,400	69	700	130	76	302	62
25-----	161	4,250	1,850	62	620	104	75	252	51
26-----	148	1,580	631	57	470	72	72	223	43
27-----	139	1,070	402	103	1,200	sa 360	67	205	37
28-----	138	1,200	447	80	2,220	479	62	171	29
29-----	190	1,910	980	55	1,150	171	60	186	30
30-----	156	1,280	539	39	1,030	108	57	146	22
31-----	134	880	318	33	700	62	--	--	--
Total-	12,768	--	24,921	6,090	--	115,400	8,321	--	85,318
Total discharge for year (cfs-days).....									
Total load for year (tons).....									
									38,845.7
									488,616

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, May to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
May 21, 1951.....	5:30 a.m.	419	57	12,300	9,730	--	43	--	74	--	99	100	--			SPWCM
May 21.....	8:30 a.m.	224	60	8,920	5,970	--	54	--	60	--	99	100	--			SPWCM
May 24.....	6:45 a.m.	301	63	4,460	4,660	--	32	--	79	--	99	100	--			SPWCM
May 26.....	4:30 p.m.	374	68	4,700	2,620	--	61	--	76	--	99	100	--			SPWCM
June 6.....	6:30 a.m.	128	48	13,600	9,620	--	47	--	83	--	100	--	--			SPWCM
June 8.....	10:10 a.m.	880	52	21,800	6,830	--	38	--	63	--	98	100	--			SPWCM
June 8.....	3:30 p.m.	826	56	17,200	6,270	--	52	--	75	--	99	100	--			SPWCM
June 8.....	6:30 p.m.	561	52	17,900	6,430	--	58	--	84	--	99	100	--			SPWCM
June 14.....	5:30 p.m.	287	70	9,360	6,070	--	48	--	70	--	98	100	--			SPWCM
June 22.....	5:15 a.m.	389	62	22,200	17,400	--	33	--	57	--	97	99	100			SPWCM
June 22.....	11:05 a.m.	460	68	8,390	4,050	36	44	50	61	80	98	100	--			SPWCM
June 22.....	11:05 a.m.	460	68	8,390	3,940	15	26	38	53	77	97	100	--			SPN
June 22.....	7:15 p.m.	604	66	13,800	4,610	--	45	--	65	--	98	100	--			SPWCM
June 25.....	2:00 p.m.	551	72	5,800	3,880	--	53	--	87	--	99	100	--			SPWCM
June 26.....	7:00 p.m.	626	71	5,830	4,210	--	48	--	61	--	97	99	100			SPWCM
June 28.....	7:00 p.m.	750	72	5,250	3,280	--	54	--	63	--	98	100	--			SPWCM
July 11.....	1:00 p.m.	156	--	2,700	1,660	--	54	--	72	--	98	100	--			SPWCM
July 12.....	7:10 a.m.	456	64	13,200	5,630	--	43	--	58	--	98	100	--			SPWCM
July 12.....	12:45 p.m.	637	62	11,600	9,010	--	34	--	53	--	96	100	--			SPWCM
July 12.....	7:15 p.m.	905	61	10,300	4,010	33	41	47	57	76	98	100	--			SPWCM
July 12.....	7:15 p.m.	905	61	10,300	3,700	16	24	37	49	75	96	100	--			SPN
July 12.....	8:15 p.m.	926	60	10,300	7,460	--	41	--	60	--	97	99	100			SPWCM
July 13.....	12:00 p.m.	569	63	7,720	5,460	--	42	--	50	--	97	99	100			SPWCM
July 14.....	1:15 p.m.	810	66	8,960	5,400	--	35	--	50	--	98	100	--			SPWCM
July 15.....	2:15 a.m.	1,222	69	5,060	4,920	--	50	--	62	--	96	99	100			SPWCM
July 15.....	9:05 a.m.	1,700	--	2,950	2,980	--	71	--	77	--	96	98	99		100	SPWCM
July 15.....	2:50 p.m.	1,960	76	2,580	7,770	--	84	--	86	--	96	100	--			SPWCM
July 16.....	4:15 p.m.	2,460	81	2,080	2,200	--	80	--	84	--	99	100	--			SPWCM
July 19.....	11:10 a.m.	486	79	9,080	7,660	--	34	--	51	--	97	100	--			SPWCM

KANSAS RIVER BASIN--Continued
SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, May to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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	0.350		0.500	1.000
July 25, 1951.....	3:10 p.m.	159	78	5,810	6,640	--	70	--	95	--	100	--	--	--	--	SPWCM
Aug. 11.....	1:40 a.m.	700	--	14,000	4,560	--	42	--	62	--	98	100	--	--	--	SPWCM
Aug. 11.....	2:30 a.m.	735	--	21,000	7,760	--	29	--	47	--	98	100	--	--	--	SPWCM
Aug. 11.....	3:25 a.m.	897	63	23,000	8,210	--	40	--	64	--	98	100	--	--	--	SPWCM
Aug. 13.....	2:30 p.m.	920	69	17,800	5,130	--	38	--	60	--	98	100	--	--	--	SPWCM
Aug. 13.....	6:30 p.m.	1,010	69	14,800	5,130	--	44	--	62	--	99	100	--	--	--	SPWCM
Aug. 14.....	10:00 a.m.	1,220	68	11,400	5,290	--	58	--	76	--	99	100	--	--	--	SPWCM
Aug. 14.....	4:00 p.m.	1,240	72	6,960	3,210	19	42	60	74	81	97	100	--	--	--	SPN
Aug. 14.....	4:00 p.m.	1,240	72	6,960	3,290	55	64	73	78	86	98	100	--	--	--	SPWCM
Aug. 15.....	12:30 p.m.	1,930	68	7,460	4,720	--	57	--	72	--	99	100	--	--	--	SPWCM
Sept. 5.....	3:50 a.m.	507	64	10,000	6,970	--	34	--	58	--	98	100	--	--	--	SPWCM
Sept. 5.....	10:15 a.m.	603	--	9,700	5,800	--	42	--	61	--	98	100	--	--	--	SPWCM
Sept. 5.....	7:45 p.m.	690	65	7,740	6,130	--	46	--	63	--	97	100	--	--	--	SPWCM
Sept. 6.....	6:30 a.m.	737	64	6,870	4,490	--	53	--	63	--	98	100	--	--	--	SPWCM
Sept. 7.....	3:40 p.m.	1,050	66	4,970	3,380	43	50	52	56	72	95	99	100	--	--	SPWCM

KANSAS RIVER BASIN--Continued
BEAVER CREEK NEAR BEAVER CITY, NEBR.

LOCATION.--At gaging station at bridge on U. S. Highway 283, 3½ miles west of Beaver City, Furnas County.
DRAINAGE AREA.--2,060 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: December 1950 to September 1951.
EXTREMES, December 1950 to September 1951.--Water temperatures: Maximum, 80°F Aug. 5; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 12,100 ppm June 8; minimum daily, not determined.
Sediment loads: Maximum daily, 22,600 tons June 8; minimum daily, less than 0.50 ton on several days.

REMARKS.--Flow affected by ice Dec. 14 to Feb. 21, Mar. 8-21. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, December 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Dec. 4, 1950.....	5	24	0.10	87	22	43	322	35	51	5.0	0.8	2.0	0.10	0.10	132	0.50	308	308	0	23	685	8.4
Feb. 26, 1951.....	25	30	.04	81	13	83	426	0	54	15	1.9	1.8	1.19	1.19	382	.89	231	231	0	32	609	7.7
May 3.....	12	30	.02	75	23	62	426	0	54	18	1.3	2.9	1.3	1.3	492	.87	301	301	0	31	758	7.0
May 21.....	533	25	.12	33	7.4	13	167	0	3.0	.1	.4	1.0	1.0	1.0	198	.27	113	113	0	20	267	7.3
June 8.....	750	25	.08	42	7.5	15	197	0	4.0	1.5	.4	.6	1.3	1.3	212	.29	136	136	0	20	315	7.5
July 17.....	2,430	30	.02	42	4.7	20	179	0	14	3.2	.4	1.3	1.3	1.3	232	.32	124	124	0	26	326	7.1
Sept. 5.....	228	--	--	--	--	--	207	0	--	--	--	--	--	--	--	--	145	145	0	--	376	7.4

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Temperature (°F) of water, December 1950 to September 1951
 /Once-daily temperature measurement generally between 6 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	--	--	a 40	a 46	54	64	66	76	72
2			--	--	--	a 42	45	54	55	65	75	71
3			--	32	--	a 38	54	52	54	68	76	65
4			--	--	--	a 41	33	53	53	67	73	64
5			--	--	33	38	45	53	57	68	a 80	68
6			--	--	--	a 41	51	a 60	59	68	74	68
7			--	--	--	a 44	45	47	61	75	75	62
8			--	--	--	34	a 50	52	57	77	73	66
9			--	--	--	a 35	a 50	58	57	69	71	67
10			--	--	--	a 36	a 40	55	62	67	70	64
11			--	--	--	a 35	a 42	55	67	66	67	66
12			--	--	--	a 34	a 45	62	59	60	70	65
13			--	--	--	a 35	a 55	62	64	59	70	60
14			--	--	--	35	a 55	59	66	66	71	61
15			a 33	34	a 36	a 37	a 52	62	67	70	67	61
16			36	--	--	a 42	44	62	72	72	69	60
17			--	34	a 37	a 35	a 59	62	72	76	71	58
18			--	--	--	34	a 60	63	75	74	70	59
19			a 33	--	34	a 36	a 57	60	72	76	74	61
20			a 36	--	a 34	a 37	a 48	64	71	77	73	59
21			a 36	--	--	34	a 51	57	68	76	69	58
22			--	a 38	a 38	45	a 51	61	71	78	67	57
23			--	--	--	a 46	a 60	60	66	71	64	55
24			--	--	--	a 50	a 51	60	62	74	66	54
25			--	--	38	48	a 60	63	69	73	68	53
26			--	a 37	--	a 57	a 55	62	70	76	74	55
27			--	--	a 44	a 53	54	a 69	72	77	74	83
28			--	--	a 42	a 43	a 71	62	70	a 76	73	50
29			--	a 32	--	a 43	61	64	62	75	73	a 58
30			--	a 32	--	a 47	a 66	62	65	71	73	--
31			--	--	--	a 49	--	68	--	76	74	--
Average			--	--	--	41	52	59	65	71	72	61

a Observations made between 1 p. m. and 8 p. m.

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, December 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----							--	--	--
2-----							--	--	--
3-----							--	--	--
4-----							--	--	--
5-----							--	--	--
6-----							--	--	--
7-----							--	--	--
8-----							--	--	--
9-----							--	--	--
10-----							--	--	--
11-----							--	--	--
12-----							--	--	--
13-----							--	--	--
14-----							6	12	(t)
15-----							6	18	
16-----							6	24	
17-----							6	34	
18-----							6	--	
19-----							6	25	
20-----							7	17	
21-----							7	36	
22-----							7	--	
23-----							7	--	
24-----							7	--	
25-----							7	--	
26-----							6	--	(t)
27-----							5	--	
28-----							4	--	
29-----							4	--	
30-----							5	--	
31-----							6	--	
Total--							108	--	7
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	7	--		4			22	81	5
2-----	7	--		4			21	80	4
3-----	6	15		5			18	80	4
4-----	6	--		5			15	79	3
5-----	6	--		6	23	(t)	14	62	2
6-----	6	--		6			13		
7-----	6	--		6			13		
8-----	6	--		7			10	49	1
9-----	6	--		8			8		
10-----	6	--		8			6		
11-----	7	--		9			6		
12-----	7	--		10			6	42	1
13-----	7	--		11			6		
14-----	7	--		12			5		
15-----	7	66	e 1	15			5		
16-----	9	--		18	21	1	6		
17-----	9	43		20			6	54	1
18-----	8	--		18			7		
19-----	8	--		18			8		
20-----	8	--		17			9		
21-----	6	--		16			10		
22-----	6	29		16	104		12	35	1
23-----	7	--		12			13		
24-----	7	--		14		e 3	14		
25-----	7	--		17	36		12		
26-----	7	36		18			12		
27-----	7	--		18	61	3	12		
28-----	6	--		24	87	6	13	27	1
29-----	5	65		--	--	--	13		
30-----	4	58		--	--	--	12		
31-----	4	--		--	--	--	12	34	1
Total--	205	--	31	342	--	39	339	--	44

e Estimated.

t Less than 0.50 ton.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment December 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	12	46	1	13	19		43	1,220	142
2-----	11	42	1	13	16		36	940	91
3-----	11			13	21		31	730	61
4-----	11			13	18		27	620	45
5-----	12	27	1	13	18		25	560	38
6-----	13			13	18		24	500	32
7-----	14			12	17		23	430	27
8-----	12			12	23		653	12,100	s 22,600
9-----	12			13	14	1	418	7,320	s 8,570
10-----	12	15	(t)	13	12		127	4,600	1,580
11-----	13			13	12		91	3,500	860
12-----	13			13	15		75	3,600	a 750
13-----	13			12	18		68	2,460	452
14-----	13			12	10		46	1,610	200
15-----	14	14	(t)	14	38		27	1,510	110
16-----	12			14	37		123	3,700	sa 1,600
17-----	13			14	50	2	240	6,700	4,340
18-----	13			12	50	2	262	5,800	4,100
19-----	13			12	58	2	277	4,710	3,520
20-----	13	12	(t)	52	--	e 1,400	280	3,680	2,780
21-----	14			447	8,660	s 11,600	289	3,160	2,460
22-----	14			182	5,700	2,800	298	4,600	3,700
23-----	14			164	5,000	s 2,270	292	4,800	3,780
24-----	14			152	4,290	s 1,820	348	5,110	4,800
25-----	14			220	4,890	3,020	342	4,520	4,170
26-----	14			232	3,880	2,430	346	3,900	3,640
27-----	15	16	1	154	2,900	1,200	356	3,420	3,290
28-----	14			80	2,860	618	368	3,650	3,820
29-----	14			63	2,360	401	412	3,540	3,940
30-----	13			57	2,090	322	498	3,050	4,100
31-----	--	--	--	50	1,610	217	--	--	--
Total--	390	--	22	2,106	--	28,120	6,445	--	89,598
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	549	2,280	3,390	190	1,860	954	68	1,200	220
2-----	305	2,860	s 2,240	150	1,510	612	190	5,520	s 3,230
3-----	192	3,090	1,600	130	1,250	439	98	3,400	s 820
4-----	157	2,300	975	114	1,060	326	166	3,980	s 2,050
5-----	136	1,940	712	102	940	259	218	3,550	2,090
6-----	120	1,590	515	94	880	223	314	4,500	3,810
7-----	108	1,330	388	102	930	256	1,050	3,980	s 8,810
8-----	101	1,290	352	82	830	184	1,910	1,640	8,460
9-----	90	1,160	282	74	750	150	1,510	1,280	5,220
10-----	93	1,540	s 412	70	800	151	1,610	1,360	s 6,030
11-----	221	5,760	s 3,590	194	3,400	sa 2,200	1,630	1,310	5,760
12-----	440	7,000	8,320	250	3,740	2,520	1,020	1,120	3,080
13-----	482	3,420	4,450	306	4,170	3,440	707	890	1,700
14-----	512	2,610	3,610	399	4,970	s 5,570	314	2,000	1,700
15-----	587	1,940	3,070	468	3,550	4,480	226	1,470	897
16-----	665	2,640	s 5,560	424	2,780	3,160	226	1,150	702
17-----	2,050	2,500	13,800	202	3,700	2,020	198	970	518
18-----	1,510	1,850	7,540	210	2,670	1,510	166	850	381
19-----	1,080	1,370	3,990	194	2,600	1,360	150	780	316
20-----	802	1,300	2,810	146	1,900	749	138	650	242
21-----	563	1,700	2,580	110	1,390	413	126	530	180
22-----	352	2,500	2,380	92	1,220	303	118	470	150
23-----	356	2,250	2,160	92	1,060	263	114	400	123
24-----	363	3,380	3,490	85	870	200	102	370	102
25-----	366	2,400	s 2,540	74	730	146	97	298	78
26-----	218	2,230	1,310	67	660	119	93	288	72
27-----	196	1,730	915	71	810	s 163	89	268	64
28-----	275	2,390	1,770	230	3,100	sa 2,000	85	249	57
29-----	347	3,170	2,970	242	4,040	s 2,800	81	242	53
30-----	388	2,410	2,520	106	2,180	624	78	238	50
31-----	300	2,040	1,650	80	1,740	376	--	--	--
Total--	13,964	--	91,891	5,150	--	37,970	12,892	--	57,065

Total discharge for period Dec. 14, 1950, to Sept. 30, 1951 (cfs-days)..... 41,941

Total load for period Dec. 14, 1950, to Sept. 30, 1951 (tons)..... 304,787

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, May to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350		0.500	1.000
May 21, 1951 . . .	6:30 a. m.	595	56	11,600	7,440	--	52	--	77	--	99	100				SPWCM
May 21, 1951 . . .	9:00 a. m.	486	--	10,000	4,900	34	49	63	76	88	100	--				SPWCM
May 21, 1951 . . .	9:00 a. m.	486	--	10,000	5,010	7	17	58	75	89	99	100				SPN
May 23, 1951 . . .	2:00 a. m.	202	59	5,580	3,960	--	74	--	91	--	100	--				SPWCM
May 23, 1951 . . .	2:35 p. m.	154	66	4,980	3,950	--	76	--	93	--	99	100				SPWCM
May 25, 1951 . . .	6:10 a. m.	226	63	4,900	3,890	--	68	--	87	--	99	100				SPWCM
June 8, 1951 . . .	6:30 a. m.	690	--	17,600	12,900	--	32	--	58	--	98	100				SPWCM
June 8, 1951 . . .	4:00 p. m.	870	52	9,200	7,160	--	63	--	87	--	99	100				SPWCM
June 8, 1951 . . .	8:40 p. m.	770	55	8,440	6,390	--	66	--	86	--	99	100				SPWCM
June 16, 1951 . . .	7:30 p. m.	202	72	5,180	3,150	--	51	--	80	--	100	--				SPWCM
June 17, 1951 . . .	9:30 a. m.	234	72	6,740	4,370	--	60	--	85	--	100	--				SPWCM
June 19, 1951 . . .	7:35 a. m.	282	72	4,860	3,150	--	62	--	78	--	98	100				SPWCM
June 22, 1951 . . .	4:00 a. m.	330	--	4,510	2,600	--	52	--	69	--	99	100				SPWCM
June 24, 1951 . . .	11:20 a. m.	354	67	5,880	3,470	--	54	--	71	--	99	100				SPWCM
June 24, 1951 . . .	7:20 p. m.	346	67	5,300	3,840	--	63	--	76	--	99	100				SPWCM
July 1, 1951 . . .	9:00 a. m.	565	66	2,520	2,610	--	42	--	55	--	94	100				SPWCM
July 11, 1951 . . .	12:45 p. m.	202	--	5,620	3,580	--	49	--	72	--	100	--				SPWCM
July 12, 1951 . . .	7:00 a. m.	378	60	8,410	5,120	--	48	--	68	--	99	100				SPWCM
July 12, 1951 . . .	12:00 m.	495	60	7,600	5,440	--	42	--	60	--	98	100				SPWCM
July 12, 1951 . . .	6:25 p. m.	486	62	5,100	4,610	35	48	58	64	76	98	100				SPWCM
July 15, 1951 . . .	6:45 a. m.	575	70	1,980	4,190	--	58	--	65	--	96	100				SPWCM
July 17, 1951 . . .	12:05 a. m.	2,430	79	4,140	4,770	51	63	70	77	86	98	100				SPWCM
July 17, 1951 . . .	10:00 a. m.	2,120	--	2,560	5,640	--	82	--	89	--	99	100				SPWCM
July 19, 1951 . . .	11:30 a. m.	1,100	80	1,320	2,500	76	78	82	85	91	96	99		100		SPWCM
July 24, 1951 . . .	4:30 p. m.	394	77	3,640	4,130	--	60	--	--	--	98	100				SPWCM
July 25, 1951 . . .	4:00 p. m.	346	78	1,940	4,060	--	55	--	68	--	98	100				SPWCM
Aug. 14, 1951 . . .	2:45 p. m.	442	--	6,200	2,930	46	59	66	72	87	98	100				SPWCM
Aug. 14, 1951 . . .	2:45 p. m.	442	--	6,200	2,860	12	35	60	69	82	98	100				SPN

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, May to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Sept. 7, 1951..	9:30 a. m.	495	66	5,390	3,160	--	47	--	56	--	98	100				SPWCM
Sept. 7,	2:45 p. m.	770	67	6,770	6,770	--	52	--	62	--	96	100				SPWCM
Sept. 8,	12:10 p. m.	1,930	69	1,620	2,980	--	90	--	93	--	99	100				SPWCM

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.

LOCATION.--At county highway bridge, 500 feet upstream from gaging station which is 2 miles east of Stamford, Harlan County, and 5½ miles upstream from mouth.

DRAINAGE AREA.--3,840 square miles, approximately, of which about 3,560 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1949.

Water temperatures: November 1949 to September 1951.

Sediment records: March 1947 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 87°F July 20; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 11,000 ppm May 21; minimum daily, not determined.

Sediment loads: Maximum daily, 24,500 tons June 9; minimum daily, not determined.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum, 87°F July 20, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 15,900 ppm Mar. 3, 1949; minimum daily, not determined.

Sediment loads: Maximum daily, 180,000 tons (estimated) June 22, 1947; minimum daily, less than 1 ton on many days 1948-50.

REMARKS.--Flow affected by ice Nov. 23-25, Dec. 3-20, Dec. 26 to Feb. 20, Mar. 3, 4, 8-14. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, water year October 1950 to September 1951
/Once-daily temperature measurement generally between 11 a. m. and 6 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	50	37	--	32	39	--	63	a 65	70	a 77	76
2	56	--	--	35	--	--	47	63	64	70	81	74
3	60	47	35	--	32	41	56	68	61	a 70	a 77	69
4	51	--	--	32	--	38	56	70	--	a 68	a 77	67
5	55	--	--	--	35	44	--	70	62	a 69	84	65
6	62	47	--	36	--	42	a 42	a 55	66	72	84	--
7	61	--	34	--	33	38	50	65	72	a 73	83	a 66
8	--	--	--	--	--	--	54	67	62	a 75	80	a 65
9	65	--	--	35	36	35	--	64	63	77	a 75	69
10	62	35	37	--	--	--	--	68	63	71	76	72
11	66	--	--	--	41	--	42	71	a 62	70	a 71	a 71
12	--	39	--	33	--	34	48	70	69	63	73	a 68
13	67	38	38	--	34	36	55	70	a 65	68	a 73	a 57
14	63	44	--	36	--	34	--	a 60	a 68	69	75	a 65
15	70	--	--	--	35	41	46	69	a 69	70	75	65
16	--	42	40	39	35	43	46	71	75	80	75	--
17	68	--	--	--	37	--	--	74	75	78	71	--
18	61	--	35	37	39	36	62	65	a 74	81	75	a 61
19	69	--	--	--	37	41	58	69	76	83	77	66
20	62	35	35	--	39	36	--	75	75	87	73	a 62
21	59	--	--	35	--	48	48	64	73	a 78	a 70	59
22	--	43	39	--	--	42	58	65	71	77	a 67	a 56
23	55	--	--	38	--	--	62	66	67	a 75	a 66	61
24	--	34	38	--	41	a 43	53	68	68	a 75	72	a 55
25	53	--	--	37	40	56	50	73	73	a 75	75	55
26	--	--	--	--	45	a 48	55	71	70	a 77	78	a 59
27	56	39	34	--	43	50	61	70	a 73	a 80	79	59
28	--	--	--	--	39	--	71	a 64	73	a 76	77	55
29	58	38	--	--	--	45	68	70	73	a 74	a 75	60
30	54	--	34	32	--	50	65	74	71	a 78	a 76	a 58
31	--	--	--	--	--	a 39	--	71	--	a 78	a 75	--
Average	--	--	--	--	--	--	--	68	69	74	76	64

a Reading obtained between 6 a. m. and 10 a. m.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day
1-----	37	220	22	21	--	--	13	--	--
2-----	40	380	41	21	--	--	12	--	--
3-----	38	220	22	21	36	--	12	--	--
4-----	34	140	13	22	--	--	12	24	1
5-----	43	181	21	22	--	--	14	--	--
6-----	40	153	16	22	32	--	10	--	--
7-----	35	150	14	22	--	--	12	--	--
8-----	32	150	a 13	22	--	--	15	--	--
9-----	32	125	11	21	--	--	18	--	--
10-----	29	98	8	21	42	--	20	--	--
11-----	28	--	--	21	--	--	20	--	--
12-----	26	--	--	21	36	--	20	--	--
13-----	25	--	--	22	25	--	20	53	a 3
14-----	26	--	--	22	27	--	20	--	--
15-----	25	76	5	22	45	--	21	--	--
16-----	25	--	--	20	25	a 2	21	--	--
17-----	25	--	--	20	--	--	19	--	--
18-----	26	70	5	19	--	--	23	--	--
19-----	25	53	4	19	--	--	19	--	--
20-----	23	55	3	19	23	--	20	--	--
21-----	23	--	--	17	--	--	20	--	--
22-----	24	--	--	18	18	--	20	--	--
23-----	24	--	--	17	--	--	19	--	--
24-----	24	--	--	21	35	--	20	--	--
25-----	24	--	--	22	--	--	19	--	--
26-----	23	117	7	20	--	--	17	38	a 2
27-----	23	--	--	17	52	--	20	--	--
28-----	23	--	--	13	--	--	20	--	--
29-----	23	--	--	11	48	--	22	--	--
30-----	23	51	3	12	--	--	21	--	--
31-----	23	144	9	--	--	--	20	--	--
Total--	871	--	303	588	--	60	559	--	69
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day
1-----	18	--	--	3.0	--	--	42	211	24
2-----	21	38	--	3.4	--	--	42	150	a 17
3-----	7.9	--	--	4.7	--	--	42	138	16
4-----	10	30	--	5.8	--	--	39	143	15
5-----	12	--	--	7.0	40	1	37	153	15
6-----	12	51	--	9.8	--	--	36	130	13
7-----	14	--	--	13	--	--	38	96	10
8-----	15	--	--	17	--	--	35	--	e 11
9-----	16	64	--	20	--	--	20	--	--
10-----	17	--	--	20	--	--	11	--	--
11-----	17	--	--	26	--	--	11	--	--
12-----	17	144	--	27	36	2	30	178	12
13-----	16	--	--	13	--	--	33	--	--
14-----	17	49	--	10	30	a 1	33	--	--
15-----	17	--	--	10	25	1	38	--	--
16-----	20	56	a 2	14	30	1	38	128	13
17-----	20	--	--	21	33	2	35	100	a 10
18-----	20	46	--	25	30	2	32	200	sa 19
19-----	18	--	--	28	22	2	28	101	8
20-----	20	--	--	32	87	8	32	58	5
21-----	15	70	--	30	--	--	31	63	5
22-----	19	--	--	28	--	e 6	28	68	5
23-----	22	48	--	34	--	--	31	--	--
24-----	22	--	--	35	--	--	28	--	--
25-----	23	40	--	32	54	5	30	--	--
26-----	22	--	--	32	--	--	30	61	5
27-----	9.7	--	--	31	62	5	28	--	--
28-----	5.2	--	--	54	--	e 220	30	--	--
29-----	5.4	--	--	--	--	--	28	--	--
30-----	5.5	80	--	--	--	--	27	--	--
31-----	4.7	--	--	--	--	--	27	39	3
Total--	478.4	--	62	585.7	--	292	970	--	311

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN

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KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	28	30	a 2	31	166	14	103	1,700	473
2-----	28	30	2	31	126	10	88	1,410	335
3-----	26			29	127	10	72	1,090	212
4-----	25	55	4	26	119	8	62	880	147
5-----	26			25	113	8	57	770	118
6-----	29			25	103	7	56	780	118
7-----	28			25	110	a 7	52	650	91
8-----	28			27	180	a 13	467	7,800	s 16,100
9-----	28	54	4	26	165	12	1,190	7,800	s 24,500
10-----	25			26	120	8	811	7,400	s 14,500
11-----	28			26	132	9	232	6,400	4,010
12-----	25			25	175	12	222	7,000	a 4,200
13-----	26			25	168	11	156	3,300	1,390
14-----	28	71	5	24	152	10	135	2,600	948
15-----	28			25	135	9	122	2,500	sa 900
16-----	28			25	151	10	347	6,800	a 6,400
17-----	26			26	111	8	348	3,600	3,380
18-----	26			31	150	12	351	4,700	4,450
19-----	27	45	3	37	280	a 28	363	5,200	5,100
20-----	28			65	--	e 900	355	4,200	4,020
21-----	30			557	11,000	a 17,000	359	4,300	4,170
22-----	30			818	9,000	s 21,200	381	3,600	s 3,850
23-----	31			244	5,300	3,490	854	9,400	21,700
24-----	30			180	4,920	2,390	849	6,800	15,600
25-----	29	60	5	255	4,320	s 3,160	858	6,300	14,600
26-----	28			384	4,320	4,480	858	5,800	13,400
27-----	33			478	4,320	5,570	895	5,200	12,600
28-----	32			369	3,860	3,840	948	4,700	12,000
29-----	32	96	8	246	3,640	2,420	1,010	4,900	13,400
30-----	31			169	2,770	1,260	890	4,600	11,100
31-----	--	--	--	125	2,010	678	--	--	--
Total--	845	--	129	4,405	--	66,594	13,489	--	213,812
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	616	4,900	8,150	396	1,800	1,920	137	1,600	592
2-----	622	3,200	5,370	288	1,580	1,230	172	--	e 1,200
3-----	440	2,600	s 2,880	249	1,410	948	252	4,000	a 2,700
4-----	273	2,800	2,060	225	1,250	759	272	3,800	a 2,800
5-----	261	2,400	1,690	212	1,060	607	363	4,700	a 4,600
6-----	219	1,900	1,120	189	950	485	663	7,170	s 13,400
7-----	191	1,700	877	174	910	427	948	5,340	13,700
8-----	172	1,500	696	169	900	411	1,120	4,350	13,200
9-----	159	1,300	558	151	850	346	1,950	2,630	s 13,400
10-----	149	1,200	483	139	800	300	2,840	1,810	13,900
11-----	302	4,800	3,910	492	5,700	sa 11,000	2,640	1,660	11,800
12-----	895	7,100	s 17,700	791	8,500	18,200	2,610	1,710	12,000
13-----	1,280	5,200	18,000	503	6,500	8,830	1,810	1,690	8,260
14-----	1,290	4,200	14,600	743	7,800	s 16,900	1,240	1,680	5,620
15-----	1,160	5,000	15,700	1,200	5,700	18,500	690	2,200	a 4,100
16-----	1,370	3,160	11,700	1,460	3,540	14,000	409	1,670	1,840
17-----	1,760	2,290	11,000	1,040	4,620	13,000	370	1,290	1,290
18-----	3,010	2,230	18,100	479	4,630	5,990	320	1,040	898
19-----	3,800	1,840	18,900	416	3,780	4,190	278	900	675
20-----	2,430	2,130	14,000	355	3,010	2,880	256	880	608
21-----	1,330	2,680	9,620	275	2,240	1,660	239	690	445
22-----	1,130	3,890	11,900	237	1,930	1,230	225	620	377
23-----	723	3,340	6,520	213	1,530	880	212	610	349
24-----	593	2,600	4,160	198	1,260	674	201	527	286
25-----	603	2,750	4,480	182	1,170	575	191	465	240
26-----	552	2,220	3,310	165	970	432	183	433	214
27-----	355	2,150	2,060	158	1,800	a 750	176	380	180
28-----	520	4,300	sa 6,800	154	1,040	432	167	341	154
29-----	425	3,260	3,740	297	3,700	a 3,000	161	299	130
30-----	464	2,880	3,610	268	4,510	s 3,340	160	290	125
31-----	510	2,100	2,890	164	2,260	1,000	--	--	--
Total--	27,624	--	226,584	11,962	--	134,896	21,255	--	129,083
Total discharge for year (cfs-days).....									83,652.1
Total load for year (tons).....									772,195

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Particle-size analyses of suspended sediment, May to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment													Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
May 21, 1951.....	1:30 p. m.	398	64	5,580	3,990	--	49	--	73	--	99	100	--	--	--	--	SPWCM
May 21.....	6:00 p. m.	492	62	7,720	5,710	--	56	--	81	--	99	100	--	--	--	--	SPWCM
May 22.....	3:55 p. m.	712	65	6,450	3,710	--	64	--	87	--	99	100	--	--	--	--	SPWCM
May 25.....	3:50 p. m.	355	73	4,460	9,950	--	52	--	76	--	98	99	99	--	100	--	SPWCM
May 26.....	7:00 p. m.	392	68	4,260	2,960	--	64	--	85	--	98	100	--	--	--	--	SPWCM
June 8.....	4:30 p. m.	849	--	17,100	8,130	31	42	55	71	87	99	100	--	--	--	--	SPWCM
June 8.....	4:30 p. m.	849	--	17,100	8,340	4	8	47	66	88	99	100	--	--	--	--	SPN
June 9.....	4:35 a. m.	1,120	59	9,150	6,620	--	57	--	81	--	98	100	--	--	--	--	SPWCM
June 9.....	7:30 p. m.	1,350	67	5,690	3,800	--	70	--	83	--	98	100	--	--	--	--	SPWCM
July 12.....	12:00 m.	1,100	63	7,480	4,180	--	39	--	58	--	94	95	95	--	100	--	SPWCM
July 13.....	9:00 a. m.	1,260	62	5,460	6,720	--	46	--	65	--	98	99	100	--	--	--	SPWCM
July 15.....	7:40 a. m.	1,110	68	5,310	11,800	--	40	--	59	--	98	99	99	--	100	--	SPWCM
July 17.....	11:00 a. m.	1,620	78	2,200	4,240	--	58	--	62	--	95	98	100	--	--	--	SPWCM
July 19.....	5:30 a. m.	4,230	68	1,860	2,490	--	71	--	80	--	96	97	100	--	--	--	SPWCM
July 19.....	12:20 p. m.	3,750	80	1,850	3,110	--	71	--	78	--	94	95	100	--	--	--	SPWCM
July 28.....	6:30 p. m.	737	76	6,610	8,010	--	37	--	66	--	99	100	--	--	--	--	SPWCM
Aug. 11.....	7:00 p. m.	836	69	9,240	6,836	--	44	--	63	--	99	100	--	--	--	--	SPWCM
Aug. 15.....	8:30 a. m.	1,170	70	5,900	4,060	--	61	--	74	--	99	99	100	--	--	--	SPWCM
Aug. 16.....	12:30 p. m.	1,450	75	3,420	4,260	--	73	--	78	--	96	100	--	--	--	--	SPWCM
Sept. 5.....	11:25 a. m.	370	65	4,620	6,240	--	47	--	71	--	98	100	--	--	--	--	SPWCM
Sept. 6.....	12:55 p. m.	773	--	9,720	5,850	--	36	--	58	--	98	100	--	--	--	--	SPWCM
Sept. 8.....	2:15 a. m.	1,060	65	4,970	3,860	--	55	--	68	--	99	100	--	--	--	--	SPWCM
Sept. 10.....	2:00 p. m.	2,860	72	2,010	2,820	--	65	--	69	--	89	91	94	--	100	--	SPWCM

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.

DRAINAGE AREA--721 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1948 to September 1949.

Water temperatures: December 1947 to September 1951.

Sediment records: March 1947 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 79°F Aug. 4, 6; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 9,080 ppm July 11; minimum daily, not determined.

Sediment loads: Maximum daily, 133,000 tons July 12; minimum daily, 1 ton on many days.

EXTREMES, 1947-51.--Water temperatures (1948-51): Maximum, 83°F June 30, July 18, 1949; minimum, freezing point on many days during winter months each year.

Sediment concentrations: Maximum daily, 14,100 ppm May 19, 1949; minimum daily, not determined.

Sediment loads: Maximum daily, 133,000 tons July 12, 1951; minimum daily, less than 1 ton on many days during 1947-50.

REMARKS.--Flow affected by ice Nov. 10, 11, Nov, 23 to Feb. 19, Mar. 8-15. Records of discharge for water year October 1950 to September 1951 given in

Water-Supply Paper 1210.

Chemical analyses, in parts per million, July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or	Col-	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
July 13, 1951....	10,500	20	0.02	35	3.3	6.7		132	3.0	0.5	0.2	4.5	0.02	147	0.20		101	0	13	225	8.1	

KANSAS RIVER BASIN--Continued

PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement generally between 6 a. m. and 12 m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	48	--	32	--	33	38	52	65	a 70	72	--
2	48	46	--	a 33	--	32	40	50	52	63	73	66
3	45	--	32	--	32	32	39	51	50	a 73	72	58
4	a 54	34	--	a 32	32	a 43	43	51	52	64	a 79	62
5	--	44	--	a 32	--	53	47	59	56	68	73	63
6	a 65	42	--	a 32	a 33	--	45	51	59	68	79	65
7	--	--	--	32	--	a 48	40	45	58	72	73	63
8	50	43	--	a 34	a 39	--	38	52	60	69	--	64
9	--	--	--	--	--	a 33	39	56	62	67	69	64
10	a 58	--	a 32	a 36	--	32	39	53	a 69	65	68	62
11	53	a 35	--	--	37	--	a 42	54	62	60	67	65
12	a 66	33	a 32	33	--	a 33	34	52	61	60	73	53
13	54	--	--	32	--	a 32	35	52	63	66	65	--
14	--	a 47	a 35	a 36	--	--	a 55	57	64	68	67	51
15	a 68	--	32	a 34	a 32	a 38	38	61	66	72	67	55
16	59	a 42	32	a 38	--	a 49	57	60	68	76	72	a 63
17	--	--	32	a 43	--	--	43	61	70	74	69	--
18	58	a 46	a 37	--	a 37	--	54	61	70	71	67	54
19	a 64	36	a 32	--	a 34	a 37	46	61	69	69	--	58
20	a 63	--	a 34	32	a 44	a 38	45	63	66	72	72	--
21	a 62	--	a 36	32	a 46	a 56	41	62	62	73	a 68	56
22	48	49	--	--	--	--	45	60	63	a 70	65	48
23	--	--	a 39	a 33	a 48	--	46	62	65	68	62	--
24	41	--	35	a 34	--	36	52	61	64	69	67	52
25	43	--	--	a 37	41	43	45	65	68	69	70	a 56
26	47	33	--	a 40	a 52	--	48	62	69	72	71	--
27	--	--	32	a 32	a 46	a 57	53	66	69	73	75	52
28	--	a 35	--	--	39	a 43	58	62	65	72	71	49
29	51	--	a 33	--	--	a 46	67	66	64	70	71	--
30	41	a 36	--	--	--	a 54	59	70	a 63	73	78	a 65
31	48	--	33	--	--	39	--	67	--	72	--	--
Average	--	--	b 33	b 33	--	--	46	58	63	69	71	58

a Reading obtained between 1 p. m. and 6 p. m.

b Includes estimated temperature of 32°F on missing days.

KANSAS RIVER BASIN--Continued

PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	22	585	s 46	14			15		
2-----	30	1,000	81	16			15		
3-----	19	262	13	15			14		
4-----	17	178	8	16			14		
5-----	17	142	6	16			14		
6-----	18	114	6	17	61	3	11	--	e 3
7-----	16	108	5	17			12		
8-----	14	106	4	17			12		
9-----	14	110	a 4	17			13		
10-----	13			16			13		
11-----	12			15			13		
12-----	13			16			13		
13-----	14			17			13		
14-----	14			18			13		
15-----	14			18			12		
16-----	14	79	3	18			12		
17-----	15			18			12	34	1
18-----	15			18			12		
19-----	15			18			12		
20-----	15			16			12		
21-----	14			16	51	2	12		
22-----	14			16			12		
23-----	14			15			13		
24-----	15			14			13		
25-----	14			13			13		
26-----	15			14			12		
27-----	15	40	2	15			11	35	1
28-----	16			16			11		
29-----	15			15			11		
30-----	16			15			12		
31-----	16			--	--	--	13		
Total-	485	--	229	480	--	71	390	--	51
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	12			6	--	e 1	35	1,050	99
2-----	11			7	40	a 1	33	1,280	114
3-----	11			8	38	1	19	550	28
4-----	11			9	22	1	16	340	15
5-----	10			9	22	a 1	15	240	10
6-----	10			9	28	1	14	180	a 7
7-----	9			8	32	a 1	12	152	5
8-----	9			8	40	1	12	140	a 4
9-----	9	36	1	10	--	e 2	10	158	4
10-----	9			13	112	4	10	106	3
11-----	10			20	104	6	11	--	e 3
12-----	10			18	--	e 5	11	110	3
13-----	10			15	--	e 3	12	126	4
14-----	10			13	--	e 2	13	--	e 4
15-----	10			13	25	1	14	182	7
16-----	10			14	30	a 1	14	138	5
17-----	10	72	2	16	40	a 2	12	--	e 3
18-----	10	--	e 2	20	54	3	12	--	e 3
19-----	9	--	e 4	23	92	6	10	98	3
20-----	8	280	a 6	19	92	5	10	82	2
21-----	6	83	1	12			10	96	3
22-----	6	42	a 1	12			12	110	a 4
23-----	9	48	1	12			10	95	a 2
24-----	11	80	2	12	50	2	9.0	84	2
25-----	14	190	a 7	12			10	68	2
26-----	16	100	a 4	12			10	60	a 2
27-----	11	76	2	15	1,800	sa 140	10	60	2
28-----	7	80	a 1	43	2,880	334	12		
29-----	6	50	1	--	--	--	13		
30-----	6	40	a 1	--	--	--	12	88	3
31-----	6	--	e 1	--	--	--	12		
Total-	296	--	52	388	--	534	415.0	--	355

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	10	122	3	11	57	2	65	440	77
2-----	10			11	38	1	56	340	51
3-----	9.5			10	50	1	46	335	42
4-----	10	--	e 24	10	61	2	39	390	41
5-----	14			10	58	2	40	345	37
6-----	13			10	41	1	58	550	86
7-----	10	160	a 6	10	39	1	40	515	56
8-----	10			10	260	sa 9	121	6,570	s 2,380
9-----	10			16	--	e 60	82	2,290	s 570
10-----	12	75	2	24	1,800	sa 130	95	2,100	sa 600
11-----	9.5			10	370	10	199	4,460	s 4,210
12-----	9.5			8.2	220	5	463	6,680	s 8,680
13-----	9.5	49	1	8.2	210	5	305	4,200	a 3,500
14-----	10			8.2	190	4	318	5,050	4,340
15-----	9.0			8.6	392	9	286	4,300	3,320
16-----	10	56	2	29	2,920	229	246	4,450	2,960
17-----	9.0			17	800	37	155	4,100	1,720
18-----	10			12	300	10	75	3,300	668
19-----	10	52	1	15	340	14	50	2,100	283
20-----	12	68	2	13	600	s 33	42	1,400	159
21-----	13	52	2	197	6,560	s 3,750	83	1,500	sa 400
22-----	13	57	2	724	8,620	s 17,200	2,230	7,330	s 45,400
23-----	12	66	2	822	5,850	s 12,600	3,290	5,210	s 48,400
24-----	19	88	4	282	4,650	3,540	1,420	5,230	20,000
25-----	15	62	2	527	6,820	s 11,400	840	5,620	12,700
26-----	12	67	2	455	5,540	s 7,000	439	4,900	s 5,970
27-----	13	61	2	158	3,200	1,360	206	3,030	1,700
28-----	13	68	2	131	2,100	742	148	2,870	1,150
29-----	13	60	2	97	1,260	327	115	1,080	335
30-----	12	64	2	81	750	164	92	690	171
31-----	--	--	--	74	555	111	--	--	--
Total--	342.0	--	83	3,799.2	--	58,759	11,646	--	170,006
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	82	610	135	77	404	84	23	146	9
2-----	89	850	204	55	278	41	162	3,120	s 2,760
3-----	71	750	144	53	222	32	842	6,120	13,900
4-----	58	600	94	46	158	20	2,190	6,000	s 34,000
5-----	50	460	62	46	210	26	2,840	3,220	s 25,200
6-----	44	420	50	44	152	18	889	4,880	11,700
7-----	40	430	46	44	210	26	708	4,810	s 10,300
8-----	36	420	41	64	390	67	1,360	4,380	16,100
9-----	31	520	44	40	202	22	615	3,750	6,230
10-----	60	1,610	s 1,160	44	184	22	254	2,090	s 1,480
11-----	1,390	9,080	34,100	68	1,550	s 325	182	1,070	526
12-----	6,710	7,730	s 133,000	68	790	s 229	149	600	241
13-----	4,050	4,320	s 50,100	867	9,050	s 21,900	133	410	147
14-----	2,800	3,040	23,000	698	6,580	s 13,100	123	345	114
15-----	1,730	3,960	s 18,100	145	3,200	1,250	108	280	82
16-----	729	4,730	s 9,550	78	900	190	100	232	63
17-----	318	2,470	s 2,180	60	456	74	94	248	63
18-----	222	1,130	677	50	320	43	88	440	a 100
19-----	173	710	332	46	278	34	81	480	a 100
20-----	145	560	219	42	246	28	74	226	45
21-----	123	590	196	39	283	30	69	176	33
22-----	351	4,340	s 4,500	36	276	27	65	148	26
23-----	257	1,980	s 1,430	36	242	24	60	135	22
24-----	106	1,400	401	37	--	e 28	57	141	22
25-----	74	510	102	53	480	sa 75	56	166	25
26-----	67	390	70	33	254	23	52	150	a 22
27-----	62	312	52	30	236	19	49	137	18
28-----	58	300	47	28	230	17	48	200	a 26
29-----	55	224	33	28	236	18	47	98	12
30-----	54	239	35	27	162	12	46	88	11
31-----	54	266	39	25	140	9	--	--	--
Total--	20,089	--	280,143	3,007	--	37,812	11,564	--	123,377
Total discharge for year (cfs-days)									52,901.2
Total load for year (tons)									671,472

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Particle-size analyses of suspended sediment, February to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
Feb. 27, 1951	11:40 p. m.	53	47	4,460	3,490	--	50	--	78	--	98	98	99	--	100	SPWCM
Feb. 28	1:10 p. m.	47	42	3,550	2,110	--	81	--	97	--	100	--	--	--	--	SPWCM
May 15	11:00 a. m.	32	65	2,760	2,240	--	83	--	100	--	--	--	--	--	--	PWCM
May 20	11:50 p. m.	72	63	5,730	4,300	--	47	--	76	--	96	97	98	--	100	SPWCM
May 21	6:00 a. m.	198	61	6,070	4,650	--	48	--	72	--	98	98	99	--	99	SPWCM
May 21	7:45 a. m.	311	61	11,800	8,050	--	42	--	64	--	99	99	100	--	--	SPWCM
May 21	8:40 p. m.	228	--	5,530	4,330	--	56	--	77	--	99	100	--	--	--	SPWCM
May 22	7:30 a. m.	378	60	9,360	6,730	--	48	--	70	--	98	99	100	--	--	SPWCM
May 22	1:45 p. m.	800	--	11,600	12,000	28	39	50	62	81	97	99	100	--	--	SPWCM
May 22	1:45 p. m.	800	--	11,600	12,300	4	5	40	61	79	97	98	100	--	--	SPN
May 22	6:30 p. m.	1,160	--	8,620	10,600	30	40	50	59	76	97	99	100	--	--	SPWCM
May 22	9:30 p. m.	1,290	--	8,620	10,800	4	7	47	58	75	94	96	100	--	--	SPN
May 22	9:45 p. m.	1,290	--	6,840	6,270	--	46	--	63	--	95	97	98	--	100	SPWCM
May 22	9:45 p. m.	1,340	--	6,840	6,430	--	26	--	59	--	94	96	98	--	100	SPN
May 23	1:00 a. m.	1,340	--	5,760	3,460	--	54	--	64	--	96	97	100	--	--	SPWCM
May 23	9:15 a. m.	910	62	5,400	3,380	--	58	--	71	--	95	96	100	--	--	SPWCM
May 23	1:20 p. m.	458	69	8,100	4,470	--	49	--	65	--	98	99	100	--	--	SPWCM
May 25	4:50 p. m.	790	--	12,000	8,500	--	41	--	65	--	97	100	--	--	--	SPWCM
May 25	4:50 p. m.	790	--	12,000	8,500	--	21	--	64	--	97	100	--	--	--	SPN
May 25	10:05 p. m.	1,040	59	7,170	5,520	--	53	--	68	--	96	97	100	--	--	SPWCM
May 26	5:00 p. m.	268	69	5,230	2,940	--	69	--	87	--	97	97	100	--	--	SPWCM
June 8	12:45 p. m.	138	64	9,820	6,560	--	56	--	79	--	99	100	--	--	--	SPWCM
June 11	9:50 p. m.	503	63	12,200	7,110	--	48	--	70	--	99	99	100	--	--	SPWCM
June 11	11:20 p. m.	543	--	11,200	7,050	--	50	--	70	--	98	99	100	--	--	SPWCM
June 22	3:15 a. m.	1,320	--	11,800	8,070	--	36	--	57	--	97	98	100	--	--	SPWCM
June 22	4:00 a. m.	1,670	62	12,000	9,770	--	42	--	66	--	97	99	100	--	--	SPWCM
June 22	6:35 a. m.	2,080	62	10,300	5,860	--	47	--	70	--	97	98	100	--	--	SPWCM

KANSAS RIVER BASIN--Continued
PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Particle-size analyses of suspended sediment, February to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per-ature (° F)	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		0.350	0.500	1.000
June 22, 1951...	10:55 p. m.	5,580	--	8,270	4,770	--	--	--	73	--	90	92	100	SPWCM	
June 23	8:40 p. m.	2,220	68	4,500	9,650	--	66	--	78	--	96	98	100	SPWCM	
July 10	10:15 p. m.	132	--	4,940	3,880	--	36	--	59	--	98	99	100	SPWCM	
July 11	2:30 a. m.	1,590	61	13,800	10,400	--	35	--	53	--	98	99	100	SPWCM	
July 11	5:30 a. m.	2,180	60	11,800	7,500	--	46	--	66	--	98	99	100	SPWCM	
July 12	7:30 a. m.	3,310	--	5,320	2,220	--	66	--	80	--	95	100	--	SPWCM	
July 12	4:50 p. m.	12,700	--	7,580	7,520	37	45	58	69	86	99	100	--	SPWCM	
July 12	4:50 p. m.	12,700	--	7,580	7,050	23	35	52	66	84	98	100	--	SPN	
July 12	8:05 p. m.	14,100	61	7,960	5,530	--	43	--	65	--	98	100	--	SPWCM	
July 13	8:45 a. m.	4,190	--	4,840	3,510	--	55	--	75	--	98	100	--	SPWCM	
July 22	8:00 a. m.	562	--	5,660	3,390	--	46	--	69	--	99	100	--	SPWCM	
Aug. 12	1:30 a. m.	456	--	10,100	6,190	--	45	--	73	--	98	100	--	SPWCM	
Aug. 13	5:50 a. m.	1,400	--	9,400	7,850	--	56	--	80	--	98	100	--	SPWCM	
Aug. 14	9:30 a. m.	1,200	--	7,500	5,080	--	65	--	85	--	99	100	--	SPWCM	
Aug. 14	11:50 a. m.	908	70	7,260	5,460	--	66	--	86	--	99	100	--	SPWCM	
Sept. 3	3:00 a. m.	854	57	6,670	8,930	--	50	--	77	--	98	100	--	SPWCM	
Sept. 4	10:55 a. m.	1,940	63	5,620	9,800	--	63	--	79	--	97	100	--	SPWCM	
Sept. 5	1:00 a. m.	3,160	63	3,880	7,930	--	72	--	89	--	95	96	97	100	SPWCM
Sept. 8	3:45 a. m.	1,520	--	5,100	3,730	--	53	--	73	--	98	100	--	SPWCM	

KANSAS RIVER BASIN--Continued
REPUBLICAN RIVER NEAR HARDY, NEBR.

LOCATION.--At gaging station at highway bridge, 1½ miles southwest of Hardy, Nuckolls County, DRAINAGE AREA.--22,400 square miles, approximately, of which about 16,700 square miles contribute directly to surface runoff. RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1951. REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids at 180° C			Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 17, 1950	312	31	0.04	67	13	34		269	52	11	0.6	2.0	0.20	346	0.47	220	0	25	541	7.7	
Dec. 26	a 400	31	.04	70	13	33		278	51	11	.7	3.0	.10	352	.48	230	2	24	548	7.9	
Jan. 22, 1951	438	34	.10	74	16	33		301	52	12	.6	2.7	.10	374	.51	249	2	22	563	8.0	
Feb. 19	513	32	.04	58	13	29		238	45	9.0	.6	4.6	.09	318	.43	196	1	24	480	8.0	
Mar. 23	623	31	.04	65	16	37		279	54	11	.7	4.7	.01	372	.51	228	0	26	563	8.0	
Apr. 16	577	30	.04	66	18	40		281	61	11	.9	4.1	--	380	.52	237	0	27	587	8.0	
May 18	4,380	40	.30	61	15	32		274	45	7.0	.6	.6	--	348	.47	213	0	25	517	7.4	
June 2	17,700	15	.16	40	5.8	13		163	13	2.0	.4	.8	--	176	.24	124	0	18	278	7.2	
June 21	4,340	27	.10	48	11	29		216	38	6.5	.6	1.3	--	278	.38	164	0	28	420	7.4	
a 7,880	20	.08	37	5.7	15			149	22	1.5	.3	1.6	--	192	.26	116	0	22	276	7.9	
July 15	2,830	--	--	--	--	--		208	--	--	--	--	--	--	--	167	0	--	428	7.5	
July 27	2,080	--	--	--	--	--		184	--	--	--	--	--	--	--	148	0	--	373	7.5	
Aug. 16	5,360	--	--	--	--	--		163	--	--	--	--	--	--	--	125	0	--	320	7.7	
Sept. 14		--	--	--	--	--			--	--	--	--	--	--	--			--			

a Mean daily discharge.

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.

LOCATION.--At gaging station at county bridge, half a mile northwest of Lovewell, Jewell County. Gaging station 1.2 miles downstream until Apr. 23, 1951, at which time it was moved to same location as the sampling site.

DRAINAGE AREA.--358 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: February 1950 to September 1951.

Sediment records: February 1950 to September 1951.

EXTREMES, 1950-51.--Water temperatures: Maximum, 84° F Aug. 7; minimum, freezing point Nov. 24, Jan. 3.

Sediment concentrations: Maximum daily, 32,000 ppm Apr. 25; minimum daily, not determined.

Sediment loads: Maximum daily, 88,000 tons June 7; minimum daily, 1 ton on several days during winter months.

EXTREMES, February 1950 to September 1951.--Water temperatures: Maximum, 84° F Aug. 7, 1951; minimum, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 32,000 ppm Apr. 25, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 88,000 tons June 7, 1950; minimum daily, 1 ton on many days during 1950.

REMARKS.--Flow affected by ice Nov. 24, Dec. 3-20, Dec. 26 to Feb. 9, Feb. 14-26, Mar. 9-19. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, January to July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)			
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate						
																			Residue at 180°C			Sum	Sum	Sum
Jan. 17, 1951.....	9	19	0.06	209	42	58	68	478		343	39	0.3	49	0.01	1,060	1,000	1.44	696	304	18	1,460			
Apr. 3,	27	--	--	--	--	58	--	220		315	36	--	--	--	--	--	--	442	282	6	1,100			
June 8,	5,100	13	.02	47	4.5	7.1	7.1	159		13	2.3	.4	4.2	.01	184	.25	136	136	6	10	285			
July 12,	7,400	12	.10	39	4.0	7.8	7.8	140		12	1.0	.5	1.0	.04	154	.21	114	114	0	13	244			

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 √Once-daily temperature measurement during Oct. to Apr. between 2 p.m. and 6 p.m.;
 during May to Sept. between 5 a.m. and 10 a.m. √

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	a 55	35	35	33	43	47	59	71	65	72	73
2	58	50	34	33	33	a 41	--	59	62	66	76	70
3	57	49	34	a 32	35	38	52	59	60	68	72	--
4	57	43	34	34	a 37	38	52	59	57	67	72	63
5	60	50	33	34	37	a 39	52	58	58	67	a 78	64
6	65	48	33	33	35	43	a 49	57	60	68	72	66
7	63	a 46	33	34	34	a 37	48	53	60	70	84	65
8	60	42	33	34	34	36	49	57	63	75	74	--
9	60	a 39	33	34	36	34	a 49	60	64	72	75	65
10	62	36	34	34	37	34	46	60	65	68	74	64
11	63	38	34	35	42	33	42	55	65	65	72	66
12	62	39	34	35	35	33	44	57	64	65	--	67
13	68	36	36	34	35	33	48	60	65	65	72	62
14	66	48	39	35	34	34	58	65	69	65	70	61
15	61	41	34	35	a 34	36	50	62	70	67	71	60
16	62	45	35	35	35	42	47	63	69	77	69	60
17	63	43	34	35	36	35	a 48	63	69	75	71	60
18	62	39	34	38	40	35	58	65	72	73	70	60
19	67	36	34	36	36	35	--	62	72	73	71	61
20	62	36	33	33	39	38	49	65	71	75	72	60
21	60	41	a 34	34	40	38	48	65	63	78	69	60
22	a 55	40	36	34	41	48	50	64	64	73	68	55
23	55	37	a 35	34	40	40	a 50	63	61	73	67	56
24	55	32	35	35	a 39	50	56	65	65	72	67	55
25	59	34	39	38	a 40	54	46	65	68	72	70	54
26	60	34	33	36	39	50	a 48	62	70	74	72	55
27	59	37	33	33	41	a 52	65	63	69	75	72	52
28	60	34	35	33	43	44	68	62	69	72	69	53
29	61	35	34	33	--	a 42	65	65	66	72	73	54
30	62	--	37	33	--	48	65	70	64	74	73	58
31	60	--	36	33	--	a 46	--	69	--	75	77	--
Average	61	40	34	34	37	40	52	62	66	71	72	61

a Reading obtained between 10 a.m. and 12 m.

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	402	3,070	s 13,900	15	75	3	13	20	1
2-----	1,960	6,030	31,800	15			12		
3-----	2,260	4,340	s 25,800	13			12	18	1
4-----	292	6,300	a 5,000	14	180	7	11		
5-----	106	4,240	s 1,260	15			11		
6-----	68	2,040	s 380	14			9		
7-----	84	--	e 1,600	16			7	109	2
8-----	40	930	100	15			7		
9-----	32	317	27	14	179	7	9		
10-----	29	259	20	13			11		
11-----	27	239	17	12			13		
12-----	23	241	15	13			13	123	4
13-----	21	239	14	14			12		
14-----	21	203	12	14	164	6	11		
15-----	20			14			11		
16-----	18			14			10	81	2
17-----	18	183	9	14			9		
18-----	17			12			8		
19-----	16			13	54	2	9		
20-----	16	210	9	13			8		
21-----	15	166	7	12			8		
22-----	15	148	6	12			9	80	2
23-----	15	154	6	12			10		
24-----	15	161	6	10	44	1	10		
25-----	16	125	5	9			10		
26-----	14	97	4	9			11		
27-----	15	88	4	11			7	61	1
28-----	16	98	4	12			7		
29-----	15	105	4	12	20	1	7		
30-----	14	98	4	12			7		
31-----	14	114	4	--	--	--	8	54	1
Total-	5,634	--	80,053	398	--	122	300	--	61
Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	9			4			342	15,000	a 14,000
2-----	8	54	1	5	74	1	239	19,000	a 12,000
3-----	7			4			275	17,000	a 13,000
4-----	8	28	1	6	156	3	231	14,000	a 8,700
5-----	8			8			80	12,200	2,630
6-----	8			10			34	9,400	863
7-----	7	150	3	12			20	4,400	238
8-----	7			12	151	4	15	1,500	61
9-----	8			10			10	600	16
10-----	9			11			8	420	9
11-----	11			13			14		
12-----	10	153	4	15			10		
13-----	10			12	134	4	12	325	10
14-----	9			7			11		
15-----	9			8			12		
16-----	10			10			20		
17-----	11	134	4	12			20		
18-----	13			12	76	2	19	254	13
19-----	13			12			16		
20-----	11			12			17		
21-----	9			12			16		
22-----	9	112	3	13			17		
23-----	11			14	78	3	18	197	8
24-----	9			16			15		
25-----	9			30	240	a 19	14		
26-----	9			40	360	a 38	14	195	7
27-----	8	50	1	28	260	a 20	14	218	8
28-----	5			307	15,100	s 19,900	20	--	e 15
29-----	4			--	--	--	27	300	22
30-----	4			--	--	--	21	258	15
31-----	4	74	1	--	--	--	18	314	15
Total-	267	--	81	655	--	20,048	1,599	--	51,754

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	18	178	9	538	16,100	23,400	94	4,340	s 1,140
2-----	16	160	7	287	12,700	s 10,400	1,500	22,200	s 86,200
3-----	14	153	6	106	6,880	s 2,010	2,080	7,350	40,900
4-----	13	153	5	73	2,420	477	693	--	e 25,000
5-----	16	165	7	60	1,080	175	158	6,400	2,730
6-----	26	320	a 22	54	870	98	152	3,800	a 1,600
7-----	21	180	10	49	442	58	5,310	10,400	s 88,000
8-----	17	87	4	47	361	46	5,380	5,150	74,800
9-----	17	130	6	47	327	41	1,390	8,200	a 31,000
10-----	17	83	4	45	242	29	461	7,350	9,150
11-----	18	75	4	44	163	19	261	5,400	3,800
12-----	18	130	6	43	180	21	234	2,800	a 1,800
13-----	15	112	4	41	175	19	355	4,000	3,830
14-----	14	138	5	44	312	37	382	9,600	9,900
15-----	13	160	6	60	418	68	333	9,600	sa 9,100
16-----	11	118	4	52	320	45	170	2,270	s 1,080
17-----	10	134	4	76	868	s 183	118	1,550	494
18-----	11	122	4	170	2,980	s 1,680	111	840	252
19-----	12	103	3	147	2,710	s 1,170	96	610	158
20-----	23	--	e 55	91	1,140	280	94	700	sa 260
21-----	66	--	e 1,200	452	11,800	s 21,800	1,270	15,000	s 48,500
22-----	52	--	e 320	441	9,300	a 11,000	1,810	10,000	sa 48,000
23-----	64	1,700	sa 300	438	11,000	s 13,400	1,580	7,800	a 33,000
24-----	79	--	e 1,100	176	5,130	s 2,550	715	--	e 23,000
25-----	894	32,000	sa 84,000	105	2,430	689	220	4,300	s 2,680
26-----	231	15,600	s 10,200	77	960	200	182	2,110	1,040
27-----	185	9,700	a 320	62	500	84	159	2,200	a 950
28-----	108	6,400	2,400	54	430	63	139	1,000	375
29-----	70	2,250	a 250	89	1,580	s 494	123	780	259
30-----	307	11,200	s 17,100	179	7,000	s 3,490	122	710	234
31-----	--	--	--	172	9,630	s 4,660	--	--	--
Total--	2,352	--	125,365	4,319	--	98,486	25,672	--	549,212
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	116	507	159	80	780	188	53	750	107
2-----	109	472	139	71	570	109	54	1,150	168
3-----	97	500	a 130	152	2,300	sa 1,200	99	1,700	sa 500
4-----	87	441	104	128	2,310	s 635	1,200	7,410	s 25,100
5-----	80	--	e 130	76	950	195	1,800	4,460	21,700
6-----	79	315	67	62	505	84	398	4,500	sa 4,900
7-----	76	278	57	57	351	54	122	2,400	790
8-----	72	233	45	52	250	35	84	1,080	245
9-----	66	224	40	49	229	30	68	850	119
10-----	574	11,000	sa 25,000	51	240	a 34	63	500	85
11-----	2,410	5,200	s 33,200	70	420	a 80	58	460	72
12-----	5,040	4,100	s 56,700	59	251	40	66	1,000	a 180
13-----	4,220	2,950	33,800	50	277	37	62	470	79
14-----	1,510	3,100	sa 10,000	57	440	sa 75	83	650	a 150
15-----	320	3,010	2,600	138	1,610	600	75	640	130
16-----	224	1,490	901	136	1,930	709	61	315	52
17-----	176	1,120	532	72	720	s 151	56	218	33
18-----	172	1,010	469	53	430	62	62	197	33
19-----	179	870	420	425	4,620	s 11,300	50	181	24
20-----	186	710	356	371	5,520	s 6,290	44	158	19
21-----	146	500	197	54	2,940	s 450	40	152	16
22-----	202	--	e 1,400	43	610	71	38	130	13
23-----	340	2,400	sa 2,500	41	360	40	38	153	16
24-----	434	2,990	3,500	58	800	sa 160	39	125	13
25-----	142	2,390	918	72	870	s 178	41	97	11
26-----	98	1,010	267	48	500	65	40	138	15
27-----	125	--	e 2,000	758	9,400	s 23,700	40	128	14
28-----	1,070	11,600	a 33,500	1,090	8,450	s 24,800	38	82	8
29-----	330	6,480	s 5,960	233	6,700	s 4,370	36	73	7
30-----	148	4,930	s 2,030	89	3,260	s 821	37	73	7
31-----	96	1,800	466	64	1,180	204	--	--	--
Total--	18,924	--	217,385	4,759	--	76,947	4,945	--	54,606

Total discharge for year (cfs-days)..... 69,814

Total load for year (tons)..... 1,274,120

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature discharge (° F)	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		0.350	0.500	1.000
Oct. 1, 1950.....	5:15 p.m.	882	60	22,300	7,350	--	48	--	68	--	99	100	--	SPWCM	
Oct. 1.....	7:00 p.m.	1,100	59	16,800	5,690	--	52	--	72	--	99	100	--	SPWCM	
Oct. 2.....	6:10 a.m.	1,830	55	6,360	4,300	--	76	--	90	--	100	--	--	SPWCM	
Oct. 2.....	8:00 a.m.	1,880	55	6,200	4,190	--	78	--	93	--	100	--	--	SPWCM	
Oct. 2.....	10:00 a.m.	1,940	55	6,140	3,920	--	76	--	91	--	100	--	--	SPWCM	
Oct. 2.....	1:10 p.m.	2,050	57	5,600	6,310	--	79	--	95	--	100	--	--	SPWCM	
Oct. 2.....	2:00 p.m.	2,060	57	5,790	8,280	--	81	--	94	--	100	--	--	SPWCM	
Oct. 2.....	6:00 p.m.	2,150	58	5,640	3,780	--	82	--	94	--	100	--	100	SPWCM	
Oct. 3.....	6:30 a.m.	2,950	48	4,080	2,230	71	85	98	93	98	98	99	--	SPWCM	
Feb. 28, 1951.....	12:30 p.m.	605	43	27,800	9,100	--	58	--	82	--	100	--	--	SPWCM	
Feb. 28.....	2:30 p.m.	557	43	28,800	9,440	--	55	--	78	--	100	--	--	SPWCM	
Feb. 28.....	4:30 p.m.	498	44	27,000	9,210	--	59	--	84	--	100	--	--	SPWCM	
Mar. 1.....	4:30 p.m.	258	43	13,700	10,690	--	64	--	88	--	100	--	--	SPWCM	
Mar. 1.....	6:45 p.m.	270	42	14,500	4,280	--	64	--	85	--	100	--	--	SPWCM	
Mar. 2.....	11:45 a.m.	187	41	17,600	6,800	--	72	--	93	--	100	--	--	SPWCM	
Mar. 3.....	3:45 p.m.	312	38	18,400	5,110	--	67	--	86	--	100	--	--	SPWCM	
Mar. 4.....	7:00 p.m.	189	38	12,400	8,320	--	84	--	99	--	100	--	--	SPWCM	
Mar. 5.....	10:20 a.m.	76	39	12,400	8,340	--	84	--	99	--	100	--	--	SPWCM	
Mar. 6.....	11:40 a.m.	32	39	8,990	5,590	--	92	--	98	--	100	--	--	SPWCM	
Mar. 6.....	3:40 p.m.	29	43	8,300	9,320	--	89	--	100	--	100	--	--	SPWCM	
Apr. 25.....	9:00 a.m.	1,270	45	37,600	6,850	--	54	--	75	--	100	--	--	SPWCM	
Apr. 25.....	3:30 p.m.	826	46	30,000	15,700	--	54	--	79	--	99	100	--	SPWCM	
Apr. 25.....	11:00 a.m.	222	48	15,600	5,810	--	69	--	93	--	100	--	--	SPWCM	
Apr. 28.....	9:30 a.m.	103	58	11,200	7,820	--	81	--	94	--	100	--	--	SPWCM	
Apr. 30.....	6:50 p.m.	734	--	32,700	6,500	49	53	59	72	91	100	--	--	SPWCM	
May 1.....	1:00 p.m.	558	62	16,900	6,180	--	60	--	81	--	100	--	--	SPWCM	
May 3.....	5:30 p.m.	98	67	5,500	3,980	--	85	--	96	--	100	--	--	SPWCM	
May 21.....	1:30 p.m.	795	65	31,400	10,300	--	43	--	64	--	100	--	--	SPWCM	
May 21.....	4:30 p.m.	822	68	22,600	10,500	48	54	64	76	93	99	100	--	SPWCM	
May 21.....	4:30 p.m.	822	68	22,600	10,600	2	4	31	68	91	99	100	--	SPN	

May 23, 1951	6:00 p.m.	319	67	11,600	7,860	--	62	--	84	--	96	100	SPWCM
May 31	1:15 p.m.	227	74	14,100	9,560	63	61	--	90	--	100	--	SPWCM
June 2	2:15 p.m.	1,700	62	15,700	6,340	63	64	72	82	95	99	100	SPWCM
June 2	2:15 p.m.	1,700	62	15,700	6,340	6	14	83	80	92	98	100	SPN
June 3	7:00 p.m.	2,230	59	6,160	3,550	--	65	--	94	--	100	--	SPWCM
June 7	10:20 a.m.	2,050	80	12,000	7,800	--	65	--	81	--	99	100	SPWCM
June 15	10:15 a.m.	373	70	12,000	8,920	--	68	--	90	--	100	--	SPWCM
June 21	6:45 a.m.	1,280	63	11,600	5,940	--	37	--	56	--	100	--	SPWCM
June 21	1:15 p.m.	1,560	67	15,600	6,150	--	48	--	68	--	100	--	SPWCM
June 22	12:40 p.m.	1,840	67	7,820	3,430	57	59	67	77	94	99	100	SPWCM
June 22	12:40 p.m.	1,840	67	7,820	3,550	16	31	55	70	91	98	100	SPN
June 22	9:00 p.m.	1,960	67	5,310	3,550	--	64	--	84	--	100	--	SPWCM
July 10	8:15 p.m.	1,540	65	15,600	5,840	--	53	--	71	--	99	100	SPWCM
July 11	10:40 a.m.	2,480	65	5,440	3,940	--	78	--	92	--	100	--	SPWCM
July 12	10:45 a.m.	4,290	65	4,660	3,190	--	76	--	91	--	100	--	SPWCM
July 12	10:45 p.m.	7,280	63	2,880	2,450	--	--	--	59	--	100	--	SPWCM
July 13	7:45 p.m.	3,260	66	2,960	3,380	--	86	--	97	--	100	--	SPWCM
July 28	5:30 a.m.	1,210	72	11,200	7,520	--	63	--	85	--	100	--	SPWCM
July 28	8:30 a.m.	990	73	10,800	7,390	--	62	--	83	--	100	--	SPWCM
July 28	7:00 p.m.	1,490	72	10,100	6,330	--	59	--	77	--	100	--	SPWCM
Aug. 27	4:50 p.m.	1,030	72	9,400	5,660	52	60	69	79	92	100	--	SPWCM
Aug. 27	4:50 p.m.	1,030	72	9,400	5,730	5	8	34	72	93	100	--	SPN
Sept. 4	1:15 p.m.	1,600	64	9,740	5,510	--	54	--	70	--	99	100	SPWCM
Sept. 4	7:00 p.m.	1,980	64	7,380	4,940	--	53	--	71	--	99	100	SPWCM
Sept. 5	3:25 p.m.	1,850	68	4,670	5,910	61	68	74	81	92	100	--	PWCM

KANSAS RIVER BASIN--Continued

SMOKY HILL RIVER NEAR ELLIS, KANS.

LOCATION.--At gaging station at highway bridge 11½ miles south of Ellis, Ellis County.

DRAINAGE AREA.--5,630 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: March 1947 to November 1950 (discontinued).

EXTREMES, October to November 1950.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 18,000 tons Oct. 2; minimum daily, less than 0.50 ton on some days during November.

EXTREMES, 1947-50.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 207,000 tons July 31, 1950; minimum daily, less than 0.50 ton on many days.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Suspended sediment, October to November 1950

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	106	500	sa 160	64	40	a7			
2-----	1,440	4,640	18,000	65					
3-----	1,460	1,260	4,970	65					
4-----	1,080	440	1,290	64					
5-----	444	720	863	64					
6-----	211	1,320	752	61	33	b1			
7-----	162	1,300	569	59					
8-----	138	420	b 160	59					
9-----	120	289	94	58					
10-----	106	240	b 70	77					
11-----	96	268	69	59	--	e 36			
12-----	95	240	b 60	65	--	e 8			
13-----	95	209	54	64	--	e 6			
14-----	89	200	b 48	31	--	e 3			
15-----	87	190	44	18	13	(t)			
16-----	87	178	42	13					
17-----	84	150	b 34	12					
18-----	79	92	20	10					
19-----	79	96	20	8.5					
20-----	79	95	b 20	8.0	13	(t)			
21-----	80	90	19	7.5					
22-----	80	67	13	7.5					
23-----	80			7.0					
24-----	80			6.6					
25-----	79			5.8					
26-----	77			5.5	13	(t)			
27-----	75			5.5					
28-----	70			5.5					
29-----	70			5.0					
30-----	68			5.0					
31-----	67			--	--	--			
Total-	6,973	--	27,488	965.4	--	134			

Total discharge for period Oct. 1 to Nov. 30, 1950 (cfs-days) 7,958.4

Total load for period Oct. 1 to Nov. 30, 1950 (tons) 27,622

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

SMOKY HILL RIVER NEAR RUSSELL, KANS.

LOCATION.--At gaging station at bridge on U. S. Highway 281, a quarter of a mile upstream from Landon Creek and 7.7 miles south of Russell, Russell County. DRAINAGE AREA.--6,965 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.

REMARKS.--Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Sum	Tons per acre-foot	Calcium mag-nesium	Non-carbonate				
Oct. 16, 1950	173	20	0.02	139	33	169	231	300	215	0.4	3.0	3.0		1,020	983	1.39	441	282	45	1,570	7.9	0.001
Oct. 31	107	18	.02	149	32	181	230	333	258	.7	1.9	1.9		1,150	1,080	1.56	506	317	44	1,790	7.9	.000
Dec. 4	63	14	.08	165	33	362	272	285	575	.6	2.5	2.5		1,680	1,570	2.28	546	323	59	2,700	7.8	.000
Jan. 3, 1951	a 30	10	.06	166	38	559	280	335	854	.4	1.8	1.8		2,150	2,100	2.92	570	340	68	3,610	7.8	.000
Feb. 5	32	11	.06	203	38	613	328	320	967	.2	3.8	3.8		2,450	2,340	3.33	664	395	67	4,050	7.6	.000
Mar. 5	38	11	.04	166	28	354	254	250	586	.3	4.2	4.2		1,630	1,520	2.22	530	322	59	2,600	7.6	.000
Apr. 2	71	12	.02	143	25	150	228	295	204	.6	4.0	4.0		1,030	946	1.40	460	273	41	1,810	7.7	.000
May 1	205	13	.01	82	13	66	145	140	95	.4	2.3	2.3		524	--	.71	258	139	36	813	7.4	.000
June 5	1,320	14	.03	70	9.6	39	145	104	48	.4	3.2	3.2		402	--	.55	214	195	28	601	7.6	.000
June 28	6,340	15	.04	51	4.9	24	149	43	21	.2	1.7	1.7		241	--	.33	147	25	26	382	7.6	.000
Aug. 1	1,370	17	.02	72	10	43	149	118	47	.6	2.3	2.3		404	--	.55	222	100	30	628	7.5	.000
Sept. 5	6,140	15	.01	41	4.3	18	120	30	19	1.0	1.0	.7		203	--	.28	130	22	25	309	7.4	.000

a Mean daily discharge.

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: January 1946 to September 1949.

Water temperatures: January 1946 to September 1951 (discontinued).

Sediment records: May 1946 to September 1951 (discontinued).

EXTREMES, 1950-51.--Water temperatures: Maximum, 79°F Aug. 1; minimum, freezing point on some days December to February.

Sediment concentrations: Maximum daily, 8,400 ppm May 22; minimum daily, not determined.

Sediment loads: Maximum daily, 207,000 tons June 28; minimum daily, not determined.

EXTREMES, 1946-51.--Water temperatures: Maximum, 80°F July 8, 1947; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily (1949-51), 11,000 ppm July 5, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 207,000 tons June 28, 1951; minimum daily, less than 1 ton on many days during 1946-50.

REMARKS.--Flow affected by ice Nov. 24, 25, Dec. 3-13, 26-30, Jan. 2-16, 21-23, Jan. 27 to Feb. 10, Feb. 13-20, Mar. 8-15. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, water year October 1950 to September 1951
/Once-daily temperature measurement between 7 a. m. and 10:30 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	63	54	a 37	34	--	35	44	60	71	--	79	71
2	59	50	34	34	--	42	44	58	59	--	76	69
3	--	42	34	34	--	a 41	42	56	59	71	76	87
4	--	34	33	a 36	--	34	45	56	58	69	72	--
5	55	43	--	34	33	39	50	58	61	71	76	66
6	58	46	--	34	34	38	48	54	62	74	78	68
7	59	46	--	34	a 34	34	44	50	62	74	72	68
8	52	50	--	a 34	33	33	39	55	66	74	75	87
9	54	34	--	34	33	a 35	42	60	66	72	73	--
10	56	34	--	36	35	35	46	56	66	70	74	67
11	56	35	34	37	35	--	37	54	67	68	71	69
12	56	36	34	34	34	a 33	35	57	64	66	74	66
13	58	36	34	34	--	a 34	40	56	67	61	72	62
14	60	40	33	33	--	35	41	58	67	68	74	61
15	59	46	34	35	--	34	44	62	70	72	71	60
16	61	34	34	36	--	46	40	62	70	75	70	57
17	60	38	33	35	--	40	43	64	73	--	72	58
18	59	39	33	35	--	35	50	63	73	a 77	71	61
19	58	38	33	35	34	34	45	64	72	74	74	62
20	56	34	32	33	34	34	46	66	72	75	74	64
21	56	36	34	33	34	33	45	65	65	74	70	59
22	65	38	33	33	38	41	44	80	85	71	69	54
23	49	34	33	34	41	42	49	62	67	71	62	57
24	60	--	34	34	48	a 47	48	68	67	74	71	56
25	49	a 35	35	34	52	41	50	61	68	75	72	56
26	63	34	33	34	40	39	51	65	71	71	73	61
27	54	34	33	32	41	51	58	68	70	75	74	54
28	58	33	a 36	--	--	43	64	64	67	70	72	65
29	53	34	34	--	--	37	65	65	67	74	75	54
30	62	35	36	--	--	38	62	70	--	76	74	a 70
31	55	--	34	--	--	42	--	68	--	76	76	--
Average	57	39	34	34	--	38	47	61	67	72	75	62

a Reading obtained between 10:30 a. m. and 1 p. m.

KANSAS RIVER BASIN--Continued

SALINE RIVER NEAR RUSSELL, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	108	250	73	68			54		
2-----	1,000	4,400	sa 22,000	69			53	12	2
3-----	1,620	5,160	s 25,500	67			50		
4-----	311	2,400	s 2,120	68			50		
5-----	193	660	344	68			50		
6-----	152	332	136	67	44	8	50		
7-----	130	241	84	66			50		
8-----	118	189	80	65			50	--	e 5
9-----	111	181	54	65			50		
10-----	106	188	54	63			52		
11-----	99	178	48	63			54		
12-----	96	170	44	58			58		
13-----	94	236	60	62	22	4	60	47	7
14-----	92	254	63	63			61		
15-----	92	130	32	62			58		
16-----	90	83	20	58	20	3	57		
17-----	89	93	22	58	20	3	55		
18-----	86	73	17	57			52	33	5
19-----	85	60	14	58			54		
20-----	80			58			51		
21-----	79			58	23	4	52		
22-----	78			56			51		
23-----	76			56			48	30	4
24-----	76			55			49		
25-----	76	--	e 8	56			49		
26-----	76			57	40	6	49		
27-----	75			55			48		
28-----	74			55			47	44	6
29-----	70			56	12	2	60		
30-----	72			55			52		
31-----	69			--	--	--	54	72	10
Total--	5,571	--	50,641	1,822	--	166	1,628	--	161
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	55			30			63	79	13
2-----	50	72	9	30	--	e 6	73	135	27
3-----	32			30			76	132	27
4-----	35			30			72	132	26
5-----	35			34	74	7	87	100	18
6-----	35	53	5	34			61		
7-----	40			34			58		
8-----	45			34	45	4	50	45	6
9-----	45			34			44		
10-----	45			50			42		
11-----	46	77	9	82	110	24	30	55	a 4
12-----	45			60	110	18	36		
13-----	45			40			40		
14-----	45			40			44	64	8
15-----	45			40			46		
16-----	45	76	10	42	--	e 13	53		
17-----	52			50			55		
18-----	52			58			57	37	5
19-----	60			66	110	20	54		
20-----	50			74	110	22	49		
21-----	48	98	13	81	220	a 48	49		
22-----	46			75	170	a 34	46		
23-----	45			67	120	a 22	47	50	6
24-----	47			66	120	a 21	46		
25-----	50			72	160	a 32	44		
26-----	51	103	13	75	180	a 36	41		
27-----	40			70	150	28	41	--	e 10
28-----	30			66	100	a 18	54		
29-----	30			--	--	--	96	--	a 400
30-----	30	--	e 7	--	--	--	103	1,000	278
31-----	30			--	--	--	82	185	41
Total--	1,349	--	292	1,464	--	452	1,723	--	984

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

SALINE RIVER NEAR RUSSELL, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	69	87	16	247	6,060	s 4,570	272	520	382
2-----	63	103	18	108	1,320	s 408	971	--	e 14,000
3-----	57	113	17	85	389	89	1,050	4,210	s 13,400
4-----	54	88	13	75	312	63	408	1,680	1,850
5-----	56	87	13	69	267	50	293	880	696
6-----	82	--	e 360	67	228	41	756	4,100	sa 8,700
7-----	85	980	s 225	64	185	32	1,350	3,850	14,000
8-----	72	144	26	63	171	29	1,760	5,830	s 29,600
9-----	63	88	15	63	150	26	4,350	8,220	s 75,200
10-----	62	105	18	65	149	26	1,080	4,000	11,700
11-----	61	65	11	65	144	25	804	2,680	5,770
12-----	61	52	8	61	118	19	1,360	4,670	s 19,400
13-----	60	48	8	56	124	19	2,350	4,940	31,300
14-----	54	50	7	67	--	e 65	1,580	4,010	17,100
15-----	52	52	7	165	1,300	sa 650	1,700	4,400	s 22,100
16-----	50	30	4	107	900	260	1,810	4,250	s 23,300
17-----	47	32	4	110	430	128	651	2,440	4,290
18-----	46	32	4	252	2,600	sa 2,400	493	1,410	1,880
19-----	44	26	3	373	5,200	a 5,200	421	940	1,070
20-----	118	--	e 3,800	244	2,450	1,610	389	880	903
21-----	180	--	e 3,700	672	6,700	sa 18,000	4,100	4,480	49,400
22-----	111	2,060	s 662	4,850	8,400	110,000	10,400	5,500	s 152,000
23-----	150	2,320	s 983	6,130	6,140	s 105,000	10,600	4,320	124,000
24-----	112	1,680	511	3,350	4,400	39,800	9,140	4,790	118,000
25-----	101	920	251	1,280	4,490	15,500	4,580	5,100	63,100
26-----	97	680	178	747	2,700	5,440	2,270	4,390	26,900
27-----	79	340	72	531	1,730	2,480	2,760	5,800	a 43,000
28-----	73	240	47	428	1,110	1,280	9,830	7,440	s 207,000
29-----	67	190	34	394	1,100	a 1,200	9,080	5,920	145,000
30-----	126	--	e 600	357	1,200	1,180	3,710	4,350	43,600
31-----	--	--	--	295	670	534	--	--	--
Total--	2,352	--	11,637	21,440	--	316,104	90,318	--	1,268,641
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,870	3,380	17,100	421	510	580	185	370	185
2-----	1,330	2,200	7,900	389	485	509	177	270	129
3-----	1,450	4,000	sa 17,000	359	412	399	681	4,730	s 9,510
4-----	1,200	3,140	10,200	336	515	487	5,010	7,070	s 91,400
5-----	872	1,340	3,150	325	417	366	6,330	4,240	72,500
6-----	717	900	1,740	313	418	353	1,770	3,500	16,700
7-----	627	640	1,080	327	800	a 550	976	1,970	5,190
8-----	568	520	797	306	735	607	1,080	--	e 8,400
9-----	531	430	616	300	520	421	1,120	--	e 7,400
10-----	531	430	616	313	450	380	712	1,200	2,310
11-----	5,270	4,940	s 85,900	313	524	443	560	780	1,180
12-----	4,940	3,800	50,700	414	--	e 4,400	452	548	669
13-----	3,890	2,930	30,800	610	3,000	a 4,900	385	385	400
14-----	2,360	2,770	17,600	736	--	e 6,400	351	347	329
15-----	1,510	2,540	10,400	508	2,630	s 3,860	324	298	281
16-----	1,020	1,690	4,650	392	940	995	296	230	184
17-----	781	1,100	a 2,300	320	570	492	278	203	152
18-----	668	770	1,390	274	440	325	259	192	134
19-----	595	650	1,040	249	370	249	245	164	108
20-----	537	540	783	226	380	232	233	180	113
21-----	498	500	672	221	320	191	217	155	91
22-----	1,510	--	e 35,000	221	280	167	211	130	74
23-----	1,890	3,760	19,200	221	400	sa 300	205	121	67
24-----	1,670	3,710	16,700	341	2,000	sa 2,400	200	96	53
25-----	1,990	5,100	s 29,200	332	--	e 2,800	197	61	43
26-----	1,700	4,630	s 22,300	352	2,100	2,000	194	98	51
27-----	903	2,640	6,440	256	750	516	189	42	21
28-----	672	1,490	2,700	215	450	261	175	59	28
29-----	553	920	1,370	197	300	160	170	38	17
30-----	508	800	1,100	189	270	138	168	50	23
31-----	472	780	994	183	310	153	--	--	--
Total--	43,633	--	401,438	10,159	--	37,816	23,350	--	217,722
Total discharge for year (cfs-days).....									204,809
Total load for year (tons).....									2,306,254

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
SALINE RIVER NEAR RUSSELL, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature per- ature (° F)	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		0.350	0.500	1.000
Oct. 3, 1950 . . .	7:35 a. m.	2,480	--	5,460	4,120	--	77	--	92	--	98	100	--	SPWCM	
Oct. 3	12:45 p. m.	1,110	--	4,530	2,620	62	74	86	92	95	99	99	100	RWCM	
Oct. 4	7:50 a. m.	332	45	2,800	1,780	66	80	90	94	97	98	99	99	RWCM	
Apr. 21, 1951 . .	7:40 a. m.	193	45	8,240	5,480	--	64	--	85	--	100	--	--	SPWCM	
May 1	7:40 a. m.	366	60	7,240	5,050	--	68	--	88	--	99	100	--	SPWCM	
May 1	1:50 p. m.	215	67	5,180	5,290	60	78	91	97	99	100	--	--	SPWCM	
May 1	1:50 p. m.	215	67	5,180	5,490	3	3	9	96	97	100	--	--	SPN	
May 19	7:10 a. m.	387	64	5,610	3,340	--	75	--	93	--	100	--	--	SPWCM	
May 21	5:35 p. m.	1,460	71	14,400	9,230	--	65	--	83	--	99	100	--	SPWCM	
May 22	7:40 a. m.	5,720	60	6,370	4,140	--	66	--	84	--	97	100	--	SPWCM	
May 22	5:30 p. m.	4,920	--	6,490	4,290	--	63	--	81	--	96	100	--	SPWCM	
May 22	9:50 p. m.	5,210	--	6,300	4,480	--	71	--	86	--	93	--	--	SPWCM	
May 22	11:25 p. m.	5,220	--	6,520	4,440	55	71	81	86	89	93	95	98	SPWCM	
May 23	11:25 p. m.	5,220	--	6,520	4,530	5	7	39	85	92	94	95	100	SPN	
May 23	12:30 p. m.	7,700	--	7,950	4,960	--	73	--	90	--	98	100	--	SPWCM	
May 23	6:00 p. m.	6,440	66	5,710	10,500	--	73	--	89	--	95	96	97	SPWCM	
May 24	12:45 p. m.	2,870	--	4,320	2,640	--	69	--	83	--	98	100	--	SPWCM	
June 9	6:40 a. m.	5,800	66	8,370	5,180	--	69	--	83	--	96	97	100	SPWCM	
June 13	9:00 p. m.	1,650	--	3,950	7,650	--	67	--	82	--	96	98	100	SPWCM	
June 21	2:30 p. m.	3,890	71	3,120	6,860	--	63	--	80	--	96	98	98	SPWCM	
June 22	7:45 p. m.	14,500	--	5,830	5,940	53	68	79	85	89	93	95	96	SPWCM	
June 22	7:45 p. m.	14,500	--	5,830	6,330	6	9	66	84	89	93	95	96	SPN	
June 24	8:25 a. m.	9,600	67	4,800	7,880	--	69	--	86	--	94	95	96	SPWCM	
June 28	15:30 p. m.	7,200	70	7,200	6,130	--	63	--	82	--	95	96	99	SPWCM	
June 28	4:25 p. m.	15,300	70	7,200	5,940	--	22	--	82	--	94	96	98	SPN	
June 28	7:05 p. m.	16,700	--	8,240	5,910	--	62	--	83	--	94	96	100	SPWCM	
June 28	11:10 p. m.	15,900	69	6,720	11,700	--	65	--	86	--	94	96	98	SPWCM	
June 29	7:00 a. m.	10,700	67	6,560	4,700	--	69	--	89	--	96	97	100	SPWCM	

KANSAS RIVER BASIN--Continued
SALINE RIVER NEAR RUSSELL, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951--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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
July 11, 1951 . . .	7:25 a. m.	3,330	68	4,720	3,060	--	45	--	64	--	95	98	100	--	--	SPWCM
July 11, . . .	4:00 p. m.	8,230	69	4,960	7,960	--	64	--	52	--	90	91	--	--	--	SPWCM
July 12, . . .	1:35 p. m.	4,440	--	2,680	4,300	--	56	--	73	--	89	92	--	--	--	SPWCM
July 12, . . .	7:25 p. m.	5,080	--	3,330	4,370	--	57	--	74	--	91	94	--	--	--	SPWCM
July 14, . . .	6:55 p. m.	2,180	--	2,910	3,830	--	60	--	77	--	94	96	--	--	--	SPWCM
July 26, . . .	7:55 a. m.	1,770	71	4,960	3,330	--	66	--	84	--	96	100	--	--	--	SPWCM
Sept. 3, . . .	7:55 a. m.	7,980	67	6,830	4,180	--	57	--	74	--	97	97	97	97	97	SPWCM
Sept. 4, . . .	5:50 p. m.	7,850	--	7,580	6,670	--	65	--	81	--	91	93	95	100	100	SPWCM
Sept. 4, . . .	5:50 p. m.	7,630	--	7,580	6,770	--	14	--	78	--	89	91	94	99	99	SPN

KANSAS RIVER BASIN--Continued

PARADISE CREEK NEAR PARADISE, KANS.

LOCATION.--At bridge at gaging station on U.S. Highway 281, 4½ miles southeast of Paradise, Russell County.

DRAINAGE AREA.--212 square miles.

RECORDS AVAILABLE.--Chemical analyses: March to October 1947, March to November 1948, February to September 1949.

Water temperatures: June 1949 to September 1951 (discontinued).

Sediment records: March 1947 to September 1951 (discontinued).

EXTREMES, 1950-51.--Water temperatures: Maximum, 80°F Aug. 5; minimum, freezing point on many days in December, January, and February.

Sediment concentrations: Maximum daily, 13,000 ppm May 21; minimum daily, not determined.

Sediment loads: Maximum daily, 124,000 tons July 11; minimum daily, less than 0.50 ton Dec. 1-31, Apr. 19.

EXTREMES, 1947-51.--Water temperatures (1949-51): Maximum, 86°F June 14, 23, 24, 1950; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on some days 1947-50.

Sediment loads: Maximum daily, 124,000 tons July 11, 1951; minimum daily, 0 ton on some days 1947-50.

REMARKS.--Flow affected by ice Dec. 3-8, 16-17, 20-23, 26-28, Jan. 2-14, 20, 24, Jan. 27 to Feb. 22, Mar. 9-14. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Temperature (°F) of water, water year October 1950 to September 1951
/Once-daily temperature measurement between 7 a.m. and 12 m./

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

a Reading obtained between 12:30 p.m. and 7 p.m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

PARADISE CREEK NEAR PARADISE, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1.3	--	e 1	3.5	--	--	4.6	--	--
2-----	788	6,850	s 18,200	3.5	--	--	4.6	3	--
3-----	952	4,680	s 11,400	3.5	--	--	4.0	--	--
4-----	85	2,610	s 682	3.2	374	--	3.5	--	--
5-----	42	1,280	145	3.0	--	--	3.0	--	--
6-----	28	420	29	3.2	--	--	1.5	--	--
7-----	16	170	7	3.5	95	--	2.0	--	--
8-----	9.0	145	3	3.6	--	--	4.0	--	--
9-----	7.5			3.8	--	--	6.0	31	--
10-----	6.0			3.5	--	--	5.5	--	--
11-----	6.0	138	2	4.0	38	--	5.5	--	--
12-----	5.4			3.5	--	--	5.5	--	--
13-----	5.4			3.5	--	--	5.7	--	--
14-----	4.9			4.0	--	--	6.0	--	--
15-----	4.6			4.0	12	--	5.4	--	--
16-----	4.0	50	1	4.0	--	e 1	5.0	32	(t)
17-----	3.5			4.0	20	--	4.0	--	--
18-----	3.5			4.0	10	--	4.3	--	--
19-----	3.5			4.0	--	--	4.6	--	--
20-----	3.5			3.8	--	--	4.5	--	--
21-----	4.0			3.5	--	--	4.5	--	--
22-----	4.0			3.5	41	--	4.5	--	--
23-----	4.0			3.5	--	--	4.5	10	--
24-----	3.8			3.8	--	--	4.6	--	--
25-----	3.8			3.8	--	--	4.9	--	--
26-----	3.5	71	e 1	3.8	66	--	4.5	--	--
27-----	3.8			4.0	--	--	4.5	--	--
28-----	3.5			4.0	--	--	4.5	--	--
29-----	3.8			4.0	--	--	4.6	--	--
30-----	3.5			4.3	--	--	5.2	12	--
31-----	3.5			--	--	--	5.2	--	--
Total-	2,018.3	--	30,503	111.3	--	30	140.7	--	7
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	5.4	--	--	1.0	--	--	5.4	--	--
2-----	4.0	--	--	1.5	--	--	8.0	--	--
3-----	3.0	--	--	2.0	--	--	12	--	--
4-----	3.5	--	--	2.5	--	--	11	30	--
5-----	3.5	--	--	2.5	109	--	7.0	116	--
6-----	3.0	--	--	3.0	61	--	5.4	--	--
7-----	3.0	--	--	3.0	--	--	5.4	--	--
8-----	3.0	--	--	3.5	--	--	4.6	--	--
9-----	3.0	--	--	4.0	63	--	2.5	--	--
10-----	3.0	--	--	4.0	--	--	2.5	68	--
11-----	3.2	--	--	4.5	130	--	2.5	--	--
12-----	3.5	--	--	4.5	--	e 1	2.5	--	--
13-----	3.5	116	--	4.0	--	--	2.5	--	--
14-----	3.5	--	--	4.0	--	--	3.0	--	e 1
15-----	5.7	--	--	3.5	--	--	4.6	--	--
16-----	6.5	--	e 1	3.5	--	--	6.5	--	--
17-----	6.5	--	--	4.0	30	--	7.0	36	--
18-----	7.0	49	--	4.0	--	--	3.8	--	--
19-----	6.0	--	--	4.5	--	--	4.3	--	--
20-----	5.0	70	--	4.5	--	--	5.2	57	--
21-----	4.6	--	--	5.9	--	--	3.8	--	--
22-----	3.5	--	--	6.0	--	--	4.6	--	--
23-----	3.2	--	--	7.5	--	e 1	4.3	--	--
24-----	3.0	--	--	10	51	1	3.2	--	--
25-----	3.8	--	--	12	--	e 2	3.2	47	--
26-----	4.3	--	--	19	--	e 5	3.8	--	--
27-----	4.0	71	--	17	--	e 2	3.8	--	--
28-----	3.5	--	--	9.5	--	e 1	18	--	e 20
29-----	3.0	--	--	--	--	--	74	--	e 500
30-----	3.0	--	--	--	--	--	31	--	e 30
31-----	2.5	--	--	--	--	--	19	--	e 6
Total-	123.2	--	31	154.9	--	34	274.4	--	585

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

KANSAS RIVER BASIN--Continued

PARADISE CREEK NEAR PARADISE, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	15	--	e 3	83	1,200	sa 320	56	680	s 107
2-----	14	52	2	31	320	27	299	7,850	s 7,480
3-----	11	--	e 1	25	270	18	480	6,050	s 8,390
4-----	8.5	--	e 1	21	170	10	108	2,460	717
5-----	7.0	--	e 1	19	180	9	61	910	150
6-----	53	--	e 200	19	230	12	433	--	e 9,800
7-----	22	400	sa 30	17	220	a 10	1,220	5,400	17,800
8-----	14	66	2	12	170	6	560	4,100	6,200
9-----	13	70	2	12	100	3	167	3,030	s 1,470
10-----	15	49	2	12	70	2	86	1,710	397
11-----	12	34	1	12	70	2	61	600	99
12-----	9.5	45	1	10	65	2	63	570	97
13-----	7.0	53	1	10	140	4	54	890	s 240
14-----	6.5	50	1	58	--	e 380	90	3,710	s 1,100
15-----	6.5	50	1	73	1,530	s 347	53	1,090	156
16-----	5.2	50	1	52	500	70	38	520	53
17-----	4.6	48	1	62	600	sa 110	30	340	28
18-----	4.3	60	1	50	420	57	23	320	20
19-----	3.5	38	(t)	37	210	21	19	280	14
20-----	22	--	e 240	41	400	sa 60	33	--	240
21-----	82	2,100	sa 520	517	13,000	sa 23,000	2,240	5,720	34,600
22-----	40	220	24	1,290	7,860	s 26,600	3,160	3,780	32,200
23-----	19	140	7	1,010	3,700	10,100	1,980	3,100	16,600
24-----	22	--	e 85	240	4,120	s 2,840	612	7,440	s 10,500
25-----	70	--	e 550	129	1,510	s 557	196	3,900	2,060
26-----	42	697	s 87	88	850	202	158	2,250	960
27-----	22	260	15	67	700	a 130	535	8,800	sa 15,000
28-----	19	410	21	59	460	73	810	6,100	13,300
29-----	16	150	6	66	--	e 220	262	4,000	2,830
30-----	40	1,200	sa 260	103	--	e 1,200	152	1,970	808
31-----	--	--	--	58	1,200	188	--	--	--
Total--	625.6	--	2,067	4,283	--	66,580	14,039	--	183,416

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	113	1,220	372	74	350	70	23	90	6
2-----	94	920	233	66	300	a 55	40	--	e 110
3-----	120	--	e 650	61	--	e 40	143	--	e 1,600
4-----	77	610	127	57	200	a 30	1,270	7,000	sa 22,000
5-----	62	550	92	53	180	26	654	4,000	7,060
6-----	61	400	66	50	280	38	148	2,340	935
7-----	53	370	53	49	--	e 40	98	2,400	sa 750
8-----	44	370	44	48	--	e 36	123	2,000	s 726
9-----	43	340	39	43	260	a 30	91	870	214
10-----	394	--	e 16,000	42	270	31	71	700	a 130
11-----	8,350	5,550	s 124,000	43	400	a 46	53	550	a 80
12-----	3,990	3,270	35,200	45	550	67	44	400	48
13-----	2,310	2,530	15,800	102	--	e 1,600	39	320	a 34
14-----	915	4,660	s 10,600	135	5,800	sa 2,300	36	280	a 28
15-----	448	4,100	4,960	62	1,030	172	35	240	23
16-----	302	3,000	2,450	48	1,020	132	34	180	17
17-----	226	1,940	1,180	39	300	32	32	140	a 12
18-----	190	1,490	764	33	270	24	29	120	a 9
19-----	163	1,160	510	30	410	33	26	100	7
20-----	141	860	327	29	270	21	26	85	6
21-----	120	890	288	28	240	a 18	24	80	5
22-----	781	9,350	s 21,500	28	230	17	23	80	5
23-----	620	5,630	s 10,000	27	190	14	24	62	5
24-----	188	2,500	1,270	28	150	11	23	80	5
25-----	136	900	330	26	150	10	22	77	5
26-----	118	600	a 190	26	180	13	21	65	a 4
27-----	106	550	a 157	26	160	11	19	33	2
28-----	93	460	a 120	26	140	9	21	38	2
29-----	84	380	86	24	140	9	20	40	2
30-----	198	1,500	sa 1,400	24	140	9	18	43	2
31-----	87	550	129	24	130	8	--	--	--
Total--	20,627	--	248,937	1,396	--	4,952	3,230	--	33,832

Total discharge for year (cfs-days)..... 47,023.4

Total load for year (tons)..... 570,974

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
PARADISE CREEK NEAR PARADISE, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	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. 2, 1950	2:45 p.m.	1,150	59	11,500	7,740	--	64	--	80	--	97	100	--	--	--	SPWCM
Oct. 2	3:45 p.m.	1,240	57	9,300	5,940	--	64	--	79	--	96	100	--	--	--	SPWCM
Oct. 2	5:15 p.m.	1,380	57	8,280	5,240	--	70	--	85	--	96	100	--	--	--	SPWCM
Oct. 2	7:10 p.m.	1,500	55	6,320	4,060	--	80	--	91	--	99	100	--	--	--	SPWCM
Oct. 2	11:20 p.m.	1,700	--	4,710	5,970	--	76	--	90	--	97	100	--	--	--	SPWCM
Oct. 3	2:10 a.m.	1,640	--	4,380	6,020	--	73	--	90	--	98	100	--	--	--	SPWCM
Oct. 3	6:15 a.m.	1,900	52	4,440	3,060	70	75	80	84	88	93	95	96	100	100	BWCM
Oct. 3	12:20 p.m.	1,090	55	4,290	2,850	69	74	80	86	91	95	96	98	100	100	BWCM
Oct. 3	6:45 p.m.	1,281	54	6,100	3,430	59	67	72	80	86	91	93	97	100	100	BWCM
May 21, 1951	4:30 p.m.	684	67	22,000	8,110	36	46	55	65	79	91	96	98	100	--	SPWCM
May 23	5:00 p.m.	907	--	3,200	4,520	--	54	--	72	--	96	100	--	--	--	SPWCM
June 3	10:15 a.m.	592	59	7,720	5,620	--	49	--	63	--	95	97	98	100	--	SPWCM
June 7	4:30 a.m.	1,560	61	5,460	3,960	--	67	--	81	--	98	99	100	--	--	SPWCM
June 8	7:45 p.m.	298	68	4,060	3,370	--	56	--	68	--	96	98	100	--	--	SPWCM
June 21	5:45 a.m.	3,540	63	4,700	3,590	--	66	--	83	--	96	97	100	--	--	SPWCM
June 21	7:15 p.m.	1,720	66	5,380	3,910	--	69	--	85	--	97	98	100	--	--	SPWCM
June 22	11:00 a.m.	3,270	66	4,270	2,900	--	77	--	87	--	98	100	--	--	--	SPWCM
June 22	2:35 p.m.	4,010	68	3,820	6,450	--	72	--	86	--	97	99	100	--	--	SPWCM
June 23	7:30 p.m.	1,540	69	3,020	2,080	--	64	--	69	--	91	94	96	100	--	SPWCM
June 28	10:00 a.m.	1,110	66	5,700	4,560	--	62	--	77	--	97	99	100	--	--	SPWCM
July 11	6:00 a.m.	12,400	65	6,590	4,930	--	60	--	74	--	89	92	94	98	100	SPWCM
July 11	6:45 a.m.	11,300	64	5,820	4,400	--	59	--	73	--	85	87	89	92	97	100
July 11	11:45 a.m.	9,220	66	4,780	3,420	--	59	--	72	--	88	91	94	100	--	SPWCM
July 12	2:20 p.m.	3,580	67	3,400	6,360	--	55	--	67	--	88	91	93	98	100	SPWCM
July 22	11:25 a.m.	1,000	--	13,200	8,360	--	37	--	54	--	96	100	--	--	--	SPWCM
July 22	6:35 p.m.	1,010	73	8,600	5,480	--	42	--	59	--	95	100	--	--	--	SPWCM
July 30	6:30 p.m.	4,520	76	8,520	2,820	--	58	--	78	--	99	100	--	--	--	SPWCM
Sept. 4	9:50 a.m.	1,820	64	8,230	4,370	--	50	--	67	--	96	100	--	--	--	SPWCM
Sept. 4	1:50 p.m.	1,560	--	6,470	11,800	--	51	--	70	--	97	100	--	--	--	SPWCM

KANSAS RIVER BASIN--Continued

SALINE RIVER NEAR WILSON, KANS.

LOCATION. --At gaging station at highway bridge, three-quarters of a mile upstream from Hell Creek and 8 miles northwest of Wilson, Ellsworth County.
DRAINAGE AREA. --1,900 square miles, approximately.
RECORDS AVAILABLE. --Chemical analyses: February 1948 to September 1951.

Water temperatures: March 1948 to April 1951.

EXTREMES, October 1950 to April 1951. --Dissolved solids: Maximum, 2,890 ppm Feb. 5; minimum, 304 ppm Oct. 4.

Hardness: Maximum, 766 ppm Feb. 3; minimum, 167 ppm Oct. 4; minimum daily, 421 micromhos Oct. 4.

Specific conductance: Maximum, 6,140 micromhos Jan. 30; minimum daily, 421 micromhos Oct. 4.
Freezing point on many days November to March.
EXTREMES, 1948-51. --Dissolved solids: Maximum, 2,890 ppm Feb. 5; minimum, 304 ppm Oct. 4.
Hardness: Maximum, 814 ppm Oct. 9, 1949; minimum, 167 ppm Oct. 1-3, 1948-1950.

Water temperatures: Maximum daily, 8.210 micromhos May 22, 24, 26, 28, 29, 1948; minimum daily, 332 micromhos Aug. 10, 1950.
Freezing point on many days during winter months.

REMARKS. --Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water, year October 1950 to September 1951.

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium		Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Per cent sodium	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH		
						Sodium (Na)	Parts per million								Residue at 180°C	Tons per acre-foot	Tons per day	Hardness							
																		Calcium, mg./nesium	Non-carbonate						
Oct. 1-2, 1950...	206	20	0.10	100	24	302	9.6	211	240	430	0.4	2.5	0.30	1,250	1,230	1.70	695	348	175	65	2,040	7.6	--	--	
Oct. 3	2,780	15	10	92	11	61	9.8	228	120	86	4	7	10	1,536	1,420	7.3	4,020	275	88	32	2,772	7.3	--	--	
Oct. 4	1,210	20	0.04	58	5.4	24	7.6	192	40	29	--	2.2	0.8	304	1,411	993	41	993	167	10	23	421	7.6	--	--
Oct. 6-31	1,128	26	0.04	147	33	410	13	290	340	585	3	3.8	30	1,740	1,700	2.37	601	502	264	63	2,740	7.7	--	--	
Oct. 16	118	19	0.02	150	41	521	311	390	733	2	4.5	5.1	26	2,070	2,020	2.82	660	566	310	67	3,380	7.8	0.001	0.001	
Oct. 31	89	14	0.02	152	50	557	292	410	798	4	2.6	6.6	--	2,240	2,130	3.05	538	584	345	67	3,570	7.8	0.001	0.001	
Nov. 1-30	83.2	17	0.20	167	49	584	12	333	430	820	4	4.2	30	2,300	2,250	3.13	515	618	345	67	3,600	7.8	--	--	
Dec. 1-31	71.0	20	10	182	49	614	9.6	369	455	830	4	6.0	0.30	2,370	2,350	3.22	454	654	351	67	3,700	7.8	--	--	
Dec. 4	66	11	0.08	162	50	612	449	345	849	6	4.6	6.6	--	2,330	2,300	3.21	421	610	324	69	3,800	7.7	0.000	0.000	
Jan. 1-31, 1951	63.7	17	0.1	201	43	574	9.4	382	400	850	5	9.1	26	2,450	2,280	3.33	423	680	367	64	3,850	7.9	--	--	
Jan. 3	40	15	0.04	176	45	543	352	405	770	4	5.6	6.6	--	2,170	2,130	2.95	234	622	333	65	3,560	7.9	0.002	0.002	
Feb. 1-28	82.4	17	0.1	183	50	536	9.2	368	385	785	4	8.5	28	2,290	2,160	3.11	507	664	362	63	3,600	7.8	--	--	
Feb. 5	64	18	0.06	209	59	547	747	439	508	1,060	4	5.9	--	2,890	2,820	3.93	489	766	406	68	4,680	7.5	0.000	0.000	
Mar. 1-Apr. 2	79.1	17	0.1	169	44	474	9.2	318	375	695	4	7.5	20	2,050	1,950	2.79	437	604	343	63	3,250	7.9	--	--	
Mar. 5	96	15	0.30	151	36	366	290	335	517	3	5.9	5.9	--	1,620	1,570	2.20	420	526	288	60	2,560	7.7	0.001	0.001	
Apr. 2	96	15	0.04	151	36	284	244	335	435	4	3.7	3.7	--	1,440	1,390	1.96	373	526	326	55	2,270	8.0	0.000	0.000	
Apr. 8-19	87.8	18	0.04	149	44	395	9.1	237	403	577	5	3.5	17	1,820	1,720	2.48	432	552	358	60	2,780	8.0	--	--	
Apr. 20	101	15	12	116	32	315	9.2	192	320	452	4	3.8	15	1,430	1,360	1.93	387	420	263	61	2,280	8.0	--	--	
Apr. 21	345	18	16	86	9.6	104	9.1	184	130	140	5	1.9	10	1,610	1,610	--	883	568	254	103	46	970	8.0	--	--
Apr. 22	285	16	0.08	139	27	215	11	172	300	340	4	5.6	11	1,140	1,140	1.69	887	460	319	50	1,840	8.0	--	--	
Apr. 24-30	175	17	0.06	123	27	188	9.8	211	263	271	5	4.8	11	1,090	1,010	1.47	510	419	246	49	1,650	7.7	--	--	
May 1	224	14	0.1	143	41	290	246	345	419	5	3.0	3.0	--	1,470	1,380	2.00	889	526	324	54	2,300	7.8	0.000	0.000	
May 23	5,890	21	0.02	64	8.9	33	4	39	4	7	0.5	3.7	--	328	328	--	45	5,220	196	57	27	516	7.3	--	--
June 5	743	15	0.05	109	16	94	189	180	137	4	4	5.6	--	736	736	--	1,000	336	181	38	1,080	7.8	0.000	0.000	
June 28	5,380	17	0.02	76	8.4	27	34	180	92	41	3	3.7	--	396	396	--	54	5,750	224	76	27	583	7.5	0.000	0.000
Aug. 1	6,779	20	0.04	145	27	244	270	279	346	6	2.8	2.8	--	1,270	1,200	1.73	2,330	473	252	53	2,010	7.6	0.000	0.000	
Sept. 5	9,700	15	0.02	61	4.9	35	161	59	39	2	3	3	--	336	336	--	42	8,070	172	40	31	506	7.5	0.000	0.000

KANSAS RIVER BASIN--Continued

SALINE RIVER NEAR WILSON, KANS.--Continued

Temperature (°F) of water, water year October 1950 to April 1951
 /Once-daily temperature measurement between 9 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	55	a38	35	a31	42	48					
2	61	53	36	33	32	a45	46					
3	56	43	33	a33	a33	39	50					
4	54	38	35	a34	33	41	52					
5	--	50	32	32	a34	43	53					
6	61	50	31	a32	33	a49	51					
7	62	a49	a32	32	32	40	48					
8	60	47	32	33	a32	34	42					
9	--	34	34	a33	a33	32	48					
10	--	a36	34	33	a38	36	48					
11	--	33	34	33	38	--	41					
12	57	a40	33	--	a32	32	40					
13	61	38	36	32	31	a32	a58					
14	62	44	35	33	31	33	a61					
15	--	51	34	a37	32	39	a52					
16	62	43	33	a41	32	45	a58					
17	--	a45	33	36	32	a41	a56					
18	--	a50	33	36	32	a40	52					
19	a65	a41	34	38	32	a46	a64					
20	--	34	32	32	a35	39	a49					
21	57	38	34	33	33	39	47					
22	55	40	36	a36	38	a55	51					
23	--	32	35	35	44	a51	--					
24	52	a32	36	32	49	41	--					
25	--	a34	37	a41	51	53	52					
26	--	a37	32	39	47	58	56					
27	--	34	32	32	43	a57	--					
28	--	a39	a33	32	a49	a42	71					
29	57	36	33	31	--	39	68					
30	55	36	32	32	--	43	--					
31	--	--	35	31	--	46	--					
Average	--	41	34	34	36	42	54					

a Freezing point on many days November to March. Reading obtained between 1 p. m. and 5 p. m.

KANSAS RIVER BASIN--Continued

SALINE RIVER AT TESCOTT, KANS.

LOCATION.--At gaging station at highway bridge, half a mile south of Tescott, Ottawa County, and half a mile upstream from Dry Creek.

DRAINAGE AREA.--2,820 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1951.

Water temperatures: April 1950 to September 1951.

Hardness: Maximum, 600 ppm Dec. 1-31; minimum, 126 ppm June 8-10.

Specific conductance: Maximum daily, 3,770 micromhos Dec. 16; minimum daily, 253 micromhos June 8.

Water temperatures: Maximum, 82.8 July 21; minimum, freezing point, on many days during December to March.

EXTREMES, April 1950 to September 1951.--Dissolved solids: Maximum, 4,650 ppm Apr. 4 to May 5, 1950; minimum, 170 ppm June 8-10, 1951.

Hardness: Maximum, 610 ppm May 5, 1950; minimum, 120 ppm July 20, 1950.

Specific conductance: Maximum daily, 4,940 micromhos May 6, 82°F July 21, 1951; minimum, freezing point, on many days during winter months.

Water temperatures: April 1950 to September 1951: Maximum, 82°F July 21, 1951; minimum, freezing point, on many days during winter months.

REMARKS.--Ball samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Nite- rate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Per- cent sodium carbon- ate	Specific conduct- ance (micro- mhos at 25°C)	pH	Col- or	
														Parts per mil- lion	Sum	Tons per acre- foot	Calcium, per magnesium	Non-carbon- ate					
Oct. 1, 1950 ...	197	22	0.04	131	35	439	9.6	294	325	618	0.4	3.9	0.20	1,790	1,730	2.43	592	471	230	66	2,950	7.7	11
Oct. 2 ...	2,560	19	1.10	101	16	171	7.2	284	128	236	--	.6	.16	850	--	1.16	5,880	318	85	53	1,350	7.4	15
Oct. 3 ...	3,680	15	.16	61	5.0	34	7.6	202	31	45	.6	2.3	.04	314	--	.43	3,120	173	7	29	443	7.3	15
Oct. 4-6 ...	1,750	20	.20	74	11	109	7.7	185	110	135	.3	1.2	.10	574	--	.78	2,710	228	76	50	922	7.4	10
Oct. 7-31 ...	221	28	.04	127	26	284	11	302	245	405	.3	5.4	.10	1,300	1,280	1.77	776	424	176	59	2,070	7.8	10
Nov. 1-30 ...	136	20	.04	160	46	502	11	384	375	690	.3	4.4	.20	2,020	2,000	2.75	742	568	273	64	3,180	7.8	5
Dec. 1-31 ...	118	20	.10	166	45	468	11	390	375	660	.3	6.7	.20	2,000	1,940	2.72	637	600	280	82	3,140	7.7	5
Jan. 1-Feb. 5, 1951	104	17	.01	172	41	448	7.2	384	330	650	.3	7.2	.23	1,960	1,860	2.67	550	596	281	82	2,930	7.9	5
Feb. 12-Mar. 11	119	17	.01	169	33	416	5.8	350	330	590	.4	7.7	.25	1,790	1,740	2.43	575	566	269	62	3,180	7.9	10
Mar. 12-Apr. 2	102	16	.01	163	29	424	7.8	308	300	630	.4	5.8	.22	1,650	1,730	2.52	509	524	271	63	3,020	7.9	10
Apr. 3-20 ...	128	18	.05	121	39	338	8.2	198	358	480	.7	4.1	.23	1,530	1,470	2.08	529	464	302	61	2,380	8.0	6
Apr. 21 ...	909	16	.20	96	8.4	77	9.0	234	108	102	.2	.9	.10	596	--	.81	1,460	274	82	37	778	7.5	13
Apr. 22 ...	1,350	18	.18	91	8.7	99	9.2	232	114	130	.1	1.8	.09	588	--	.80	2,140	263	73	44	915	7.4	9
Apr. 23 ...	730	17	.20	86	7.8	84	9.8	222	86	112	.1	4.2	.06	518	--	.70	1,020	247	65	41	815	7.6	14
Apr. 24-May 16	345	17	.10	113	15	88	8.3	218	163	126	.4	6.2	.10	728	--	.99	678	342	163	35	1,070	8.1	7
May 17 ...	952	14	.06	85	14	135	7.9	140	158	189	.4	5.9	.10	722	--	.98	1,860	270	155	51	1,170	7.6	10
May 18 ...	1,360	17	.04	78	13	112	8.9	180	118	149	.3	5.9	.09	606	--	.82	2,230	248	100	48	978	7.7	10
May 22-25 ...	3,875	16	.20	64	8.4	29	6.4	147	86	40	.4	3.4	.04	350	--	.48	3,680	194	73	24	525	8.0	25
May 26-28 ...	4,870	20	.04	64	7.0	32	9.6	146	77	42	.4	5.7	.07	388	--	.53	5,100	189	69	26	511	7.7	9

KANSAS RIVER BASIN--Continued

SALINE RIVER AT TESCOTT, KANS.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1951--continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved Solids (residue after evaporation)			Hardness as CaCO ₃		Per- cent so- dium	Specific conductance (micro-mhos at 25°C)	pH	Col- or		
														Parts per million	Sum	Tons per acre-foot	Tons per day	Calcium, mag- nesium					Non-carbon- ate	
June 2, 1951.....	2,120	17	0.02	88	6.4	70	8.8	162	116	97	0.3	9.7	0.08	590	--	0.80	3,380	246	113	37	803	7.9	13	
June 3-5.....	2,713	34	.10	56	13	48	9.0	222	106	13	.4	1.9	.11	414	--	.56	3,030	194	12	34	566	8.1	29	
June 3 a.....	3,590	16	.10	58	5.7	39	7.4	134	66	51	.3	7.8	.05	380	--	.49	3,490	168	58	32	516	8.1	23	
June 6.....	2,180	23	.04	71	12	32	8.4	198	78	36	.3	1.4	.09	384	--	.50	2,140	228	66	23	540	7.5	7	
June 7.....	6,500	16	.04	46	5.1	12	6.3	148	20	11	.2	6.5	.03	196	--	.27	3,440	136	15	15	310	7.6	6	
June 8-10.....	9,533	15	.04	45	3.3	7.8	5.8	144	15	7.0	.3	1.2	.03	170	--	.23	4,380	126	8	11	253	7.5	7	
June 11-12.....	6,940	22	.04	72	8.9	24	8.0	170	83	30	.3	4.0	.01	352	--	.48	6,600	216	77	19	524	7.5	7	
June 13-21.....	3,674	21	.02	75	8.5	38	7.8	184	89	50	.6	4.8	.10	398	--	.54	3,950	222	71	26	623	7.8	7	
June 22-28.....	13,430	16	.02	54	4.0	15	7.0	146	41	23	.4	2.9	.08	246	--	.33	8,920	151	31	17	394	7.6	8	
June 29-July 5.....	6,564	19	.02	70	7.2	32	8.5	172	79	39	.4	3.9	.08	350	--	.48	6,200	204	63	24	540	7.7	7	
July 6-10.....	2,544	22	.02	125	17	112	9.8	257	193	151	.4	8.4	.13	800	--	1.09	5,500	381	170	38	1,230	7.9	6	
July 15.....	10,300	15	.02	123	4.9	14	7.2	131	55	20	.4	3.2	.10	246	--	.33	6,840	152	45	16	392	7.4	6	
July 18-19.....	3,900	20	.02	122	13	70	8.8	259	166	91	.4	12	.12	666	--	.91	7,010	360	148	29	1,010	7.8	6	
July 20-Aug. 14.....	1,423	23	.02	127	19	148	10	254	217	204	.6	13	.24	918	--	1.25	3,530	396	188	44	1,440	8.0	6	
Aug. 19-Sept. 3.....	608	19	.02	127	22	210	9.5	269	231	300	.4	12	.15	1,100	1,060	1.50	1,800	408	187	52	1,770	8.1	5	
Sept. 4-12.....	5,318	17	.02	58	5.0	35	7.6	139	67	45	.3	7.0	.09	319	--	.43	4,580	165	51	30	512	8.0	13	
Sept. 13-30.....	809	--	--	176	25	218	9.1	--	275	295	--	.2	--	--	--	--	--	541	--	46	--	--	--	--
Weighted average b.....	1,328	19	0.04	80	10	73	8.0	191	107	100	0.4	5.1	0.10	509	--	0.69	1,830	241	84	39	793	--	--	

a Not included in weighted average.

b Includes estimates where data are missing. Represents 78 percent of runoff for water year October 1950 to September 1951.

KANSAS RIVER BASIN--Continued

SALINE RIVER AT TESCOTT, KANS.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement, 8 a. m. and 10 a. m./

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

a Measurement made between 11 a. m. and 2 p. m.

KANSAS RIVER BASIN--Continued

NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 6 a. m. and 9 a. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	63	a 58	37	35	32	35	40	55	65	64	77	70
2	56	47	35	--	32	41	43	52	55	65	75	67
3	50	41	--	33	--	33	40	55	55	70	75	67
4	49	37	--	--	--	35	44	55	55	70	70	64
5	57	43	33	--	--	36	48	55	61	69	76	68
6	58	45	--	--	--	37	a 46	51	63	70	76	65
7	57	47	32	--	32	33	43	47	62	72	75	77
8	53	46	--	--	33	--	40	55	61	72	77	65
9	52	33	--	--	33	--	40	60	65	70	75	67
10	56	34	--	--	35	a 35	40	55	66	68	70	62
11	56	35	--	--	37	--	38	58	63	66	74	70
12	52	37	--	--	33	32	36	56	61	62	72	62
13	55	35	--	--	32	32	46	58	67	64	70	58
14	58	40	--	--	--	35	45	60	67	68	74	80
15	58	42	--	--	--	35	42	62	70	72	78	58
16	60	38	--	34	--	36	38	63	62	75	58	82
17	56	38	33	35	--	39	43	68	79	69	70	55
18	60	38	--	36	--	35	49	63	74	73	72	58
19	57	39	--	35	34	--	45	62	70	74	70	60
20	54	34	--	--	36	35	48	65	70	77	75	61
21	54	42	36	--	34	34	42	65	67	75	68	60
22	50	39	36	--	37	43	44	63	63	66	65	52
23	48	--	36	36	43	48	48	62	66	68	64	45
24	48	--	36	35	48	48	54	64	66	70	70	52
25	47	--	34	35	48	43	49	67	70	75	72	62
26	56	--	--	35	38	42	47	63	70	75	65	58
27	50	35	--	32	40	50	57	63	70	72	70	53
28	50	35	--	32	43	a 45	60	62	66	79	72	50
29	51	34	--	32	--	37	62	68	65	73	80	52
30	49	35	--	33	--	37	61	66	65	75	72	60
31	52	--	37	32	--	40	--	68	--	75	75	--
Average	54	b 38	b 33	b 33	b 35	38	46	60	65	71	72	61

a Reading obtained between 10 a. m. and 5 p. m.

b Includes assumed 32° for missing days.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA
KANSAS RIVER BASIN--Continued
NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	61	112	18	40			49		
2-----	67	192	35	38			47		
3-----	85	e 500	37	37			30		
4-----	95	1,600	sa 460	37			35		
5-----	72	520	101	37	26	3	25	24	2
6-----	64	310	54	38			15		
7-----	58	235	37	38			13	60	3
8-----	52	199	28	38			15		
9-----	50	183	25	37			30		
10-----	49	182	24	34	91	9	35		
11-----	49	167	22	36			40		
12-----	46	145	18	38			40		
13-----	45	143	17	41			40		
14-----	45	140	17	40	43	4	45		
15-----	45	94	11	40			45		
16-----	45	88	11	38			40		
17-----	45	91	11	39			40	46	5
18-----	42			39			40		
19-----	42			40			40		
20-----	42	59	7	39			40		
21-----	42			39			46		
22-----	42			41	33	3	47	37	5
23-----	42			40			48		
24-----	42			30			54		
25-----	42	144	16	35			50		
26-----	42			40			45		
27-----	42			45			40	27	3
28-----	41			47			40		
29-----	41	39	4	47	37	5	40		
30-----	41			49			40		
31-----	42			--	--	--	42	34	4
Total-	1,558	--	1,520	1,177	--	134	1,196	--	119
Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1-----	40			20			89	3,500	a 850
2-----	35	34	3	25	34	2	66	910	162
3-----	35			30			46	560	70
4-----	35			30	27	2	35	368	37
5-----	30			30			29	240	19
6-----	30	60	5	25			26		
7-----	30			20			22		
8-----	35			20	11	1	20	199	11
9-----	35			25			15		
10-----	40			40			21		
11-----	40	53	6	60			10		
12-----	45			64			20		
13-----	45			45	46	6	20	124	7
14-----	50			40			24		
15-----	60			40			27		
16-----	60	24	4	45			32		
17-----	56			45			32		
18-----	48			45	44	6	28	146	11
19-----	49			58			24		
20-----	30			61			26		
21-----	35	25	3	65	95	a 17	24		
22-----	40			64	109	19	24		
23-----	44			53	94	13	23	102	6
24-----	38			48	69	9	20		
25-----	41			48	69	9	18		
26-----	40	30	3	47	51	6	18		
27-----	25			46	40	5	19	76	5
28-----	20			53	360	a 50	29		
29-----	20			--	--	--	33		
30-----	20	34	2	--	--	--	33		
31-----	20			--	--	--	30	52	4
Total-	1,171	--	120	1,192	--	203	883	--	1,340

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	26	52	4	40	281	30	551	5,600	sa 12,000
2-----	20	40	2	34	220	a 20	228	3,600	a 2,800
3-----	21	21	1	33	143	13	155	1,990	s 883
4-----	21			31	112	9	106	560	180
5-----	25			31	92	8	93	410	103
6-----	35	34	3	30	81	6	823	4,910	s 12,700
7-----	38			30	76	6	1,940	6,610	35,700
8-----	33			29	97	8	3,240	9,500	63,100
9-----	29	19	2	40	--	e 55	1,980	9,100	sa 50,000
10-----	30			37	580	58	464	4,350	s 5,610
11-----	33			32	240	a 20	281	--	e 1,800
12-----	33	7	1	31	127	11	255	--	e 2,700
13-----	32			31	110	9	518	6,900	sa 11,000
14-----	31			33	70	6	902	7,450	18,100
15-----	28	16	1	125	--	e 3,100	663	5,200	a 9,300
16-----	25			90	4,280	s 1,140	886	--	e 23,000
17-----	25	16	1	87	1,880	442	1,060	8,900	s 27,100
18-----	24	18	1	74	1,610	322	431	3,360	a 4,070
19-----	24	20	1	94	2,300	a 600	293	1,980	1,570
20-----	27	26	2	72	2,210	430	235	1,370	869
21-----	32	21	2	565	9,290	s 17,200	1,390	7,980	s 31,000
22-----	86	1,400	sa 360	2,430	10,400	s 66,200	8,610	9,120	s 184,000
23-----	75	1,180	239	1,570	11,600	49,200	8,300	5,900	132,000
24-----	60	670	108	778	7,650	16,100	3,660	7,210	71,200
25-----	48	710	92	345	4,700	a 4,400	2,220	5,880	35,200
26-----	41	390	43	199	1,940	1,040	780	4,190	8,820
27-----	41	303	34	201	--	e 1,800	539	2,350	3,420
28-----	46	400	a 50	174	3,370	1,580	385	1,000	a 1,000
29-----	42	273	31	138	2,390	890	428	--	e 1,900
30-----	50	576	s 83	112	1,010	305	360	--	e 1,700
31-----	--	--	--	223	--	e 5,400	--	--	--
Total--	1,081	--	1,081	7,739	--	170,408	41,836	--	772,805
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	238	970	623	292	760	599	124	240	80
2-----	236	650	414	252	425	289	130	305	107
3-----	200	630	340	214	369	213	203	1,000	s 807
4-----	382	4,910	s 6,050	201	348	189	3,070	10,800	89,500
5-----	198	2,000	1,070	197	325	173	3,270	9,250	81,700
6-----	150	910	368	189	316	161	1,130	5,610	s 18,400
7-----	111	660	198	185	312	156	962	--	e 17,000
8-----	130	520	182	182	315	155	2,040	6,600	35,800
9-----	124	500	167	258	--	e 3,000	1,040	5,280	14,800
10-----	431	--	e 11,000	365	--	e 5,100	615	3,290	5,460
11-----	10,800	4,310	s 119,000	473	4,200	a 5,400	385	1,790	1,860
12-----	12,000	4,190	136,000	365	2,590	2,550	285	870	669
13-----	10,700	5,710	165,000	1,820	7,800	s 42,700	221	590	352
14-----	4,960	5,310	71,100	1,990	8,660	46,500	190	593	304
15-----	3,010	4,730	38,400	1,080	6,630	s 20,700	172	370	172
16-----	1,140	3,490	10,700	449	2,610	3,160	160	343	148
17-----	674	2,150	3,910	350	1,050	992	151	342	139
18-----	626	1,450	2,450	268	650	470	145	293	115
19-----	526	1,160	1,650	214	590	341	139	249	93
20-----	438	740	875	182	450	221	136	245	90
21-----	396	600	641	166	426	191	130	211	74
22-----	1,840	5,240	s 31,000	154	422	175	123	185	61
23-----	1,690	7,850	35,800	144	370	144	120	168	54
24-----	1,380	6,200	23,100	144	500	a 190	120	159	52
25-----	1,130	4,680	14,300	144	500	a 190	120	147	48
26-----	580	2,200	3,440	140	400	151	119	137	44
27-----	418	1,150	1,300	136	325	119	113	118	36
28-----	559	--	e 8,500	134	310	112	111	95	28
29-----	408	3,100	3,410	133	259	93	110	92	27
30-----	305	630	519	130	215	75	111	69	21
31-----	295	470	374	126	210	71	--	--	--
Total--	56,075	--	691,881	11,077	--	134,580	15,745	--	268,041

Total discharge for year (cfs-days) 140,730

Total load for year (tons) 2,042,232

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued
NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.--Continued

Particle-size analyses of suspended sediment, April to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Apr. 22, 1951	8:45 a. m.	128	44	2,100	1,400	--	68	--	90	--	95	100	--	SPWCM	
May 21	7:30 a. m.	775	65	13,000	6,480	--	59	--	80	--	98	98	100	SPWCM	
May 21	11:15 p. m.	1,450	--	13,600	5,720	--	50	--	68	--	99	100	--	SPWCM	
May 22	3:30 a. m.	4,990	60	9,030	6,000	--	51	--	67	--	82	82	88	SPWCM	
May 22	5:00 p. m.	1,890	65	14,600	8,970	--	48	--	67	--	97	98	100	SPWCM	
May 22	7:05 p. m.	1,780	65	13,600	7,090	51	54	65	74	86	97	98	100	SPWCM	
May 23	7:05 p. m.	1,780	65	13,600	6,580	3	9	51	70	86	96	97	100	SPN	
May 23	2:25 p. m.	1,690	66	11,600	4,710	55	60	68	75	87	97	98	100	SPWCM	
May 23	2:25 p. m.	1,690	66	11,600	4,370	9	21	57	71	87	95	97	100	SPN	
May 23	4:25 p. m.	1,470	67	11,500	8,670	--	55	--	73	--	95	95	99	SPWCM	
May 28	12:40 p. m.	171	69	3,210	7,750	--	78	--	94	--	99	100	--	SPWCM	
June 1	7:25 a. m.	733	65	6,550	5,340	--	60	--	81	--	99	100	--	SPWCM	
June 1	11:35 a. m.	416	--	5,290	5,340	--	65	--	81	--	99	100	--	SPWCM	
June 7	12:50 a. m.	2,030	--	6,100	9,690	--	55	--	72	--	93	94	95	SPWCM	
June 8	6:20 p. m.	5,000	--	8,620	6,030	--	59	--	74	--	95	96	97	SPWCM	
June 13	4:15 p. m.	628	73	8,810	5,590	62	69	79	85	92	98	98	100	SPWCM	
June 13	4:15 p. m.	628	73	8,810	5,270	7	11	68	87	96	97	98	100	SPN	
June 16	2:35 a. m.	712	--	5,850	5,030	--	62	--	83	--	97	--	--	SPWCM	
June 21	10:50 a. m.	1,550	--	4,340	7,630	--	56	--	72	--	93	94	96	SPWCM	
June 22	--	10,900	--	7,890	5,910	--	62	--	82	--	99	100	--	SPWCM	
June 22	4:05 p. m.	8,260	--	5,580	4,630	--	74	--	90	--	97	100	--	SPWCM	
June 22	11:05 p. m.	10,300	--	6,310	3,780	--	79	--	92	--	99	100	--	SPWCM	
June 24	1:50 a. m.	5,428	--	6,130	4,610	--	68	--	81	--	94	95	96	SPWCM	
June 25	6:50 a. m.	2,520	70	6,300	2,170	--	50	--	62	--	91	--	--	SPWCM	
July 13	7:10 p. m.	8,720	74	5,660	3,830	--	68	--	86	--	97	100	--	SPWCM	

July 22, 1951 ...	2,600	72	7,240	4,630	--	42	--	63	--	83	--	--	--	SPWCM
July 23 ...	2,630	70	7,320	4,480	--	42	--	63	--	90	--	--	--	SPWCM
Aug. 13 ...	2,950	74	9,800	3,900	39	50	58	70	84	97	100	--	--	SPWCM
Aug. 13 ...	2,950	74	9,800	3,900	5	14	53	69	84	96	96	100	--	SPN
Aug. 14 ...	2,770	80	10,300	7,190	--	53	--	71	--	95	--	--	--	SPWCM
Sept. 4 ...	3,220	65	9,660	5,570	--	53	--	71	--	91	--	--	--	SPWCM
Sept. 4 ...	3,580	65	9,680	6,680	--	52	--	72	--	94	--	--	--	SPWCM
Sept. 4 ...	3,830	64	10,200	3,900	47	61	69	77	87	94	95	100	--	SPWCM
Sept. 4 ...	3,830	64	10,200	3,890	6	17	82	75	86	94	95	100	--	SPN
Sept. 5 ...	4,150	68	10,100	6,110	--	54	--	69	--	89	90	93	100	SPWCM
Sept. 5 ...	3,410	66	8,600	3,600	49	57	87	74	84	94	94	96	100	SPWCM
Sept. 5 ...	3,410	66	8,600	3,740	16	43	64	71	83	95	95	97	100	SPN
Sept. 8 ...	2,270	65	6,580	3,900	--	44	--	57	--	93	94	96	100	SPWCM

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, approximately.

RECORDS AVAILABLE.--Water temperatures: June 1946 to July 1951 (discontinued).

EXTREMES, October 1950 to July 1951.--Water temperatures: Maximum, 81°F June 17; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 8,750 ppm May 21; minimum daily, not determined.

Sediment loads: Maximum daily, 1,020,000 tons July 12; minimum daily, not determined.

EXTREMES, 1946-51.--Water temperatures (1949-51): Maximum, 89°F July 9, 1950; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 1,020,000 tons July 12, 1951; minimum daily, less than 1 ton on many days during 1946-50.

REMARKS.--Flow affected by ice Dec. 5-21, Dec. 29 to Jan. 15, Jan. 23 to Feb. 21, Mar. 8-20. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, July 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carb. borate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate		
July 13, 1951	30,900	19	0.10	45	4.3	9.0	148	22	2.0	0.3	1.0	187	0.25	130	9	13	285				7.5

KANSAS RIVER BASIN--Continued

SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Temperature (°F) of water, October 1950 to July 1951
 /Once-daily temperature measurement between 2 p.m. and 9 p.m. 7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	56	37	32	--	43	52	67	72	--		
2	57	51	a33	32	a36	42	53	67	a57	a68		
3	56	44	37	32	--	--	55	69	a59	a72		
4	53	a39	35	32	36	44	55	72	--	a71		
5	--	52	33	--	a33	53	52	69	a63	a71		
6	68	49	--	33	a33	46	47	--	63	a73		
7	63	52	--	--	32	--	a47	--	a64	--		
8	60	45	38	--	32	36	52	70	70	a76		
9	62	a34	34	--	37	--	a49	66	68	--		
10	60	a34	a35	--	--	--	a47	70	--	a69		
11	65	38	--	--	--	a32	44	--	a68	a65		
12	--	42	35	--	33	33	49	65	a63	64		
13	67	42	34	--	a33	a32	--	a69	73	a65		
14	68	46	--	--	32	--	59	a61	76	--		
15	63	50	33	--	33	43	55	a63	a73	--		
16	67	41	34	--	33	47	56	--	a72	--		
17	68	--	32	--	34	38	62	a65	81	--		
18	a57	45	35	--	35	a34	--	67	76	77		
19	--	37	34	--	34	41	59	a63	a73	--		
20	a59	38	33	--	34	a35	49	a66	a73	--		
21	69	43	35	--	a35	50	49	67	a67	--		
22	--	45	37	--	--	57	--	65	a60	--		
23	57	33	38	--	--	a47	59	a60	--	--		
24	55	34	39	--	46	--	59	a67	a68	--		
25	57	32	43	--	46	59	54	a67	a69	--		
26	54	38	32	--	52	60	--	a68	a73	--		
27	60	38	33	32	49	57	73	a67	75	--		
28	a52	a36	35	32	a44	43	77	69	a70	--		
29	59	--	36	32	--	a39	--	a68	a68	--		
30	61	38	36	32	--	52	65	--	--	--		
31	67	--	37	--	--	54	--	a74	--	--		
Average	61	42	35	--	--	45	55	67	69	--		

a Reading obtained at or before 12 m.

KANSAS RIVER BASIN--Continued

SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Suspended sediment, October 1950 to July 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	78	--	e 340	37			38		
2-----	319	--	e 4,000	36			37		
3-----	242	3,320	s 2,580	36			27	17	1
4-----	114	685	s 220	35			25		
5-----	93	190	a 48	37			10		
6-----	80	138	30	38	14	1	20		
7-----	69	109	20	39			20		
8-----	61	86	14	40			10	46	2
9-----	55	73	11	37			10		
10-----	53	71	10	31			12		
11-----	50			31			15		
12-----	48			33			20		
13-----	46			34	30	3	25		
14-----	45	42	5	43			40	44	4
15-----	44			45			50		
16-----	43			41			55		
17-----	42			42			55		
18-----	40			41			54		
19-----	39			42			55		
20-----	37	32	3	39			60	32	5
21-----	37			37			60		
22-----	36			38			59		
23-----	36			36	11	1	61		
24-----	37			21			66		
25-----	37			26			64	27	5
26-----	38			30			61		
27-----	38	20	2	32			50		
28-----	39			36			33		
29-----	37			42			30	18	2
30-----	37			40			25		
31-----	37			--	--	--	25		
Total-	2,007	--	7,339	1,095	--	40	1,172	--	98
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	20			15			115	--	e 320
2-----	20			15			106	510	146
3-----	20			15			88	370	88
4-----	20			15			74	205	41
5-----	20	48	3	15			71	186	36
6-----	20			15	43	2	67		
7-----	25			15			61		
8-----	25			15			55		
9-----	30			15			40	104	13
10-----	31			15			35		
11-----	35	7	1	20	140	a 8	20		
12-----	38			40	--	e 46	25		
13-----	38			35	120	a 11	30		
14-----	38			30	140	a 11	35		
15-----	40	17	2	25	50	3	40	141	15
16-----	55			25			45		
17-----	74			30			60		
18-----	95	140	a 36	30	63	5	40	155	17
19-----	123	160	a 55	35			45	160	19
20-----	84	80	18	100	260	a 70	45	130	16
21-----	61	30	5	130	400	a 140	47	108	14
22-----	40	20	2	93	--	e 60	48		
23-----	35	35	3	79	--	e 34	47		
24-----	35	50	5	78	120	25	41		
25-----	30	50	4	78	89	19	40	137	15
26-----	35	65	6	78	86	18	37		
27-----	30			76	86	18	38		
28-----	30			121	--	e 550	56		
29-----	25	31	2	--	--	--	81		
30-----	20			--	--	--	81	146	29
31-----	20			--	--	--	76		
Total-	1,212	--	180	1,253	--	1,053	1,689	--	1,071

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Suspended sediment, October 1950 to July 1951--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	84	146	25	90	270	66	370	--	e 2,100
2-----	56	78	12	67	130	24	810	4,600	sa 10,000
3-----	53	70	10	58	92	14	482	2,020	2,630
4-----	48	75	a 10	48	75	10	300	--	e 900
5-----	53	75	11	44	69	8	247	--	e 750
6-----	76	250	a 50	41	73	8	1,370	5,500	s 21,200
7-----	86	140	32	38	65	a 7	7,950	5,860	s 130,000
8-----	90	95	23	38	42	4	4,290	4,940	57,200
9-----	74	75	15	41	31	3	2,190	4,160	s 25,300
10-----	71	78	15	41	23	2	1,080	--	e 7,400
11-----	69	63	12	38	25	2	1,100	--	e 6,500
12-----	67	45	8	38	38	4	1,780	6,700	a 32,000
13-----	69	55	a 10	38	38	4	1,430	5,980	23,100
14-----	64	63	11	40	27	3	2,500	5,200	s 45,900
15-----	58	51	8	44	33	4	3,060	6,030	s 52,200
16-----	53	50	7	76	--	e 800	915	4,320	10,700
17-----	50	61	8	206	4,800	a 2,700	632	2,060	3,510
18-----	50	55	a 7	259	4,940	s 3,570	503	1,120	1,520
19-----	48	44	6	170	2,990	1,370	454	890	1,090
20-----	52	50	7	208	1,600	sa 650	408	820	903
21-----	56	39	6	2,590	8,750	61,200	820	3,200	sa 13,000
22-----	69	--	e 80	11,600	7,850	246,000	13,100	6,790	240,000
23-----	142	--	e 460	5,340	6,300	s 92,200	13,900	6,500	s 263,000
24-----	100	650	175	1,220	5,170	s 17,800	3,700	5,840	58,300
25-----	88	400	95	781	2,960	6,240	1,690	5,560	25,400
26-----	83	220	a 50	574	1,710	2,650	1,100	5,300	a 16,000
27-----	74	132	26	465	1,160	1,460	1,650	6,300	sa 30,000
28-----	176	98	20	408	810	892	4,700	5,890	s 77,000
29-----	104	210	a 60	382	1,100	1,130	3,270	5,140	s 46,900
30-----	104	240	a 65	350	650	a 600	1,540	3,700	a 15,000
31-----	--	--	--	314	390	331	--	--	--
Total--	2,147	--	1,324	25,647	--	439,756	77,341	--	1,219,503
	July			August			September		
1-----	950	2,900	a 7,400						
2-----	750	1,920	3,890						
3-----	700	1,120	2,120						
4-----	850	--	e 17,000						
5-----	634	5,100	a 8,700						
6-----	522	1,300	1,830						
7-----	448	670	810						
8-----	730	--	e 10,000						
9-----	1,040	5,800	sa 17,000						
10-----	1,920	--	e 28,000						
11-----	17,000	5,430	s 256,000						
12-----	52,900	6,730	sa 1,020,000						
13-----	19,900	6,200	sa 380,000						
14-----	3,540	3,400	a 32,000						
15-----	2,370	--	e 13,000						
16-----	1,850	--	e 6,500						
17-----	1,500	--	e 4,500						
18-----	1,260	1,100	a 3,700						
19-----	--	--	--						
20-----	--	--	--						
21-----	--	--	--						
22-----	--	--	--						
23-----	--	--	--						
24-----	--	--	--						
25-----	--	--	--						
26-----	--	--	--						
27-----	--	--	--						
28-----	--	--	--						
29-----	--	--	--						
30-----	--	--	--						
31-----	--	--	--						
Total--	108,864	--	1,812,450						

Total discharge for period Oct. 1, 1950, to July 18, 1951 (cfs-days) 222,427

Total load for period Oct. 1, 1950, to July 18, 1951 (tons) 3,482,814

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Particle-size analyses of suspended sediment, May to July 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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	0.350	0.500		1.000
May 18, 1951	7:10 a. m.	301	65	5,420	5,000	--	73	--	--	90	--	99	100	--	--	SPWCM
May 21	5:30 a. m.	2,360	62	13,000	9,800	--	46	--	67	--	97	100	--	--	99	SPWCM
May 21	12:00 m.	3,620	62	6,090	4,740	--	70	--	89	--	97	98	--	98	99	SPWCM
May 22	5:45 a. m.	9,670	62	8,980	8,140	--	59	--	--	--	80	100	--	98	--	SPWCM
May 22	10:30 a. m.	11,500	62	6,340	5,000	--	--	--	--	83	--	98	100	--	--	SPWCM
May 22	6:50 p. m.	14,600	65	8,800	5,380	60	72	81	88	96	99	100	--	--	--	SPWCM
May 22	6:50 p. m.	14,600	65	8,800	5,170	10	57	74	89	95	99	100	--	--	--	SPN
May 22	8:50 p. m.	18,200	--	9,360	7,040	54	71	82	90	96	99	99	99	100	100	SPWCM
May 22	8:50 p. m.	18,200	--	9,360	7,340	7	12	71	88	96	98	99	100	--	--	SPN
May 23	5:30 a. m.	7,430	60	6,740	4,830	--	72	--	--	88	--	99	100	--	--	SPWCM
May 23	3:35 p. m.	2,680	--	5,410	5,900	--	64	--	--	83	--	99	99	100	--	SPWCM
June 7	8:55 a. m.	7,410	64	4,180	4,210	--	75	--	--	91	--	98	99	99	100	SPWCM
June 7	7:00 p. m.	12,200	--	7,460	5,410	--	68	--	86	--	99	100	--	--	--	SPWCM
June 8	5:15 a. m.	4,760	--	5,480	2,970	--	74	--	--	93	--	100	--	--	--	SPWCM
June 12	6:20 a. m.	2,680	63	6,900	4,720	--	69	--	87	--	--	98	100	--	--	SPWCM
June 15	1:35 a. m.	7,450	--	7,060	5,540	--	75	--	--	91	--	99	99	100	--	SPWCM
June 22	11:10 a. m.	16,400	60	7,420	7,710	--	64	--	--	87	--	99	100	--	--	SPWCM
June 23	2:05 a. m.	26,200	--	7,940	6,350	--	69	--	87	--	99	--	--	--	--	SPWCM
June 23	2:00 p. m.	23,500	--	7,100	7,280	--	73	--	--	91	--	99	99	100	100	SPWCM
June 28	8:20 p. m.	2,230	--	6,080	5,620	--	61	--	--	78	--	96	96	96	97	SPWCM
June 29	2:30 a. m.	3,410	--	6,280	11,900	--	--	--	--	85	--	100	--	--	--	PWCM
July 9	7:20 a. m.	1,140	--	6,690	6,170	--	58	--	76	--	--	98	99	99	100	SPWCM
July 11	12:05 a. m.	16,800	--	5,080	4,290	--	61	--	77	--	97	98	99	99	99	SPWCM
July 11	2:00 a. m.	17,100	--	4,530	4,100	--	--	--	77	--	98	99	99	99	100	SPWCM
July 11	5:45 a. m.	5,110	--	4,550	9,480	--	51	--	70	--	98	99	100	100	--	SPWCM

July 11, 1951	9:00 a. m.	13,000	--	6,310	3,440	--	58	--	74	--	98	99	100	100	SPWCM
July 11	4:30 p. m.	19,700	--	5,260	3,170	--	58	--	75	--	98	100	100	100	SPWCM
July 11	11:30 p. m.	27,900	--	6,520	6,950	--	64	--	82	--	98	99	99	100	SPWCM
July 12	5:30 p. m.	52,000	--	6,430	9,040	--	50	--	72	--	98	99	99	100	SPWCM
July 12	1:45 p. m.	46,800	--	5,520	4,070	--	52	--	72	--	98	99	100	--	SPWCM
July 12	3:55 p. m.	58,900	64	7,420	5,020	--	49	--	67	--	98	99	100	--	SPWCM
July 12	4:45 p. m.	73,000	--	8,430	7,570	--	45	--	65	--	99	99	100	--	SPWCM
July 13	4:15 a. m.	33,500	64	7,540	6,160	--	63	--	84	--	100	--	--	--	PWCM

KANSAS RIVER BASIN--Continued
SOLOMON 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 gaging station, which is 1 1/2 miles upstream from Lebanon Creek.

DRAINAGE AREA.--5,430 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1951.

Water temperatures: February 1949 to September 1951.

Sediment records: May 1948 to September 1951.

EXTRIMES, 1950-51.--Water temperatures: Maximum, 82°F Aug. 8; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 10,500 ppm Mar. 2; minimum daily, not determined.

EXTRIMES, 1948-51.--Water temperatures (1949-51): Maximum, 83°F June 25, 1950; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 15,100 ppm Aug. 6, 1948; minimum daily, 2 ppm Jan. 3, 4, 1950.

Sediment loads: Maximum daily, 980,000 tons July 13, 1951; minimum daily, less than 1 ton on Jan. 2-4, 1950.

REMARKS.--Flow affected by ice Dec. 7-10, 17-20, 27-30, Jan. 2 to Feb. 18, Mar. 8-20. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1210.

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH	Phenolic material as C ₆ H ₅ OH
														Parts per million	Tons per acre-foot	Calcium, mg./nesium	Non-carbonate				
Cet. 17, 1950.....	333	25	0.02	141	17	77		396	158	64	0.2	11	--	740	1.01	422	97	28	1,100	7.8	0.001
Nov. 1.....	264	25	.02	138	21	73		386	167	65	.3	8.7	--	--	--	431	114	27	1,060	8.0	.000
Dec. 5.....	226	17	.04	134	19	75		366	170	63	.4	12	--	798	.85	431	114	28	1,060	7.9	.000
Jan. 7, 1951.....	174	23	.04	151	16	82		391	190	71	.2	15	--	798	1.04	453	131	26	1,160	7.9	.000
Feb. 6.....	140	26	.10	155	22	93		432	191	81	.4	15	--	820	1.12	478	124	30	1,240	7.7	.000
Mar. 6.....	303	15	.04	83	11	41		200	118	33	.2	8.4	--	428	.58	252	88	26	649	7.4	.000
Apr. 3.....	210	21	.01	122	14	59		291	163	51	.5	11	--	632	.86	362	123	26	919	7.9	.000
Apr. 30.....	508	17	.02	105	17	46		268	150	37	.4	11	--	582	.76	330	118	23	815	7.7	.000
May 24.....	14,700	21	.05	147	5.2	13		168	23	4.5	.9	9.6	0.06	214	.29	139	31	17	318	7.6	--
June 6.....	1,420	18	.05	84	9.1	37		209	96	35	.3	9.6	.05	416	.57	247	76	25	633	7.5	.000
June 24.....	41,200	19	--	56	4.0	11		180	24	4.5	.3	8	.05	226	.31	156	8	14	339	7.5	--
July 10.....	1,840	20	.30	123	17	48		274	182	37	.3	16	--	658	.89	376	151	22	890	7.6	.000
July 13, 2:40 a.m.....	122,000	11	.02	42	2.2	8.7		134	16	3.0	.2	2.5	--	161	.22	114	7	14	257	7.5	--
July 13, 12:00 m.....	116,000	13	.15	38	3.9	8.5		127	19	3.0	.3	8	--	180	.22	111	4	14	251	7.6	--
Aug. 1.....	2,480	21	.02	88	12	38		236	121	33	.4	13	--	485	.66	295	72	22	720	7.5	.000
Sept. 4.....	2,680	17	.02	82	9.4	34		208	94	28	.4	9.7	--	397	.54	243	72	23	617	7.3	.000
Sept. 30.....	719	27	.04	148	20	70		364	194	61	.5	13	.11	762	1.04	450	162	25	1,100	7.8	--

KANSAS RIVER BASIN--Continued

SOLOMON RIVER AT BELOIT, KANS.--Continued

Temperature (°F) of water, water year October 1950 to September 1951
 /Once-daily temperature measurement between 7 a. m. and 10 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	56	35	32	32	34	40	65	70	72	76	77
2	60	53	35	32	32	35	45	68	66	70	80	--
3	56	50	32	32	32	32	45	65	65	70	78	69
4	53	42	35	32	32	32	45	65	67	72	76	a 68
5	56	46	32	32	32	34	43	68	67	70	78	65
6	57	47	32	32	32	32	44	60	62	72	78	68
7	56	46	32	32	32	34	42	59	65	70	80	70
8	56	48	32	32	32	32	44	62	68	72	82	66
9	55	45	32	32	32	32	42	65	68	--	77	68
10	60	40	32	32	32	35	42	61	70	70	78	66
11	59	38	34	32	32	32	42	60	68	70	74	70
12	59	38	35	32	32	32	40	63	68	--	76	68
13	62	36	37	32	a 32	32	44	63	68	--	76	67
14	62	42	40	32	32	32	45	64	66	--	72	65
15	65	46	40	32	32	32	--	64	70	69	76	64
16	63	42	35	32	32	32	45	64	70	72	78	61
17	64	42	32	32	32	32	43	66	70	74	76	60
18	66	42	32	32	32	32	45	66	70	75	74	62
19	64	41	32	32	32	32	53	67	72	78	74	63
20	61	37	32	32	32	32	55	70	70	78	76	65
21	60	38	32	32	32	38	48	68	68	79	74	62
22	55	40	32	32	32	36	46	68	70	74	72	60
23	53	35	32	32	32	36	50	68	70	76	70	60
24	51	32	40	32	32	36	55	67	a 71	74	70	58
25	56	32	38	32	35	34	54	65	a 74	75	72	57
26	54	35	32	32	40	46	52	70	72	78	74	62
27	55	35	32	32	36	42	56	70	72	78	75	56
28	55	35	32	32	35	44	60	70	70	78	74	54
29	57	32	32	32	--	34	67	70	68	78	77	57
30	55	35	32	32	--	34	64	70	68	76	78	62
31	60	--	37	32	--	36	--	70	--	77	80	--
Average	58	41	34	32	33	34	48	66	69	74	76	64

a Reading obtained between 1 p. m. and 4 p. m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

SOLOMON RIVER AT BELOIT, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment	
		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day
1-----	878	6,500	a 15,000	263	108	77	226		
2-----	1,930	9,500	4,950	262	134	95	240		
3-----	6,150	7,370	s 11,600	255	134	92	222	17	10
4-----	6,860	4,150	76,900	248	134	90	226		
5-----	1,740	4,400	sa 23,000	246	134	89	210		
6-----	845	1,800	4,110	245			140		
7-----	652	1,340	2,360	244			120		
8-----	550	840	1,250	254	85	56	180	79	34
9-----	472	550	701	244			180		
10-----	430	400	464	240			170		
11-----	395	371	396	234			187		
12-----	374	348	351	225			195		
13-----	360	272	264	219	77	47	203	72	40
14-----	350	249	235	224			212		
15-----	344	244	227	233			219		
16-----	336	220	200	218			225		
17-----	326	228	201	237			240		
18-----	318	214	184	244	65	40	230	64	39
19-----	311	200	168	228			210		
20-----	302	200	163	224			220		
21-----	295	193	154	231			219		
22-----	288	172	134	225			204		
23-----	285	188	145	219	46	27	214	72	42
24-----	286	195	150	216			222		
25-----	284	162	124	193			220		
26-----	285	141	108	179			226		
27-----	282	124	94	201			150		
28-----	280	114	86	210	43	24	140	59	28
29-----	281	104	79	209			170		
30-----	278	94	70	218			190		
31-----	274	84	62	--	--	--	197	46	24
Total--	27,041	--	143,930	6,888	--	1,413	6,207	--	989
Day	January			February			March		
	Mean dis- charge (cfs)	Mean concen- tration (ppm)	Tons per day	Mean dis- charge (cfs)	Mean concen- tration (ppm)	Tons per day	Mean dis- charge (cfs)	Mean concen- tration (ppm)	Tons per day
1-----	202	46	25	140	72	27	453	e 700	
2-----	200	46	25	140			832	10,500	23,600
3-----	170	124	57	130			558	6,700	10,100
4-----	150	124	50	130	55	20	777	6,400	13,400
5-----	160	134	58	130			574	5,400	8,370
6-----	150	144	58	140			286	2,600	2,010
7-----	150	144	58	140			244	870	573
8-----	140			150			220	450	267
9-----	150			150	100	41	200	330	178
10-----	170	145	61	150			170	278	128
11-----	150			170			170	244	112
12-----	170			180			130	254	89
13-----	160			120			100	161	43
14-----	170			120	88	35	130	215	75
15-----	180	128	60	150			160	247	107
16-----	180			160			190	226	116
17-----	180			170			200		
18-----	190			200			200		
19-----	210			206	60	32	210	199	113
20-----	230	86	44	201			220		
21-----	150			202			218		
22-----	170			215	63	36	202		
23-----	200			301	70	57	202		
24-----	190			304	105	86	197	152	81
25-----	180	65	33	288	105	82	193		
26-----	180			322	129	112	189		
27-----	200			343	203	188	180	127	62
28-----	130			311	173	145	182	149	73
29-----	110	72	27	--	--	--	183	118	58
30-----	150			--	--	--	384	2,200	a 2,300
31-----	160			--	--	--	370	2,600	a 2,600
Total--	5,282	--	1,429	5,363	--	1,373	8,524	--	65,931

e Estimated.

a Computed by subdividing day.

A Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

SOLOMON RIVER AT BELOIT, KANS.--Continued

Suspended sediment, water year October 1950 to September 1951--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	277	882	680	775	3,300	6,800	1,500	4,240	s 18,000
2-----	245	424	280	873	5,050	11,900	3,850	7,560	78,600
3-----	216	153	89	562	2,350	3,560	6,700	4,310	78,000
4-----	202	255	139	397	810	975	8,230	3,260	72,400
5-----	193	146	76	308	600	499	3,570	4,650	s 41,600
6-----	212	162	93	259	440	308	1,880	5,100	sa 27,000
7-----	234	250	a 160	231	296	185	6,020	5,220	s 78,200
8-----	376	650	a 650	222	223	134	13,100	3,380	120,000
9-----	305	500	a 420	250	146	98	22,200	2,780	167,000
10-----	281	281	213	222	114	68	19,300	2,830	147,000
11-----	261	179	126	200	120	65	13,400	2,700	97,700
12-----	244	124	82	187	99	50	7,580	3,020	s 58,800
13-----	262	100	71	204	52	29	4,630	5,290	66,100
14-----	234	101	64	226	49	30	4,500	4,430	53,800
15-----	220	83	49	318	170	146	3,910	3,560	37,600
16-----	212	77	44	574	1,000	a 1,500	4,160	5,100	a 57,000
17-----	200	82	44	824	2,800	sa 7,100	5,140	3,360	46,800
18-----	194	70	37	1,160	2,750	8,610	3,040	4,120	33,800
19-----	185	60	30	960	2,900	7,520	2,120	4,940	28,300
20-----	236	550	a 360	782	2,200	4,640	1,530	4,040	16,700
21-----	230	--	e 600	1,940	4,610	s 25,800	2,340	5,500	a 35,000
22-----	385	1,350	1,400	4,630	8,420	105,000	10,400	4,430	s 109,000
23-----	620	3,150	5,270	7,320	4,050	80,000	25,800	3,020	210,000
24-----	349	--	e 1,200	14,000	3,960	150,000	38,200	3,360	346,000
25-----	1,560	8,080	sa 36,000	12,000	2,980	96,600	27,900	2,920	220,000
26-----	1,090	6,800	19,800	6,450	2,740	s 44,700	14,200	3,280	s 114,000
27-----	984	4,000	19,600	3,420	19,400	8,140	2,240	2,240	55,300
28-----	508	4,000	5,480	1,450	2,640	10,300	7,030	3,020	57,300
29-----	454	1,500	1,840	1,180	2,100	6,690	7,110	2,910	55,800
30-----	397	1,020	1,090	1,170	2,100	a 6,600	9,880	3,290	87,600
31-----	--	--	--	1,180	2,480	7,900	--	--	--
Total--	11,356	--	95,967	62,954	--	607,307	288,360	--	2,614,400
Day	July			August			September		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1-----	9,740	2,360	62,100	2,500	3,130	s 22,200	912	700	1,720
2-----	6,210	2,100	s 33,100	2,230	1,400	8,430	952	1,350	3,470
3-----	3,010	3,280	26,700	2,000	1,050	5,670	952	2,800	7,200
4-----	2,180	2,250	13,100	1,770	1,230	5,680	2,580	4,760	s 34,600
5-----	1,890	1,500	7,650	1,610	1,010	4,390	6,340	3,640	62,300
6-----	2,400	2,400	a 16,000	1,480	820	3,280	9,990	3,230	87,100
7-----	1,820	2,320	11,400	1,410	730	2,780	9,370	2,700	68,300
8-----	1,500	1,820	7,370	1,410	660	2,510	5,520	3,080	s 42,900
9-----	1,520	1,700	a 7,000	1,350	650	2,370	3,790	4,650	47,600
10-----	2,500	--	e 28,000	1,300	600	2,100	5,200	3,090	43,400
11-----	11,200	3,420	s 98,500	1,370	760	2,810	4,250	2,620	30,100
12-----	72,200	--	e 620,000	2,380	1,710	11,000	2,220	2,460	14,700
13-----	113,000	--	e 980,000	3,240	3,810	33,300	1,610	1,720	7,480
14-----	67,000	3,200	a 580,000	4,550	4,500	55,300	1,400	1,300	4,910
15-----	25,400	2,740	188,000	5,720	3,980	61,500	1,260	970	3,300
16-----	12,500	2,200	74,200	7,520	2,890	58,700	1,080	800	2,330
17-----	9,160	1,570	38,800	5,260	3,480	s 46,400	1,000	610	1,650
18-----	6,820	1,610	30,100	2,120	3,620	20,700	920	490	1,220
19-----	5,510	2,080	30,900	1,940	2,800	a 12,000	920	460	1,140
20-----	4,410	1,950	23,200	1,830	3,100	15,300	920	420	1,040
21-----	3,450	1,680	15,600	1,710	1,960	9,050	845	390	890
22-----	4,050	4,100	44,800	1,200	1,500	4,860	845	360	821
23-----	4,990	2,560	34,500	1,140	860	2,650	775	350	732
24-----	7,210	2,180	42,400	1,070	700	2,020	775	510	1,070
25-----	8,580	2,570	59,500	1,070	650	1,880	775	380	795
26-----	7,380	2,470	49,200	1,110	660	1,980	775	390	816
27-----	5,220	2,200	31,000	1,070	710	2,050	775	380	795
28-----	3,390	2,610	23,900	1,110	810	2,430	740	340	679
29-----	3,620	--	e 43,000	1,160	760	2,380	705	320	609
30-----	5,310	3,460	49,600	1,030	740	2,060	705	260	495
31-----	3,980	3,780	s 38,500	912	810	2,240	--	--	--
Total--	417,230	--	3,306,120	65,172	--	410,220	68,901	--	474,162
Total discharge for year (cfs-days)									973,278
Total load for year (tons)									7,723,241

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

SOLOMON RIVER AT BELOIT, KANS.--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951

(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	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		0.350	0.500	1.000
Oct. 2, 1950	8:00 a.m.	880	60	11,800	5,760	--	71	--	95	--	100	--	--	--	SPWCM
Oct. 2	6:15 p.m.	3,310	60	8,610	6,010	--	60	--	79	--	100	--	--	--	SPWCM
Oct. 2	8:10 p.m.	3,880	60	9,560	7,460	--	60	--	79	--	100	--	--	--	SPWCM
Oct. 3	8:00 a.m.	5,550	56	7,620	5,410	--	71	--	88	--	100	--	--	--	SPWCM
Oct. 3	12:30 p.m.	6,190	58	6,320	3,610	--	80	--	94	--	100	--	--	--	SPWCM
Oct. 3	5:15 p.m.	6,690	56	5,560	3,640	--	82	--	93	--	100	--	--	--	FWCM
Oct. 4	8:15 a.m.	7,800	53	3,990	1,980	80	89	94	97	99	99	100	--	--	BWCM
Oct. 4	12:00 p.m.	7,410	54	3,860	1,970	73	83	88	92	96	98	99	100	--	BWCM
Oct. 4	5:00 p.m.	6,460	56	3,340	1,980	69	80	82	88	92	93	99	100	--	BWCM
Oct. 5	8:30 a.m.	3,970	56	5,400	3,710	--	81	--	95	--	100	--	--	--	FWCM
Mar. 2, 1951	8:30 a.m.	984	35	14,900	9,860	--	64	--	92	--	100	--	--	--	SPWCM
Mar. 2	12:45 p.m.	832	37	14,000	7,870	--	70	--	97	--	100	--	--	--	SPWCM
Mar. 6	6:40 a.m.	292	38	3,110	3,810	--	83	--	99	--	100	--	--	--	SPWCM
Mar. 23	8:15 a.m.	685	50	3,540	2,330	--	83	--	95	--	100	--	--	--	SPWCM
Apr. 25	8:30 a.m.	1,810	54	11,400	8,480	--	56	--	75	--	100	--	--	--	SPWCM
Apr. 25	12:30 p.m.	1,910	51	9,740	6,280	--	64	--	85	--	100	--	--	--	SPWCM
Apr. 25	5:15 p.m.	2,080	52	7,840	5,510	--	68	--	87	--	100	--	--	--	SPWCM
May 2	8:15 a.m.	8,928	68	5,840	4,100	--	66	--	88	--	100	--	--	--	SPWCM
May 22	1:00 p.m.	4,780	68	8,910	6,210	--	63	--	91	--	100	--	--	--	SPWCM
May 23	10:45 p.m.	9,870	65	3,880	2,650	--	84	--	94	--	100	--	--	--	SPWCM
May 24	9:20 a.m.	13,900	66	4,320	9,480	--	84	--	97	--	100	--	--	--	SPWCM
May 24	10:35 a.m.	14,300	--	4,240	6,210	--	84	--	95	--	100	--	--	--	SPWCM
May 24	1:00 p.m.	15,100	66	4,040	2,980	--	85	--	96	--	100	--	--	--	SPWCM
May 24	9:00 p.m.	15,800	65	3,940	3,170	--	86	--	95	--	100	--	--	--	SPWCM
June 7	7:30 a.m.	5,410	65	5,920	4,710	--	62	--	80	--	100	--	--	--	SPWCM
June 10	1:20 p.m.	18,600	71	2,760	1,620	--	92	--	100	--	--	--	--	--	SPWCM
June 14	3:40 p.m.	4,550	73	4,930	4,000	--	71	--	89	--	100	--	--	--	SPWCM
June 15	7:30 a.m.	3,900	70	3,900	2,580	--	69	--	87	--	100	--	--	--	SPWCM

June 16, 1951...	7:30 a.m.	3,930	70	4,290	2,520	--	72	--	--	90	--	100	--	SPWCM
June 17.....	8:00 a.m.	5,440	70	3,440	2,560	--	76	--	--	85	--	100	--	SPWCM
June 22.....	7:00 a.m.	7,470	70	5,200	3,440	--	65	--	--	82	--	99	100	SPWCM
June 23.....	10:30 a.m.	25,100	70	3,000	2,100	--	74	--	--	100	--	--	--	PWCM
June 23.....	5:10 p.m.	27,200	70	2,840	1,690	--	84	--	--	96	--	100	--	SPWCM
June 23.....	7:50 p.m.	30,900	--	3,200	2,130	--	76	--	--	90	--	100	--	SPWCM
June 23.....	9:00 p.m.	31,800	70	3,200	2,130	--	87	--	--	99	--	100	--	SPWCM
June 24.....	11:50 a.m.	39,900	--	3,470	2,130	--	80	--	--	96	--	100	--	PWCM
June 24.....	4:30 p.m.	41,100	--	3,510	2,780	--	83	--	--	96	--	100	--	SPWCM
June 29.....	1:00 p.m.	7,180	72	2,900	3,580	--	77	--	--	92	--	100	--	PWCM
June 30.....	4:45 p.m.	10,600	72	2,910	3,450	--	84	--	--	96	--	100	--	SPWCM
July 10.....	8:00 a.m.	1,820	70	2,480	1,710	--	69	--	--	86	--	100	--	SPWCM
July 11.....	8:30 a.m.	10,500	70	3,060	1,830	--	71	--	--	88	--	100	--	SPWCM
July 11.....	5:15 p.m.	11,700	72	2,580	1,980	--	72	--	--	89	--	100	--	SPWCM
July 15.....	4:25 p.m.	19,300	--	2,940	1,800	--	81	--	--	94	--	99	100	SPWCM
July 22.....	7:50 a.m.	3,980	74	5,110	3,460	--	38	--	--	77	--	99	100	SPWCM
July 22.....	1:30 p.m.	4,460	85	5,660	3,520	--	63	--	--	81	--	99	100	SPWCM
July 23.....	6:00 p.m.	4,450	--	4,220	2,770	--	82	--	--	81	--	98	100	SPWCM
July 25.....	7:30 a.m.	7,700	78	2,810	1,690	--	81	--	--	94	--	99	100	SPWCM
July 30.....	7:15 a.m.	5,190	76	3,760	2,560	--	87	--	--	84	--	99	100	SPWCM
July 30.....	5:20 p.m.	5,660	82	2,900	2,100	--	86	--	--	84	--	99	100	SPWCM
July 31.....	8:05 p.m.	3,250	--	5,340	4,460	57	65	75	83	96	99	100	--	SPWCM
July 31.....	8:05 p.m.	3,250	--	5,540	4,300	5	9	24	83	97	99	100	--	SPN
Aug. 16.....	12:15 p.m.	7,670	77	2,720	3,550	--	81	--	--	96	--	100	--	PWCM
Sept. 5.....	7:15 a.m.	5,610	65	3,970	5,070	--	63	--	--	83	--	99	100	SPWCM
Sept. 6.....	8:00 a.m.	9,920	68	3,320	2,820	--	80	--	--	94	--	99	99	SPWCM
Sept. 9.....	6:15 p.m.	4,130	73	4,660	6,710	--	49	--	--	68	--	100	--	SPWCM

KANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Instantaneous discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, mg.	Non-carbonate			
THOMPSON CREEK AT RIVERTON, NEBR.																					
Oct. 19, 1950	23	33	0.20	61	7.5	24		179	16	47	7.0	0.1	4.1	0.20	282	0.40	183	10	22	407	8.7
Feb. 15, 1951	24	22	.04	55	7.5	18		194	0	33	6.5	0	4.8	.01	282	.36	168	9	19	393	7.9
May 9	24	33	.02	61	6.1	20		202	0	38	7.5	.2	4.1	--	270	.37	177	11	19	405	8.2
Aug. 23	21	--	--	--	--	--	--	207	0	--	--	--	--	--	--	--	184	14	--	428	7.6
Sept. 27	24	--	--	--	--	--	--	209	0	--	--	--	--	--	--	--	188	17	--	431	7.8
REPUBLICAN RIVER AT MILFORD, KANS.																					
Jan. 4, 1951	480	25	0.04	92	19	54		301	13	94	36	0.6	4.9	0.00	504	0.69	306	38	28	771	8.4
Mar. 27	846	28	.04	70	19	50		287	0	80	38	.6	6.3	.41	458	.62	253	34	30	685	8.1
June 4	9,350	16	.02	48	7.8	19		182	0	28	19	.4	1.1	.10	238	.32	152	3	22	362	7.1
KANOPOLIS RESERVOIR NEAR KANOPOLIS, KANS.																					
Jan. 3, 1951	255,820	14	0.04	101	16	89		200	0	155	129	0.4	2.4	0.00	640	0.87	318	154	38	1,020	8.1
Apr. 28	254,200	9.5	.03	115	18	118		208	0	175	194	.7	2.7	.11	766	1.04	380	189	42	1,240	7.5
June 19	287,970	9.3	.03	55	7.1	39		117	0	66	59	.3	3.6	.05	314	.43	166	70	34	518	7.6
Aug. 17	319,000	16	.03	52	5.2	29		123	0	49	42	.3	2.1	.14	284	.39	151	50	29	440	8.2
SOLOMON RIVER AT MINNEAPOLIS, KANS.																					
July 13, 1951	155,000	10	0.02	33	2.3	7.8		102	0	16	4.0	0.2	3.9	0.04	144	0.20	92	8	16	220	8.1
SOLOMON RIVER NEAR BENNINGTON, KANS.																					
July 14, 1951	149,000	13	0.04	49	3.0	9.4		154	0	20	3.5	0.2	3.9	0.01	188	0.26	135	9	13	288	7.6
BIG BLUE RIVER NEAR CRETE, NEBR.																					
June 3, 1951	18,800	14	0.01	5.0	1.1	4.1		28	0	1.0	0.5	0.3	0.7	0.04	54	0.07	17	0	35	65.0	6.6
LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.																					
Dec. 27, 1950	103	24	0.10	79	2.2	49		246	0	45	44	0.2	2.1	0.01	372	0.51	206	4	31	615	7.5
Mar. 20, 1951	270	28	.20	62	8.1	32		220	0	32	29	.2	3.5	.00	316	.43	188	8	27	489	7.9
June 3	8,520	19	.08	16	1.5	8.3		62	0	9.0	1.5	.7	.06	.93	13	.46	46	0	28	127	6.9
June 12	1,560	17	.02	24	4.1	19		90	0	23	12	.4	4.6	.07	180	.22	77	3	35	225	7.5
Sept. 17	523	19	.02	44	7.2	26		157	0	32	21	.2	4.3	.08	284	.35	140	11	29	382	7.4

a Reservoir storage, in acre-feet.

KANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.

Apr. 11, 1951	0.1	35	(t)
Apr. 27	204	18,530	10,200
May 19	4	2,980	3.2
May 19	.4	674	.7
May 22	5.2	4,400	62
May 29	35	10,200	964
May 31	1,330	32,800	122,000
June 2	6	2,030	3.3
June 8	1,070	15,000	43,300
June 8	242	14,800	9,670
June 11	1.5	3,110	12
June 22	66	11,800	2,100
July 16	75	20,600	4,170
July 23	1.1	3,420	10
Aug. 27	6.5	4,520	79
Sept. 2	52	7,340	1,030
Sept. 2	12	5,280	171

MEDICINE CREEK BELOW HARRY STRUNK LAKE, NEBR.

June 20, 1951	290	29	23
June 20	290	24	19
June 23	630	25	42
July 2	295	36	29
July 20	256	20	14
July 24	218	20	12
Aug. 18	68	21	39
Sept. 4	a 145	15	5.9
Sept. 6	a 105	20	5.7

REPUBLICAN RIVER AT CAMBRIDGE, NEBR.

Dec. 22, 1950	297	806	646
Dec. 29	201	157	85
Jan. 3, 1951	264	776	553
Jan. 10	186	657	330
Jan. 17	a 274	494	365
Jan. 18	270	730	532
Feb. 5	a 167	120	54
Feb. 7	173	101	47
Feb. 14	134	79	29
Feb. 15	a 228	327	201
Feb. 21	527	2,160	3,070
Mar. 6	390	850	895
Mar. 8	402	1,400	1,520
Mar. 9	394	896	929
Mar. 10	339	1,050	961
Mar. 16	485	1,880	2,460
Mar. 22	328	808	716
Mar. 22	328	510	452
Mar. 29	317	411	352
Apr. 2	328	991	878
Apr. 6	378	766	782
Apr. 12	445	1,020	1,230
Apr. 19	240	456	295
Apr. 24	262	523	370
Apr. 26	317	477	408
May 2	378	1,730	1,770
May 9	214	738	426
May 11	214	783	452
May 29	778	3,020	6,340
June 1	846	5,740	13,100
June 5	746	2,360	4,750
June 16	963	1,550	4,030
June 20	918	2,360	5,850
June 20	900	3,660	8,890
June 21	819	1,330	2,940

t Less than 0.05 ton.

a Estimated discharge through spillway section.

KANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1950 to September 1951--Continued

Date	Instantaneous water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)

REPUBLICAN RIVER AT CAMBRIDGE, NEBR.--Continued			
June 29, 1951	1,070	3,500	10,100
July 24	1,090	8,060	23,700
July 30	402	627	681
Aug. 3	258	438	305
Aug. 6	378	2,140	2,180
Aug. 17	527	1,500	2,130
Aug. 20	302	1,570	1,280
Aug. 23	317	683	585
Aug. 31	222	475	285
Sept. 17	512	1,940	2,680
Sept. 21	445	942	1,130
Sept. 25	350	865	817
Sept. 27	328	686	808
Sept. 30	297	582	468

WOLF CREEK NEAR SYLVAN GROVE, KANS.			
Oct. 2, 1950	155	7,380	3,090
Oct. 2	32	1,120	97
Oct. 3	104	1,220	342
Oct. 6	6.7	276	5.0
Oct. 16	4.1	207	2.3
Oct. 20	4.0	208	2.2
Oct. 31	3.9	117	1.2

BIG BLUE RIVER NEAR CRETE, NEBR.			
June 2, 1951	20,400	7,470	411,000
June 3	18,900	3,710	189,000
June 20	2,520	2,070	14,100

LITTLE BLUE RIVER AT ANGUS, NEBR.			
June 11, 1951	158	1,100	469
June 22	1,500	8,060	32,600
June 28	6,090	6,610	142,000
July 5	202	264	144
July 25	147	271	108
Aug. 9	91	191	47
Aug. 22	97	200	52
Sept. 7	347	1,350	1,260
Sept. 17	116	257	80

LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.			
June 3, 1951	7,000	7,490	142,000
June 12	1,140	3,190	9,820
June 28	22,200	6,120	367,000
July 6	599	966	1,560
July 12	20,000	3,800	205,000
July 25	529	1,140	1,630
Aug. 8	284	670	514
Aug. 22	334	265	240
Sept. 6	1,840	3,210	15,900

KANSAS RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951
(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 of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.															
Apr. 27, 1951.....	11:30 a. m.	204		18,500	5,680	--	53	--	88	--	100	--			SPWCM
June 6.....	2:50 p. m.	1,070		15,000	6,680	--	42	--	67	--	96	100			SPWCM
June 8.....	4:50 p. m.	242		14,800	5,480	--	--	--	80	--	98	100			SPWCM
June 11.....	12:30 p. m.	1.5		3,110	3,270	--	98	--	100	--	--	--			PWCM
July 16.....	12:35 p. m.	75		20,600	10,800	30	42	55	67	84	99	100			SPWCM
July 18.....	12:35 p. m.	75		20,600	10,800	7	21	47	64	85	99	100			SPN
July 23.....	12:30 p. m.	1.1		3,420	2,310	--	98	--	98	--	100	--			PWCM
BIG BLUE RIVER NEAR CRETE, NEBR.															
June 2, 1951.....	6:25 p. m.	20,400		7,470	18,400		67		87		98	100			SPWCM
June 3.....	5:15 p. m.	18,900		3,710	6,030		84		96		100				SPWCM
LITTLE BLUE RIVER AT ANGUS, NEBR.															
Aug. 22, 1951.....	4:00 p. m.	97	69	200	764		74		91		97	99	100		SW
Sept. 17.....	12:50 p. m.	116		257							99	100			SPWCM
LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.															
June 3, 1951.....	9:00 a. m.	7,000	74	7,490	15,400		67		84		97	98	100		SPWCM
Aug. 22.....	12:15 p. m.	334		265							90	92	98	100	SW

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